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# CERAMICS FROM A LATE BRONZE AGE SALTERN ON THE COAST NEAR NETTUNO (ROME, ITALY)

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**ABSTRACT:** This article reports on the ceramics recovered at a Late Bronze Age site with evidence for salt production in *Latium Vetus*. This site, P13, on the coast between present-day Nettuno and Torre Astura in South Lazio (Italy), was excavated during two campaigns in 2001 and 2002 by the Groningen Institute of Archaeology. The focus of this article is a classification and catalogue of the ceramics found at the saltern. Approximately 45,000 sherds were recovered from a relatively small area. One trench contained about 10,500 sherds in 1.5 m<sup>3</sup> of soil. A selection of the most significant ceramics is presented in detail including a report on the main fabric groups.

**KEYWORDS:** Italy, Rome, *Latium Vetus*, Late Bronze Age ceramics, salt production, coastal resources.

## 1. INTRODUCTION

Following a preliminary campaign in the summer of 2000, the Groningen Institute of Archaeology (GIA) carried out archaeological fieldwork in the summers of 2001 and 2002 on various sites along the coast between Nettuno and Torre Astura (South Lazio, Italy) (fig. 1). Short notes on these campaigns appeared in Dutch as Attema *et al.* (2001b) and Attema *et al.* (2002), while a paper in Italian is forthcoming (Attema & Nijboer, forthcoming). An extensive English interim report on the fieldwork with colour illustrations was published in 2003 (Attema *et al.*, 2003). Work carried out during these campaigns comprised amongst others the excavation of a Late Bronze age site, recorded by the Italian archaeologist Fabio Piccarreta in the late seventies and listed by us as P13 (Piccarreta, 1977; fig. 2 for location). The present article concentrates on the finds recovered at P13 and includes a classification and catalogue of the ceramics found. Post-excavation work was carried out during the campaigns 2001 till 2003.

The excavation of site P13 revealed strata, largely in situ, containing concentrations of burnt tufa chunks and numerous sherds of mainly large red impasto containers. These strata did not contain any features and we probably deal with dump layers. We link these deposits to production activities involving the preparation of salt. In places the protohistorical strata were disturbed by Roman activities as the presence of some Roman amphorae sherds indicated. The latter were contained in a greasy black soil. The site as a whole has been severely eroded by the sea. Little is left of the former area of the original site and what did remain is probably limited to its northern slope. The site borders

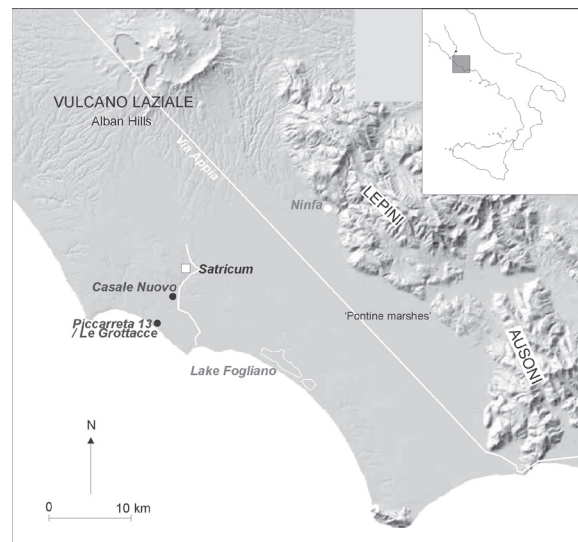


Fig. 1. Location of the fieldwork area within the Pontine Region on a shaded digital elevation model (inset: location of the Pontine Region within Italy).

on a small valley, now filled in with silty clays from which fresh water trickles onto the beach. From an archaeological point of view the site is significant, as it is the first Late Bronze Age site to be excavated on the shore of the South Latial coast.

## 2. LOCATION OF P13

Site P13 is situated on the younger dunes of the coast between Nettuno and Torre Astura in South Lazio on a sandy body consisting of so-called *sabbie rosse* in the lower part containing palaeolithic artefacts (fig. 1

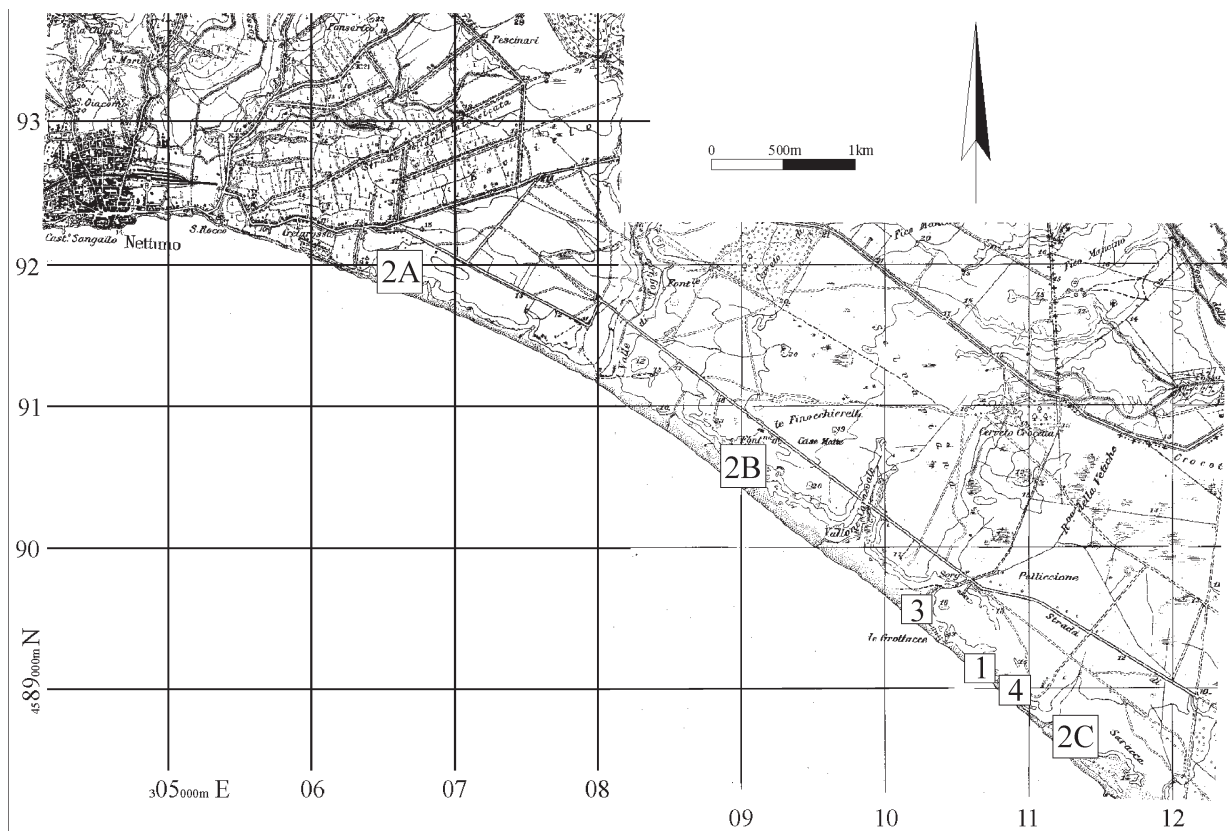


Fig. 2. Location of fieldwork areas 1 up to 4

1 = Late Bronze Age site P13 (Piccarreta, 1977: pp. 76-77); 2 = protohistorical exposures drawn and sampled between Nettuno and Torre Astura (2a: Depuratore (Alessandri, 2000/2001: p. 4), 2b: Carnevale (Piccarreta, 1977: p. 84, 2c: Bottego (Piccarreta, 1977: pp. 75-76); 3 = Le Grottace section (Piccarreta, 1977: pp. 76-84); 4 = kiln site at Bottego (Piccarreta, 1977: p. 76)

and 2; Attema *et al.*, 2003: pp. 112–113). On top of the *sabbie rosse* appear younger sands. The sandy body is eroded on three sides forming a small ‘promontory’, revealing strata with both protohistorical and Roman material (figs 3 and 4). Directly to the north, a silty clayey layer has been deposited by a former stream. The strata with sherds appear from this layer. To the south the strata with sherds merge into the sandy cliff that runs southward along the coast. The inclination of the strata excavated on P13 implies that the area under excavation is only a very small part of the northern slope of a much larger site which bordered on the fresh water stream and which is now largely eroded by the sea. It is generally accepted that since the Bronze Age the coastline has receded some metres due to various interlinked processes (Leoni & Dai Pra, 1977; pers. comm. A. Arnoldus-Huyzendveld). Nowadays marine erosion is increasing due to infrastructural projects (*cf.* Alessandri, 2000–2001: Tav. 10, fig. 3).

The hypothesis that the area north of the site bordered on a lower lying stream valley is also supported

by the presence of pits and pockets filled with amphora sherds and tuff stones (possibly remains of walls) on a much lower level than the protohistorical strata in the sandy body. Both Piccarreta’s and our own observations indicate that the whole area, including the stream valley, was intensively used in Roman times. The protohistorical site is also described by Alessandri where it appears as No. 18 and is referred to with the toponym Pellicione (Alessandri, 2000–2001).

Piccarreta describes this site in his publication of 1977 as “*molto estesa e densa*”. At the time, marine erosion had already exposed a stratum containing ceramic fragments along a length of about 200 m. According to Piccarreta the site stretched landinwards to a distance of about 50 m. The stratum had a thickness of 60 cm and the entire section had a height of 2.5 m (Piccarreta, 1977: p. 76). The ceramics were described as having been made of brown impasto and belonging mostly to large *dolii* and *olle* with notched cord decorations. He noted explicitly that no thin impasto was present. Regarding the date of the ceramics,

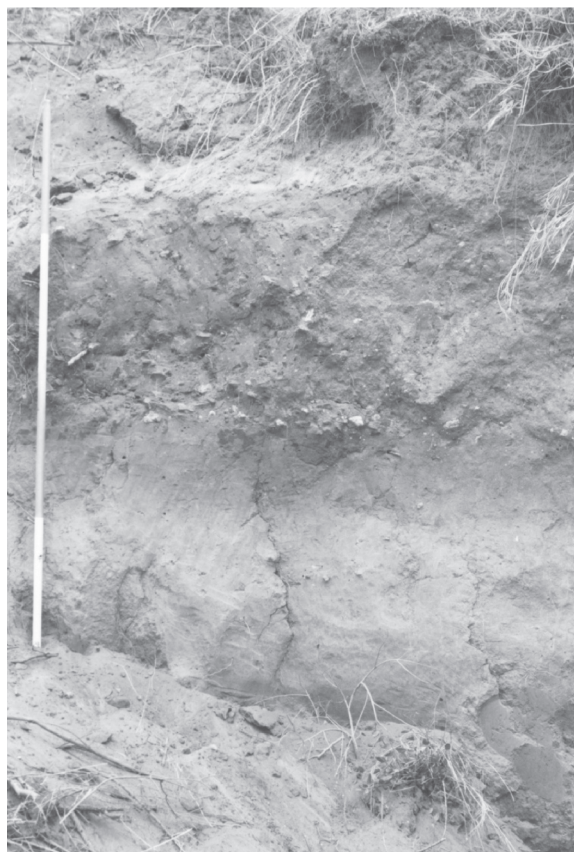


Fig. 3a. Site P13 before excavation from south-east  
 Fig. 3b. Site P13 before excavation from south-west  
 Fig. 3c. P13 during excavation  
 Fig. 3d. P13 during excavation

Fig. 4. Detail of stratigraphy south main section of promontory showing protohistorical layers

Piccarreta mentions that “*pur non essendo i frammenti esattamente databili*” the finds in general can be attributed to the early Iron age (prima Età del Ferro). His interpretation of site 13 was “*un insediamento stabile*”, meaning that we would deal with a permanent settlement. Excavation of P13 proved, however, that we may propose both a different dating and functional interpretation.

### 3. THE EXCAVATION OF P13

Work on the site began in 2001 by cleaning and drawing the sections exposed by the sea. On the site itself a grid was laid out and five trenches were measured in, the objective being to relate the strata visible in

Table 1. Ratio protohistorical impasto and Roman potsherds in trenches A-H from the 2001 and 2002 campaigns.

| trench | m <sup>3</sup> soil | N total | N/m <sup>3</sup> | N Roman pottery | N impasto | % Roman pottery |
|--------|---------------------|---------|------------------|-----------------|-----------|-----------------|
| A      | 2.5                 | 2218    | 887              | 24              | 2194      | 1               |
| B      | 4.5                 | 2445    | 543              | 25              | 2420      | 1               |
| C      | 3.1                 | 5414    | 1746             | 807             | 4607      | 15              |
| D      | 1.7                 | 10597   | 6234             | 48              | 10549     | 0               |
| D1     | 0.4                 | 203     | 508              | 6               | 197       | 3               |
| E      | 3.3                 | 3146    | 953              | 26              | 3120      | 1               |
| F      | 1.4                 | 5186    | 3704             | 43              | 5143      | 1               |
| G      | 3.3                 | 11179   | 3388             | 84              | 11095     | 1               |
| H      | 2.9                 | 3980    | 1372             | 27              | 3953      | 1               |
| Stray  | -                   | 654     |                  | 3               | 651       | 0               |
| Total  | 23.1                | 45022   |                  | 1093            | 43929     |                 |
| Median |                     |         | 2149.4           |                 |           | 2.4             |

the section to possible features in the subsoil of the site and to interpret and date these. The trenches were numbered A to E. During the 2002 campaign three trenches were added: F, G and H. Figure 5 shows the plan of the site with the location of trenches A–H indicated. Especially the closely packed sherds in Trench D are noteworthy (fig. 6). The numbering of the sherds in the catalogue marks their location in the excavation, the trench and the layer/spit from which they derive. A sherd with inventory number P13D.S4.L3/43 (or P13D4.3/43), for example, derives from the site P13, trench D, spit 4 of layer 3 and it is the 43<sup>rd</sup> sherd numbered from this layer. In general soil was

removed in spits of about 5 cm thickness.

Study of the provenance of the finds from the various strata revealed that mixed finds of protohistorical and Roman pottery occur in all trenches and layers. Table 1 gives an overview of the ratio protohistorical and Roman sherds in the excavated trenches. Trench C had the highest number of Roman pottery by far. These were contained in a humid black sandy soil, meaning that the protohistorical context is locally disturbed. For a description of the trenches and layers we refer to Attema *et al.* (2003).

Origin and composition of the protohistorical deposit at P13 are interpreted by us as various dumps

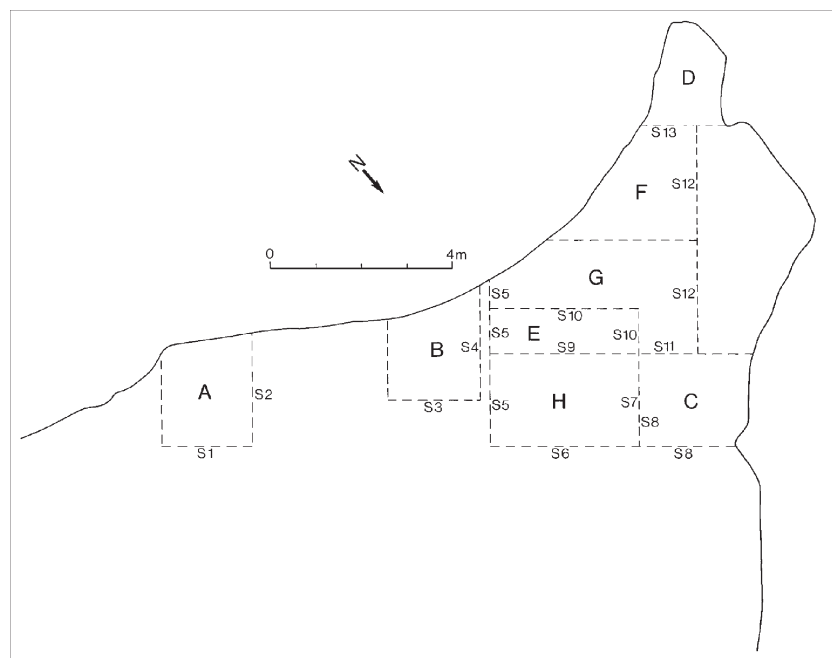


Fig. 5. Plan of the site with location of trenches A to H with internal sections indicated.

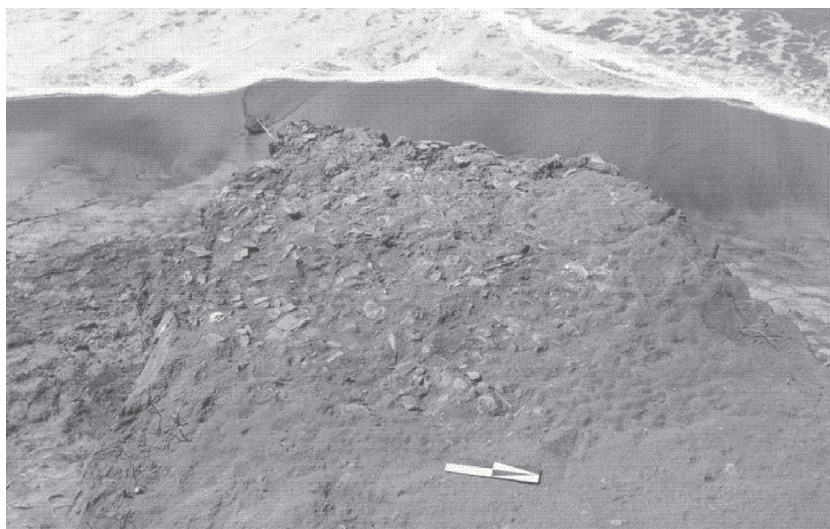


Fig. 6. Photograph of sherd concentration in trench D layer 2/3

in the dune sand and considered to have been related to activities taking place during the Late Bronze Age. The sheer number and size of the protohistorical sherds, the old fractures, the good preservation of the ceramics (hardly any abrasion) and the fact that it was possible to refit a substantial number of the sherds recovered, indicates that in situ protohistorical features cannot have been far removed from the spot where they were dumped. The protohistorical assemblage is characterized by an association of sherds of large jars (*pentole*) and often burnt tufa chunks with worked sides. That we do not deal with settlement debris is clear from the very limited number of table ware fragments (*tazze* for example) and the limited number of bones. As a result of a not yet understood post-depositional process, occasionally Roman sherds intruded in the deposits of protohistorical origin. The intrusion of a few Roman sherds may perhaps be attributed to the planting of shrubs.

The study of the stratigraphy at P13 has resulted in the identification of a number of superimposed layers containing potsherds dating mainly to the Late Bronze Age of which layer 3 was identified as an undisturbed, in situ layer of protohistorical date. However, no specific features were found that point to an activity in situ. The appearance of the layer is rather to be interpreted as a dump related to nearby activities and resulted from the preparation of salt and/or fish as will be suggested below. The salterns and possibly other activity areas were located in the vicinity of the dune which we have excavated and are probably totally eroded by the sea. There is evidence that P13 was one of many of such activity areas, as comparable deposits were found nearby.

Along the coast between Nettuno and Astura a

number of other deposits of protohistorical origin are exposed by marine erosion. A number of these were, like P13, first mapped by Fabio Piccarreta in the 1970s. In a recent thesis this coastal area was investigated in more detail by the Italian protohistorian L. Alessandri in 1999–2000 extending the research area to the whole coastal stretch between Ostia and Terracina and further south up to the Garigliano. Alessandri was able to give more accurate datings to the sherd material and made important observations that are helpful in the interpretation of the deposits (Alessandri, 2000–2001; forthcoming). Of the sites reported by Alessandri, the Groningen Institute of Archaeology investigated in 2002 a section known as Depuratore on the shore near Nettuno in more detail. Like P13, this section had thick layers of protohistorical pottery. This site as well appears to be related to industrial activities dating mainly to the Iron Age (Attema *et al.*, 2003; Tol, 2005, internal report). The Depuratore site will be published separately. We will now turn to a discussion of the classification of the P13 ceramics.

#### 4. REPORT OF THE FINDS

The catalogue of ceramics excavated at P13 is presented in vessel classes. In the classification a basic distinction is made between open and closed vessel. An open vessel has its maximum diameter at the lip. A closed vessel has its maximum diameter somewhere between the rim and base. Diagnostic forms concern rims, bases, cord decorations, lugs and handles. The typology lists the following aspects: Class, Type, Provenience (trench/spit/layer), Date and Type parallels. As far as possible the Italian equivalent of the

vessel class is given as well. A typology was made since so many sherds were similar, especially those pertaining to (large) jars. Small sherds were placed in the typology if possible. Reconstructed fragments of jars often demonstrated that the lip form within one vessel varied, for example, from convex, bevelled to flattened. Therefore, lip forms could not be a defining characteristic of a type of jar. Sherds that could not be attributed are presented as miscellaneous.

### CLASS I STORAGE JARS/PENTOLE

Diameter lip is larger than 30 cm.

**Type I.1:** troncoconical storage jar with straight rim often with plain or notched cord and lugs at transition rim to shoulder. Varieties of lips: convex, flattened, bevelled on the outside, pointed or (slightly) thickening on the outside. Open vessel.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 211, no. 687; p. 221, no. 485; p. 236, no. 247 and p. 252, no. 048.

Alessandri, 2000–2001: p. 21, fig. 2.8 (Ostia Antica Collettore; Conti, 1982); p. 26, fig. 2.1 (Fosso della Bottaccia; Angle, 1996a); p. 44, fig. 2.5 (Saracca); pp. 54–55, fig. 6.3 (Fosso Moscarello); pp. 68–69, fig. 2.1 (Monte d'Argento; Guidi, 1991).

**Type I.2:** probably cylindro-ovoidal body with (slightly) outcurved rim and on the inside a smooth transition from shoulder to rim. Often with plain or notched cord and lugs at transition shoulder to rim. Varieties of lips: convex or flattened. Closed vessel.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 218, no. 638 and p. 222, no. 499.

Alessandri, 2000–2001: p. 21, fig. 2.1 (Ostia Antica Collettore; Conti, 1982); pp. 54–55, fig. 6,6/21 (Fosso Moscarello).

**Type I.3:** cylindro-ovoidal body with slightly incurved shoulder/rim with often plain or notched cord and lugs at transition shoulder to rim. Varieties of lips: convex, pointed, bevelled on the inside or flattened. Closed vessel.

Transition from type 1 to 3 is gradual in repertoire due to some rims, which are only slightly incurving. Some rimfragments are too small to establish their typology.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 201, no. 829; p. 210, no. 727; p. 221, no. 487 and p. 222, no. 486.

Alessandri, 2000–2001: p. 20, fig. 3.73 (Ficana: Malmgren, 1981); pp. 54–55, fig. 6.10/11/14 (Fossa Moscarello); pp. 58–59, fig. 4/2 (Torre Paola) e confronti; pp. 68–69, fig. 2.22 (Monte d'Argento; Guidi, 1991).

**Type I.4:** probably cylindro-ovoidal body with outturning rim (sometimes outcurved) with angular transition rim to shoulder. Varieties of lips: convex, pointed, flattened. Closed vessel.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 231, no. 218 and p. 252, no. 036.

Alessandri, 2000–2001: p. 46, US147 (Casale Nuove: Angle *et al.*, 1992; 1993; Angle, 1996); pp. 50–51, fig. 5/2 (Borgo Sabotino); pp. 54–55, fig. 6,6,12,19 (Fosso Moscarello; some of the parallels are listed as jars).

### CLASS II JARS/OLLE/VASI

Diameter is smaller than 30 cm.

Most of the jar types are smaller versions of the storage jar types I.2, I.3, I.4.

**Type II.1:** probably cylindro-ovoidal body with (slightly) outcurved rim and on the inside a smooth transition from shoulder to rim. Often with plain cord at transition shoulder to rim. Varieties of lips: convex or flattened. Closed vessel.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 201, no. 831; p. 211, no. 713, 737; p. 212, no. 731; p. 218, no. 635; p. 236, no. 227, no. 230 and p. 256, no. 0236.

Alessandri, 2000–2001: pp. 54–55, fig. 6,6/21 (Fosso Moscarello). Gocchi Gennick, 1999: p. 420, fig. 14.4

**Type II.2:** cylindro-ovoidal body with slightly incurved shoulder/rim with notched cord and lug at transition shoulder to rim. Convex or flattened lip. Closed vessel.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 211, no. 726 and p. 233, no. 235

Alessandri, 2000–2001: p. 46, US 141 (Casale Nuovo: Angle *et al.*, 1992; 1993; Angle, 1996); pp. 54–55, fig. 6.9 (Fosso Moscarello); pp. 58–59, fig. 4/2 (Fosso della Cavatella: Pascucci, 1996) e confronti; pp. 68–69, fig. 2.22 (Monte d'Argento; Guidi, 1991).

**Type II.3:** probably cylindro-ovoidal/globular body with outcurving/outturning rim and convex lip, occasionally thickening on the outside. Closed vessel.

LATE BRONZE AGE – EIA

Cassano *et al.*, 1978: p. 211, no. 707; p. 212, no. 697; p. 218, no. 631; p. 221, no. 450; p. 224, no. 454 and p. 233, no. 138

Alessandri, 2000–2001: p. 20, fig. 3/66 (Ficana: Malmgren, 1981); p. 46, US112 (Casale Nuovo: Angle *et al.*, 1992; 1993; Angle, 1996); p. 54–55, fig. 6,12,21 (Fosso Moscarello). Dolfini, 2002: Tav. 57, no. 557. Fratini, 1997a: Tav. XVIII, no. 3. Belardelli, 2004: Tav. XLVI, no. 4.

### CLASS III BOWLS/SCODELLE/CIOTOLE

**Type III.1:** carenated bowl. Low conical body, smoothly curved carena, short steep shoulder, slightly outcurving rim with convex lip occasionally thickening on the outside. Open vessel.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 206, no. 666.

Cocchi Genick, 1999: p. 408, fig. 4.2; see also p. 381, fig. 6.4 (Bronzo Recente).

Alessandri, 2000–2001: p. 20, fig. 3.64 (Ficana: Malmgren, 1981); p. 46, US 141 (upper drawing; Casale Nuovo: Angle *et al.*, 1992; 1993; Angle, 1996).

**Type III.2:** oblique or spreading wall/rim, largest diameter at the rim. Varieties of lips: convex, flattened or thickening on the outside.

*This vessel type may also have been used as a lid because there are no bowls in Cassano et al. 1978 similar to III.2. Type III.2 may often have had double function, lid and bowl.*

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 201, no. 844.

Cocchi Genick, 1999: p.406, fig. 2.8

Alessandri, 2000/2001: p. 59, Torre Paola, fig. 4.1.

**Type III.3:** flaring wall, slightly curved or straight rim. Varieties of lips: flattened, thickening on the outside or convex. Open vessel.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 252, no. 047; see however period 1, p. 196, no. 891

Variation Type III.3a slightly incurving wall and rim (P13B.S7/17). Closed vessel.

#### CLASS IV LARGE BOWLS

**Type IV.1:** wide rounded body, straight vertical rim, sharp internal angle on transition shoulder to rim. Irregular notched cord decoration and lug on transition shoulder to rim.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 201, no. 830.

#### CLASS V CUPS/TAZZE/COPPE

**Type V.1:** deep conical body, smoothly incurved shoulder, outcurving rim, convex lip, decorated with horizontal band with oblique ridges along widest part of the body. Closed vessel.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 219, no. 414; p. 227, no. 34 and p. 248, no. 018.

Alessandri, 2000–2001: p. 46, US 11 (Casale Nuovo: Angle *et al.*, 1992; 1993; Angle, 1996).

**Type V.2:** convex shoulder, short conical neck with outturning rim and convex lip. Angular transition neck to shoulder on in- and outside (*a collo distinto*). Closed vessel.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 219, possibly no. 421 and no. 406.

Alessandri, 2000–2001: p. 35 (Anzio; fig. 3 Jar but with longer neck

(Bronzo Finale): Bergonzi, 1976: see also Anzio jar in fig. 6: De Meis, 1984).

|                   |                  |
|-------------------|------------------|
| <b>CLASS VI</b>   | COOKING STAND    |
| <b>CLASS VII</b>  | BASES            |
| <b>CLASS VIII</b> | CORD DECORATIONS |
| <b>CLASS IX</b>   | LUGS             |
| <b>CLASS X</b>    | HANDLES          |

The bulk of the excavated sherds consists of large jars, which are difficult to date because they are of generic type (*cf.* the storage jars and jars in: Alessandri, 2000–2001; Mandolesi, 1999: p. 174; Cassano *et al.*, 1978; Damiani *et al.*, 1998: Tomb 2). The excavated storage jars/pentole as such can be dated to the Late Bronze Age as well as to the Early Iron Age. Most of the storage jars are coarsely made, which accounts for the varieties of lips within the types. The lip of a jar could vary from convex to flattened, to bevelled. The majority of the jar types are smaller versions of the storage jar types I.2, I.3 and I.4 and as such can neither be dated exactly.

The few drinking vessels (bowls and cups) excavated at the site have some type parallels from nearby Casale Nuovo. Bowl type III.1 and cup type V.1 are for instance also known from Casale Nuovo context US 141 and context US 11 (Angle *et al.*, 1992; 1993). Type III.1 has type parallels from Bronzo Recente to Bronzo Finale while type V.1 can be dated to the early stages of the Final Bronze Age.

In 2002 one worn sherd of depurated clay with slip decoration was recovered at P13 (fig. 7; catalogue entry 126): P13F5.3/1 under bowl miscellaneous. It might be a fragment of an Italo-Mycenean bowl due to the context in which it was found and the lack of exact parallels from Mycenaean contexts (Mountjoy,

Fig. 7. Photograph of probably an Italian-Mycenean sherd



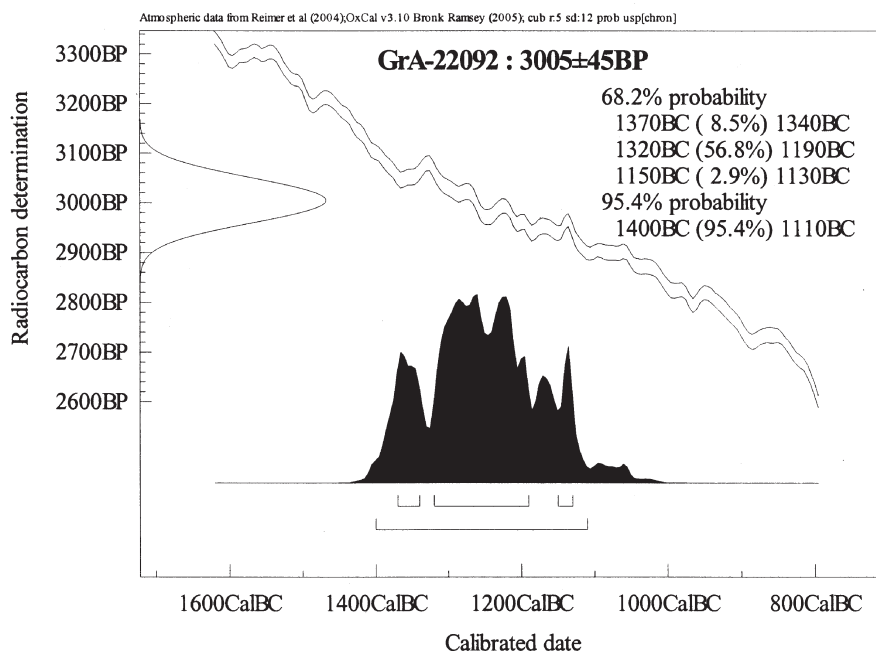
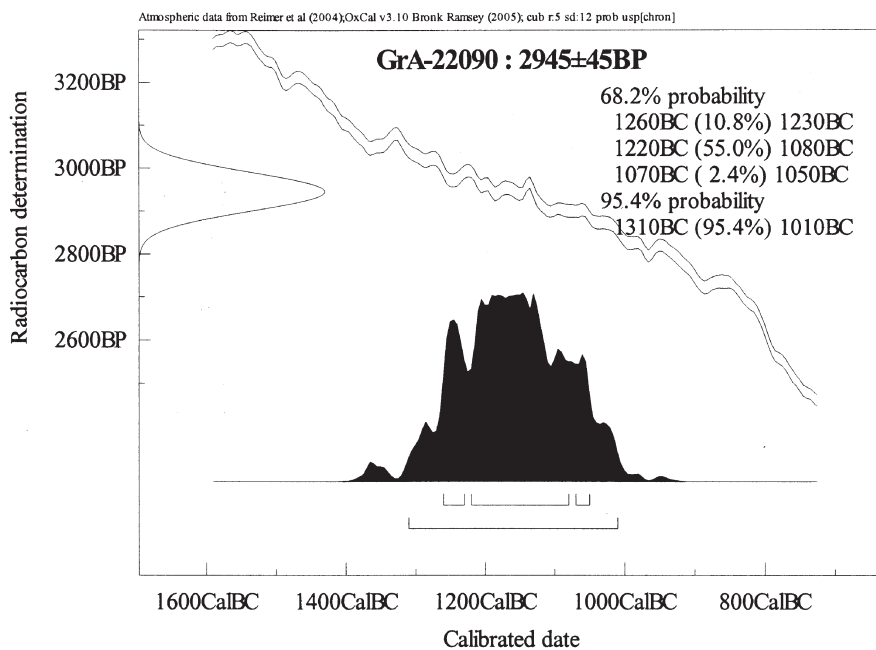
0 4cm



Table 2. Radiocarbon dates and Oxcal calibrations referring to samples taken from Pic13 (Nettuno).

| Sample                 | Material | Laboratory no. | 14C (BP) | $\delta^{13}C$ (‰) | %C   | Calibrated age BC (1 $\sigma$ ) | Calibrated age BC (2 $\sigma$ ) |
|------------------------|----------|----------------|----------|--------------------|------|---------------------------------|---------------------------------|
| <i>Late Bronze Age</i> |          |                |          |                    |      |                                 |                                 |
| Nettuno, P13           | collagen | GrA-22092      | 3005±45  | -19.10             | 15.0 | 1370–1130                       | 1400–1110                       |
| Nettuno, P13           | collagen | GrA-22090      | 2945±45  | -19.53             | 23.3 | 1260–1050                       | 1310–1010                       |

\* On account of the  $\delta^{13}C$ (‰) and %C values, these radiocarbon results cannot be qualified as high quality results. GrA-22090 is taken from P13 F.s9.14 and GrA22092 is taken from P13 F.s10.14.



1999; Bettelli, 2002). Close type parallels of this sherd have not been found though as a bowl it is somewhat comparable to Italo-Mycenean and gray-ware bowls found at Broglio di Trebisacce (Bettelli, 2002: p. 203, no. 29; Belardelli, 1994; Vagnetti & Panichelli, 1994). The Italo-Mycenean sherd from P13 could well be a local product. In 2002 Prof. Vagnetti and Dr Bettelli were so kind to inspect the sherd. They could not assign it on account of its poor diagnostics. The fabric contains some inclusions that can also be found in the vicinity of the site P13. The shallow horizontal groove on the outside just underneath the lip is atypical for Mycenean and Italo-Mycenean bowls but is one of the features of the impasto bowls type III.5 (see catalogue entry 126).

Considering the coarse character of the vast majority of the ceramics recovered, two sherds stand out on account of their careful manufacture: the above mentioned P13F5.3/1, *i.e.* the fragment of a bowl that we have classified as Italo-Mycenean (under bowl miscellaneous; catalogue entry 126) and the fine black cup P13D.S5.L2/11–14 (under Cups type V.1; catalogue entry 137). Both sherds have a fabric that contains hardly any visible inclusions and need therefore be classified as fine pastes. As such they are an anomaly within the repertoire excavated at P13 and can be considered as remnants of a fine ware tradition that is more apparent in other Italian regions. Italo-Mycenean ceramics were made in Southern Italy and possibly in the lower Po Valley at Frattesina during the Late Bronze Age (Jones *et al.*, 2002). No production centre of fine wares during this period has so far been discerned in Southern Lazio though the excavators of Casale Nuovo have speculated on the existence of such a production centre at the site (Angle & Zarattini, 1987; Angle *et al.*, 1992; Angle *et al.*, 1993; Loney, 2000; Mater, 2005: pp. 96–97).

The uncommon fabric of the fine black cup P13D.S5.L2/11–14 (under Cups type V.1; catalogue entry 137) resembles somewhat the account of a few sherds recovered at Torre Mordillo in Southern Italy. These three sherds are listed as *ceramica tornita a pasta grigia con superficie nera* and are dated to the final phases of the *Bronzo Recente* period (Vagnetti, 2001: pp. 329–330). It is however unlikely that P13D.S5.L2/11–14 is formed on a wheel.

In general close type parallels of the pottery excavated at P13 are found at Ficana (Malmgren, 2001) and at Torrioraccio Period 1, 2, 3 and 4 (Cassano *et al.*, 1978). This site in the Agro Tarquinese was recently dated by Pacciarelli to *Bronzo Recente* – *Bronzo Finale* 3, in absolute years according to him from 1325/1300 – 950/925 BC (Pacciarelli, 2000: pp. 68,

95–107). The complete lack of incised decorations at P13 also on the thousands of wall fragments not catalogued can have a chronological significance since these decorations are more common in the *Bronzo Finale* than in the *Bronzo Recente* period.

At this stage of research we date P13 on account of the excavated pottery to the Late Bronze Age. The characteristics of the sherds (not worn and large fragments that could partly be reconstructed; see for example cup 5.1; catalogue entry 137) and of the context (high concentration of sherds in a relatively small area) indicates that the deposit at P13 is formed in a relatively short period. Two radiocarbon samples from animal bones found at P13 in the lower levels of trench F (spits 9 and 10) date the context to the 14<sup>th</sup> – 11<sup>th</sup> century BC (table 2).

Interpretation of the calibration of the <sup>14</sup>C dates in combination with the associated pottery makes an absolute date for P13 around the 12<sup>th</sup> century BC likely, which implies a context that can be assigned to the early stages of the Italian *Bronzo Finale* period.

## 5. SALT PRODUCTION

A direct parallel for P13 is provided by a specific protohistorical context in a district called Le Saline on the coast of South Etruria at a distance of c. 9 km from the ancient site of Tarquinia. The context is described as an organic stratum with an extension of c. 10 m “*contenente esclusivamente resti di grandi contenitori di impasto rosso-bruno*”. The large containers are described as consisting “*in gran parte da olle e doli di medie e grandi proporzioni, realizzate probabilmente in loco con un caratteristico impasto di colorazione rosso-bruno, a volte decorati con cordoni plastici sul corpo o sotto l’orlo*” (Mandolesi, 1999: p. 174). Like at P13, table ware is almost absent in the artefact assemblage of this context and there is no mention of settlement debris in the form of bones, seeds or building remains. The site is part of a series of exposures of protohistorical strata in an area of about 60 ha, which are generically dated to the Villanovan period (Mandolesi, 1999: p. 174). These strata are found both on the coast and more inland. A second context furnishing a direct parallel comes from Scolo dei Prati in the same area. In località Fontanile delle Serpi, during cleaning of the canal, a stratum became visible that contained again “*quasi esclusivamente resti pertinenti a grande contenitori assegnabili tipologicamente alla Tarda Età del Bronzo e, al massimo più tardi, alla Prima Età del Ferro*”. Also at this site hardly any tableware was recovered and there is no mention of associated

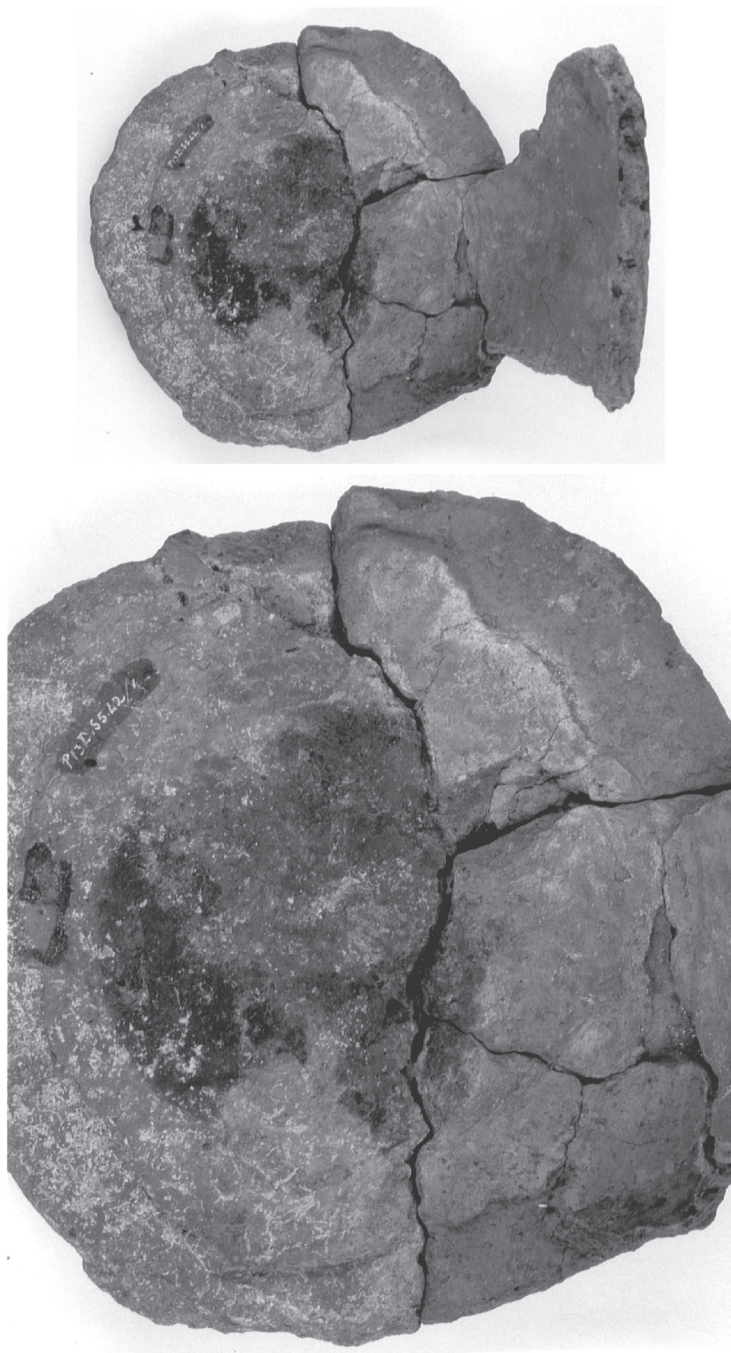


Fig. 8. Photograph of “salt colours” on base P13 D.s.12/1 (for colour photograph see Attema *et al.* 2003, fig. 12).

settlement debris (Mandolesi, 1996: p. 56). Scolo dei Prati may represent “*il primo approccio verso la costa di una rinnovata comunità tarquiniese che andava lentamente radicandosi, tra Bronzo Finale e Primo Ferro, sul territorio di pertinenza*” and is seen as part of a series of minor sites with specific functions for the control and exploitation of resources (exploitation of

the lagoonal environment for salt and fish). Towards the end of the Bronze Age, Mandolesi postulates also resident sites in the coastal area towards the inland “*a ridosso del litorale*”. Mandolesi interprets the coastal sites in close relationship with the developments at Tarquinia itself: “*Significativo è il fatto che il processo di appropriazione della costa avviene in concomi-*

*tanza con il primo intenso sviluppo dell'insediamento proto-urbano della Civita*" (Mandolesi, 1996: p. 57). On account of the present evidence Mandolesi postulates the growth of a complex settlement system in the early Iron Age with Tarquinia at its centre.

The nature of the site P13 and its associated ceramics do mark a semi-permanent settlement (relation to the sea; closely packed, substantial, well preserved sherds of large vessels; fragments fit and bases/rims could be reconstructed; a majority of crudely made storage jars; traces of burning etc.). The limited range of ceramic types of the vast majority of sherds collected and the complete lack of incised decorations also on the thousands of wall fragments not catalogued, indicate that most of the pottery was produced for a specific purpose. Some of the base fragments had particular colours, which have been labelled "salt colours" (Lane, 2001: p. 41; Crosby, 2001: pp. 410–412). Some containers from P13 display a range of pinks, whites, grays and lavender on the inner surface possibly caused by direct contact with brine (water saturated or nearly so with salt) under moderately high temperatures. Base fragment P13D.s5.12/1 illustrated in figure 8, exhibits the following discolourations weak red (10R 4/2, 4/3, 5/3), pale yellow (2.5 Y 8/2), black (2.5 Y 2.5/1: Munsell, 1994), pale red (10R 6/2), pale pink (5 RP 8/2) to grayish red purple (5 RP 4/2: Rock-color chart, Munsell, 1963). The explanation for the appearance of these colours on ceramics while producing salt is unclear though Matson obtained comparable colours while firing salt-containing clays (Matson, 1971). Nevertheless these characteristic colours do occur only occasionally on vessels, which have been used for the manufacture of salt. Crosby describes the salt making evidence from the Bourne-Morton Canal (Lincolnshire, England) from the Late Iron Age to the Pre- and Early Roman Period and states that five container sherds (from a total of 117) "exhibit pinkish or lavender 'salt colours' on the inner surface" (Crosby, 2001a: p. 293).

Another indication for the interpretation of P13 as a saltern is the composition of different types of ceramics recovered. "Briquetage" is taken to mean the ceramic equipment (containers, supports etc.) as well as the fragmented debris of hearths/ovens used in the processing of sea salt (Lane & Morris, 2001: p. 8; Crosby, 2001b). The composition of the briquetage from several salterns is marked by the predominance of large containers for the boiling of brine in order to produce salt crystals (*cf.* Lane & Morris, 2001: p. 252; Chowne *et al.*, 2001; Daire, 1994). A comparable predominance of large containers is found at P13.

A reconstruction of P13 as a salt producing site

would involve the processing and manufacture of salt from tidal sources. The tide would fill man made basins slightly towards the interior, which could be closed off from intruding seawater. Under influence of wind and sun the salt concentration of the seawater in the basin would increase due to evaporation of the water. Salt will crystallise once the water is saturated with salts. The process of salt winning often involved in prehistoric times artificial evaporation of water in containers above fires in order to produce salt crystals (Gouletquer *et al.*, 1994: pp. 123–161). Whether this process took place at P13 is hypothetical since structural features have not been excavated though burnt fragments of *tufa*, which might have been used as supports for the containers, were found frequently at P13. The evidence strongly points to the exploitation of sea resources while using fire and large containers. Other options for activities around P13 could be the boiling of food in seawater for the necessary human salt consumption or the production of preserved fish and processed fish products.

Several fishponds have been recorded in Roman times along this stretch of coast (Higginbotham, 1997). No hard evidence such as fishbones was recovered but the exploitation of the fish resources around P13 seems likely also in protohistory. The importance of salt for both humans and animals can not be stressed enough but will not be covered in this article. An acclaimed introduction to the topic was published in 2002 (Kurlansky, 2002).

There are several other protohistoric sites along the west coast of Italy associated with salt production. Well known are the salt-beds at the river mouth of the Tiber which were connected through Rome to the Sabine and Umbrian hinterland by the Via Salaria, a road in use from the Bronze Age onwards (Giovannini, 1985; Coarelli, 1988a; 1988b). Waarsenburg put forward the hypothesis that a comparable situation may have existed along the Astura with *Satricum* as a fording place (Waarsenburg, 2001). Mandolesi assembled the possible evidence for the early use of the *saline* near Tarquinia, where comparable pottery as to the ceramics recovered at P13 was found during a survey (Mandolesi, 1999: pp. 174–176, 194–204). The coastal area near Pisa also functioned as a saltmaking centre since the Bronze Age (Pasquinucci & Menchelli, 2002; 1999).

Saltwinning along the Tyrrhenian Sea appears to have been a fairly common and necessary activity during the Late Bronze Age. Lane and Morris who published various salterns in the Fenland of Eastern England from prehistoric times till the Roman period, proposed a model of two contrasting phases of pro-

duction and settlement, which they have labelled an “Opportunistic” phase and a “Permanent Settlement” phase (Lane & Morris, 2001: pp. 385–388). The “Opportunistic” phase is characterised by non-permanent, seasonal settlements in the vicinity of the salterns. Saltmaking was periodical and accompanied by transhumance, looking for suitable spring and summer grasslands. To quote Lane and Morris “The excavation of such an identified saltern site must reveal quantities of briquetage and a paucity of well-preserved animal bone and domestic pottery. During this phase, settlement sites unaccompanied by briquetage debris are not found within 2 km from the known saltern sites. Saltmaking consisted of exploration and seizing the opportunity to make salt when and where environmental conditions allowed” (Lane & Morris, 2001: p. 385). The excavated evidence from P13 conforms remarkably well to this description.

## 6. SUMMARY

In this paper we have discussed an archaeological site that provides data on the exploitation of the coastal strip between Nettuno and Torre Astura in South Lazio during the Late Bronze Age. Our work elaborates on the inventory of archaeological sites made by Piccarreta in the 1970s as part of his topographical studies for the Forma Italiae series (Piccarreta, 1977) and follows on the work done recently by Alessandri on the proto-history of the coastal strip between Ostia and Formia (Alessandri, 2001–2002; Attema *et al.*, 2003).

Central to our studies was the excavation of P13, a single period site of which only a tip is preserved. The site’s stratigraphy has revealed that we deal with in situ deposits, an interpretation that is underscored by the well preserved and hardly abraded, sherds that were excavated, and by the considerable size of the fragments of those vessels that could be reconstructed. The majority of the potsherds belong to large vessels while a limited number of sherds is classified as tableware. The sherds are found in association with *tufa* chunks with often burnt sides. The deposits from which the potsherds derive do, however, not contain any features and the sherds and *tufa* chunks are therefore interpreted as refuse. A salt-working site is implied by the large size of the vessels that could be reconstructed, the ‘salt-colours’ on some of the sherds and the fact that the sherds were found stacked. Study of the existing literature shows that close packing of fragmented containers is indeed characteristic for such sites. The discolouring on some of the bases in combination with the many shattered vessels and the

occurrence of *tufa* chunks that are interpreted by us as supports to hold the vessels during the evaporation process, moreover strongly point to a specific type of salt-making technique labelled *briquetage*. A date of P13 to the Late Bronze Age on basis of the pottery typology is confirmed by the <sup>14</sup>C dates. Several comparable exposures in this area, mapped by Piccarreta, Alessandri and ourselves, indicate that P13 is certainly not an isolated case and that *briquetage* activities may have continued well into the Archaic period along this coastal strip.

## 7. CATALOGUE

One of the aims was to obtain a typology for the Late Bronze Age shards recovered at P13 in order to process the numerous finds. This proved to be difficult on account of the variety of lip forms within one vessel fragment. We encountered some vessels with lips varying from flattened to convex to pointed etc. within one fragment. Thus the lip form could not be considered a determining characteristic for the typology therefore reducing its significance. The types are defined by rim form and open/closed vessel. The coarsely made storage jars and bowls, and to a lesser extent the jars, show as types considerable variety, which is illustrated in the catalogue. Evolution of shapes within a type is gradual and some fragments are clearly transition forms between specific types. The more carefully made vessels within the catalogue do exhibit much less variety in lip forms.

Single sherds that were not placed into the typology are listed under miscellaneous *pentole* (here translated with large jars), miscellaneous *olle* (jars) or miscellaneous *scodelle* (bowls). They have been classified as such because of their form, fabric or on account of their surface treatment. Quite a few of the sherds under miscellaneous storage jars and jars are made with more care than the generally coarse storage jars and jars that were placed in the typology.

Not all sherds assigned to a specific type have been incorporated into the catalogue. We have decided to include all the miscellaneous sherds because published contexts referring to approximately the 12<sup>th</sup> century BC are still rare in the Mediterranean. The number of sherds not assigned to a type is limited, though the present catalogue might give another impression. Less than 10% of the sherds could not be attributed to a specific type of vessel. The number of large jars at Piccarreta 13 is disproportionate for a regular settlement context (about 80–85% of the total number of sherds found at the site). This percentage

can be compared with the assemblage of ceramics from the Late Bronze Age settlement at Torrionaccio. At Torrionaccio the bowls and jars are dominant in all features examined (158 bowls/*ciotole* (51%), 82 large jars/*pentole* (27%) and 16 storage jars/*doli* (5%) on a total of 308 (see tabel 3, Cassano *et al.*, 1978: p. 187). Therefore we maintain one of our assessments in the preliminary publication (Attema *et al.*, 2003) that the distribution of types at P13 is unusual and does not comply with a regular settlement context.

All illustrations of sherds are given 1:3 unless otherwise specified.

## CLASS I STORAGE JARS/PENTOLE

Diameter lip is larger than 30 cm.

**Type I.1:** troncoconical storage jar with straight rim often with plain or notched cord and lugs at transition rim to body. Varieties of lips: convex, flattened, bevelled on the outside, pointed or (slightly) thickening on the outside. Open vessel.

1. P13D.s5.I2/23, 87; S6.I3. 36, 23

Troncoconical storage jar with spreading wall, straight rim and flattened lip. On transition body to rim on the exterior a cord decoration with oval lug incorporated.

Common red impasto ware.

Inside : 5YR4/2 (dark reddish gray) to 5YR5/6 (yellowish red)

Outside : 5 YR 4/2 (dark reddish gray) to 2.5 YR 5/6 (red)  
9.2 x 22.2 x 1.2 (wall) – 0.9 (lip) – 2.0 (wall + cord) – 5.0 (wall + lug) D. 39

All in all 15 sherds reconstructed. On the interior there are use patterns (roughening) as a horizontal band of chips just under rim (see Skibo, 1992).

2. P13D1/2

Troncoconical storage jar with spreading wall, straight rim and convex lip. It is decorated with notched cord with a lug incorporated. The lug has a depression in the middle (almost *a cornuto*).

Common brown burnished impasto

Inside : 5YR4/4

Outside : 7.5 YR 3/1

11.3 x 17.2 x 0.9 (wall and lip) – 1.6 (wall + cord) – 3.9 (wall + lug) D. 34

P13D.s5.I2/266 probably belongs to same vessel.

3. P13Ds5I2/42, 64, 71, 75, 232 + s5I3/52

Troncoconical storage jar with slightly spreading wall, partly outcurving rim and convex lip partly thickening on the outside. Horizontal cord decoration, rounded to triangular in section.

Common red/brown impasto

Inside : 10R 4/6 (red) to 10R 4/4 (weak red)

Outside : 10R 3/2 (dusky red) to 10R 4/4 (weak red)

9.0 x 16.8 x 1.0/1.2 – 1.1/1.3 (lip) – 1.9/2.1 (wall + cord) D. 37

Mended from 7 sherds. Vessel is irregularly made with many variations in thickness and shape.

4. P13D.S4.L2/18, 97, 112, 125, 172, 147; S5L3/18, 46

Troncoconical storage jar, slightly outturning rim, convex lip, partly thickening on the outside. Horizontal cord decoration, faceted to pointed in section with triangular lug incorporated.

Common red impasto

Inside : 10R 3/2 (dusky red) to 10R 4/6 (red)

Outside : 10R 4/2 weak red to 10R 4/8 (red)

8.2 x 17.4 x 0.9 – 1.1/1.3 (lip) – 1.6 (wall + cord) – 4.1 (wall + lug) D. 35

Burnishing *a stecca* on the inside.

5. P13D.S4.L2/26, 2, 171

Troncoconical storage jar with spreading wall, straight rim and convex lip. On transition body to rim somewhat pinched plain cord with lug incorporated.

Common red impasto

Inside : 5YR 2.5/1 (black)

Outside : 5 YR 4/2 (dark reddish gray) to 2.5 YR 5/8 (red)

7.5 x 12.1 x 0.7 – 0.9 (lip) – 1.8 (wall + cord) – 3.0 (wall + lug). D.37

6. P13.ssec.B/04

Troncoconical storage jar with spreading wall, straight rim and pointed to convex lip, occasionally somewhat thickening on the outside.

Common red impasto

Inside : 2.5YR3/1 (dark reddish gray) to 2.5 YR 4/6 (red)

Outside : 2.5 YR 3/1 (dark reddish gray) to 2.5 YR 4/8 (red)

6.9 x 9.7 x 1.2/1.35 – 1.2 (lip) D. 48

7. P13B.S8/7

Troncoconical storage jar with slightly outcurving rim and convex lip. Cord rounded in section on the transition body to rim.

Common brown impasto

Inside : 5YR 5/2 (reddish gray)

Outside : 5YR 5/3 (reddish brown)

9.3 x 7.4 x 1.0 – 1.0 (lip) – 2.1 (wall + cord) D.40

8. P13D.S4.L3/39; P13D.S4.L2/21; P13D.S5.L2/179; 137

Troncoconical storage jar with spreading wall, slightly outcurving rim and lip bevelled on the outside. On the transition body to rim, faceted cord with triangular lug incorporated, in section somewhat faceted.

Common red impasto

Inside : 2.5 YR 5/4 (reddish brown) to 10R5/6 (red)

Outside : 2.5 YR 5/6 (red) to 2.5 YR 5/8 (red)

Rimfragment : 5.2 x 9.0 x 1.5 – 1.45 (lip) – 2.4 (wall + cord) – 5.2

(wall + lug). D. 33

Base : 9.7 x 5.2 x 2.8 (base) – 2.2 (wall). D. 23

Four fragments of jar from trench D, reconstructed as belonging to one jar on account of ware, fabric and manufacture. This jar represents the most coarsely made vessel from trench D.

9. P13D.S4.L2/29

Troncoconical storage jar with straight wall, slightly spreading rim and flattened lip.

Common brown impasto

Inside : 7.5 YR 4/6 (strong brown)

Outside : 7.5 YR 3/3 (dark brown)

6.0 x 4.5 x 1.2 D.36

10. P13D.S4.L2/34

Troncoconical storage jar with spreading rim and convex lip, faceted on the inside.

Common red impasto

Inside : 5YR 4/4 (reddish brown)

Outside : 5YR 5/8 (yellowish red)

8.0 x 6.3 x 2.4 D.50

11. P13D.S4.L2/174

Troncoconical storage jar with spreading rim, flattened lip, slightly thickened on the outside.

Common red impasto

Inside : 5YR 3/2 (dark reddish brown)

Outside : 7.5 YR 4/1 (dark gray)

5.2 x 8.0 x 1.2 – 1.5 (lip) D.33

12. P13C.S7/19

Troncoconical storage jar with spreading to flaring wall, straight rim and flattened lip. On the transition wall to rim a cord decoration, triangular in section.

Common red impasto

Inside : 2.5 YR 4/6 (red)

Outside : 2.5 YR 4/4 (reddish brown)

5.9 x 5.6 x 1.0/1.1 – 1.1 (lip) – 1.8 (wall + cord). D. 40

13. P13D.S4.L3/55

Wallfragment of troncoconical storage jar with spreading wall, straight rim and flattened lip. On transition rim to wall a plain cord decoration, triangular to convex in section.

Common red impasto

Inside : 5YR3/1 (very dark gray).

Outside : 5YR3/1 (very dark gray) to 5YR4/4 (reddish brown) and 5YR4/6 (yellowish red).

7.6 x 6.2 x 1.1 – 1.1 (lip). D. 36

14. P13D.S5.L2/20

Rim and wallfragment of troncoconical storage jar with slightly flaring wall, straight rim and flattened to convex lip. On transition rim to body, a plain cord decoration, triangular to rounded in section.

Common red impasto.

Inside : 5YR4/2 (dark reddish gray) shifting to 5YR5/6 (yellowish red) and 2.5YR4/6 (red)

Outside : 2.5YR4/6 (red) to 5R4/4 (reddish brown)

12.2 x 20.4 x 1.6 – 1.3 (lip) – 2.9 (wall + cord). D. 47

On account of identical characteristics, P13D.S1.L2/14, P13D.S4.L3/21 and P13D.S5.L3/79 probably belong to same vessel.

15. P13E21.2BR/5

Storage jar with slightly flaring wall, straight rim and convex flattened lip, thickening on the outside.

Common red/brown impasto

Inside : 7.5YR5/2 (brown)

Outside : 5YR4/4 (reddish brown)

4.0 x 4.8 x 1.0 – 1.2 (lip). D.30

16. P13G6.3/23

Rim- and wallfragment of storage jar with spreading wall, straight rim and convex lip, slightly bevelled on the inside. On transition body to rim a plain cord decoration rounded in section into which an oval lug is inserted with oblique notch, irregular in section.

Common red impasto

8.5 x 9.3 x 1.0/1.3 – 0.9 (lip) - 1.7 (wall + cord) – 3.2 (wall + lug).

D. 34

17. P13G5.2BR/43

Rim- and wallfragment of storage jar with straight rim and convex lip, slightly thickening on the outside. Transition lip to rim on the inside somewhat angular. Remains of cord decoration on exterior.

Common brown impasto

Inside : 7.5YR4/2 (brown)

Outside : 7.5YR4/2 (brown)

4.7 x 5.5 x 1.5/1.0 – 1.4 (lip). D. 37

Variant of I.1

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 211, no. 687; p. 221, no. 485; p. 236, no. 247 and p. 252, no. 048.

Alessandri, 2000-2001: p. 21, fig. 2.8 (Ostia Antica Collettore; Conti, 1982); p. 26, fig. 2.1 (Fosso della Bottaccia; Angle, 1996a); p. 44, fig. 2.5 (Saracca); pp. 54–55, fig. 6.3 (Fosso Moscarello); pp. 68–69, fig. 2.1 (Monte d'Argento; Guidi, 1991).

**Type I.2:** probably cylindro-ovoidal body with (slightly) outcurved rim and on the inside a smooth transition from shoulder to rim. Often with plain or notched cord and lugs at transition shoulder to rim. Varieties of lips: convex or flattened. Closed vessel.

18. P13D.S5.L2/21

Probably cylindro-ovoidal storage jar with flaring wall, slightly outcurving rim and lip faceted on the outside. On the transition from

body to rim faceted cord with lug incorporated.

Common red impasto

Inside : 2.5 YR 5/4 (reddish brown) to 2.5 YR 5/8 (red)

Outside : 2.5 YR 4/2 (weak red) to 2.5 YR 4/6 (red)

11.9 x 18.1 x 0.9 – 0.7 (lip) – 1.6 (wall + cord) – 4.1 (wall + lug).

D. 37

19. P13D.S4.L3/64, 65

Probably cylindro-ovoidal storage jar with slightly flaring wall, slightly outcurving rim and flattened lip. On the transition from body to rim cord decoration, at times convex or triangular in section.

Common red impasto

Inside : 10R4/8 (red) to 10 R 3/4 (dusky red)

Outside : (10R5/6 (red) to 10R4/1 (dark reddish gray)

8.3 x 6.8 x 1.3 – 1.2/1.3 (lip) – 2.2 (wall + cord). D. 34

20. P13DS5.L2/244; P13D.S6.L3/21, 22, 29, 40, 44

Probably cylindro-ovoidal storage jar with flaring wall, outcurving rim and convex lip. On the transition from body to rim a cord decoration, rounded in section with notches at irregular intervals with lug incorporated.

Common red impasto

Inside : 2.5 YR 3/4 (dark reddish brown), 2.5 YR 4/4 (reddish brown) to 2.5 YR 4/6 (red)

Outside : 10R 4/6 (red)

14.2 x 30.3 x 1.5/1.8 – 0.9/1.0 (lip) – 2.4/2.7 (wall + cord) - 4.3 (wall + lug). D. 42

21. P13D.S5.L2/41, 24; P13D.S4.L2/35, 40

Probably cylindro-ovoidal storage jar with outcurving rim and flattened to convex lip. On transition from body to rim, a horizontal cord, rounded in section with lug incorporated, somewhat faceted.

Common red impasto

Inside : 2.5 YR 4/1 (dark reddish gray) to 2.5 YR 4/8 (red)

Outside : 2.5 YR 4/2 (weak red) to 10R4/8 (red)

8.1 x 28.5 x 1.2 – 0.8 (lip) – 1.7 (wall + cord) – 3.9 (wall + lug). D.41

22. P13D.S5.L2/24

Probably cylindro-ovoidal storage jar with slightly outcurving rim and flattened lip.

Common brown impasto

Inside : 10 YR 3/3

Outside : 10 YR 3/2

17.6 x 6.6 x 1.2 – 1.1 (lip). D. 38

Beginning of horizontal cord decoration is emerging on the outside.

23. P13D.S5.L2/38

Probably cylindro-ovoidal storage jar with slightly outcurving rim and convex lip. On transition from body to rim, horizontal cord, rounded in section.

Common brown impasto

Inside : 5YR 5/4 (reddish brown) to 5YR 6/2 (pinkish gray)

Outside : 5YR 5/4 (reddish brown) to 5YR 6/4 (light reddish brown)

7.9 x 6.7 x 1.1 – 1.0 (lip) – 1.6 (wall + cord). D. 40

Tending to type I.1

24. P13F9.4/117

Rim- and wallfragment of storage jar with slightly outcurving rim and convex lip. Just below the rim on the outside a shallow cord, rounded in section.

Probably common red impasto; however, heavily burned.

Inside : 7.5YR5/3 (brown) to 2.5YR4/1 (dark gray)

Outside : 5YR5/4 (reddish brown) to 2.5Y4/1 (dark gray)

7.5 x 9.4 x 1.4 – 1.2 (lip) – 2.2 (wall + cord). D. 40

Cracked surface due to secondary burning.

25. P13F9.4/87+88

Storage jar with slightly flaring wall, outcurving rim, convex lip and with plain cord decoration, rounded in section just below the rim.

Common red impasto

Inside : 2.5YR4/4 (reddish brown)

Outside : 2.5YR4/4 - 4/6 Reddish brown – red)

9.6 x 20.5 x 1.0 – 1.0 (lip) – 1.9 (wall + cord). D.38

P13H7.4/1 belongs to same vessel.

26. P13C.S7/27

Rimfragment of jar with straight wall/neck, outturning rim and flattened lip thickening on the outside and partly undercut.

Common red impasto

Inside : 2.5YR4/8 (red)

Outside : 2.5YR4/8 (red)

2.7 x 5.0 x 0.9/0.8 – 0.9 (lip). D. 34

27. P13G5.2BP/93

Rimfragment of storage jar with slightly incurving wall, straight rim and convex lip, somewhat thickening on the outside.

Common red impasto

Inside : 7.5YR5/4 (brown) to 7.5YR4/1 (dark gray)

Outside : 5YR4/6 (yellowish red) to 7.5YR4/1 (dark gray)

4.8 x 4.9 x 1.35 – 1.4 (lip). D. 34

Strong traces of secondary burning on in- and outside

28. P13E21.2BR/12; P13G3/40; P13G4.2BP/114

Rim- and wallfragment of storage jar with outcurving rim and convex lip, thickening on the outside.

Common red impasto but heavily burnt

Inside : 5YR4/3 (reddish brown) to 5YR3/1 (very dark gray)

Outside : 5YR5/6 (yellowish red) to 2.5Y5/2 (greyish brown)

5.7 x 18 x 1.6 – 1.2 (lip). D.37

Cracked surface due to secondary burning.



## 29. P13G5.2BP/97, 99

Rimfragment of storage jar with incurving wall, outcurving rim and convex lip, slightly thickening on the outside.

Common red impasto

Inside : 5YR5/2 (reddish gray) to 5YR6/6 (reddish yellow)

Outside : 2.5YR5/8 (red) to 2.5YR4/0 (dark gray)

3.8 x 8.2 x 1.3/1.4 – 1.0 (lip). D. 39

Strong traces of secondary burning on the in- and outside.

## 30. P13F9.4/30; P13G4.2BP/80

Storage jar with almost outturning rim and convex lip somewhat faceted on the inside.

Just below rim, a shallow plain cord with flattened, oval, notched lug incorporated. Common red impasto with severe traces of secondary burning

Inside : 7.5YR4/3 (brown) to 2.5Y4/1 (dark gray)

Outside : 5YR4/4 (reddish brown) to 2.5Y5/1 (gray)

8.3 x 12.3 x 1.2 – 0.5/1.2 (lip). D.33

Cracked surface due to secondary burning.

## 31. P13G5.2BP/80

Rim- and wallfragment of storage jar with flaring, incurving wall with outturning rim and flattened lip, slightly thickening on the outside.

Common red impasto

Inside : 2.5YR4/4 (reddish brown)

Outside : 2.5YR4/4 (reddish brown) to 2.5YR4/6 (red)

5.9 x 5.4 x 1.1/1.5 – 0.6 (lip). D.38

Cfr. Fossa Moscarello, fig. 6.8; Alessandri 2001.

## 32. P13B.S8/38

Rimfragment of jar with outturning rim with internal angle and convex lip.

Common red impasto

Inside : 10R4/6 (red)

Outside : 10R4/6 (red) to 10R5/6 (red)

4.8 x 6.4 x 1.0 – 1.0 (lip). D. 35

Well burnished on the inside and irregularly burnished on the outside (*stecca*). P13B.S8/26 wallfragment with plain cord decoration with plain lug, as well as P13B.S8/34, probably belong to same vessel on account of identical fabric/ware.

Variant of type I.2

## LATE BRONZE AGE

Cassano *et al.*, 1978: p. 218, no. 638; p. 222, no. 499.

Alessandri, 2000–2001: p. 21, fig. 2.1 (Ostia Antica Collettore:

Conti, 1982); pp. 54–55, fig. 6,6/21 (Fosso Moscarello).

**Type I.3:** cylindro-ovoidal body with slightly incurved shoulder/rim with often plain or notched cord and lugs at transition shoulder to rim. Varieties of lips: convex, pointed, bevelled on the inside or flattened.

Closed vessel.

Transition from type 1 to 3 is gradual in the P13 sherds due to some rims, which are only slightly incurving. Some rimfragments are too small to fit into a typology.

## 33. P13D.S5.L2/2; P13D.S6.L3/24

Cylindro-ovoidal storage jar with slightly incurving shoulder/rim and flattened lip, somewhat thickening on the outside. On transition body to rim, a horizontal cord decoration, triangular in section with lug incorporated.

Common brown impasto

Inside : 5YR 2.5/1 (black) to 5YR 5/4 (reddish brown)

Outside : 5 YR 2.5/1 (black) to 5 YR 5/6 (yellowish red)

10.7 x 28 x 1.2 – 1.1 (lip) – 1.8 (wall + cord) – 3.5 (wall + lug).

D.42

About 26 sherds are attributed to this vessel.

## 34. P13.s.sec.B/16

Cylindro-ovoidal storage jar with slightly incurving shoulder/rim and flattened lip. On transition from body to rim, a horizontal cord decoration, somewhat triangular in section and vertical notches.

Common red impasto

Inside : 2.5 YR 4/6 (red) to 2.5 YR 3/6 (dark red)

Outside : 2.5 YR 4/6 (red) to 2.5 YR 4/8 (red)

6.8 x 6.7 x 1.0 – 0.9 (lip) – 1.6/1.9 (wall + cord). D.42

## 35. P13D.S5.L2/33

Cylindro-ovoidal storage jar with straight rim and lip bevelled on the inside and slightly thickened on the outside.

Common red impasto

Inside : 5YR4/4 (reddish brown) to 5YR3/3 (dark reddish brown)

Outside : 5YR5/6 (yellowish red) to 5YR4/6 (yellowish red)

7.2 x 9.4 x 1.5 – 1.5 (lip). D. 45

Six other sherds are attributed to this vessel on account of fabric, ware and similar form characteristics.

## 36. P13A.S6/4

Cylindro-ovoidal storage jar with incurving wall, straight rim and flattened lip.

Common brown impasto

Inside : 7.5 YR 4/1 (dark gray) to 7.5 YR 4/4 (brown)

Outside : 2.5 YR 3/1 (dark reddish gray) to 7.5 YR 4/4

(brown)

5.2 x 4.9 x 0.7/0.9 – 0.6 (lip) D. 40

## 37. P13D.S4.L3/14

Cylindro-ovoidal storage jar with slightly incurving wall, straight rim and convex lip. On transition from body to rim, a cord decoration rounded in section into which a lug, in section oval, is incorporated.

Common red impasto

Inside : 5 YR 4/4 (reddish brown) to 2.5 YR 4/1 (dark

reddish gray)

Outside : 2.5 YR 5/6 (red) to 2.5 YR 4/2 (dusky red)  
8.6 x 9.4 x 0.9/1.1 – 0.7 (lip) – 1.8 (wall + cord) – 3.5 (wall + lug).  
D. 31

38. P13D.S4.L3/43

Cylindro-ovoidal storage jar with incurving wall, straight rim and convex lip.

Common red impasto

Inside : 2.5 YR 5/6 (red) to 2.5 YR 4/6 (dark red).

Outside : 2.5 YR 5/6 (red) to 2.5 YR 4/6 (dark red)

5 x 7.6 x 0.9/1.0 – 0.7 (lip). D. 50

39. P13D.S4.L2/61

Cylindro-ovoidal storage jar with slightly flaring wall, slightly incurving shoulder/rim and convex lip. On the transition body to rim, a horizontal cord decoration, triangular in section.

Common red impasto

Inside : 5YR5/3 (reddish brown) to 5YR4/2 (dark reddish gray)

Outside : 5YR5/6 (yellowish red) to 5YR4/1 (dark gray)

9.2 x 9.4 x 1.3/1.4 – 1.2 (lip) – 2.4 (wall + cord). D. 54

31 sherds ascribed to this vessel on account of similar characteristics.

40. P13D.S5.13/1

Cylindro-ovoidal storage jar with slightly flaring wall, straight rim and convex lip. On transition from body to rim, a horizontal notched cord, rounded in section into which a notched lug is incorporated, oval in section.

Common red impasto

Inside : 10R 5/6 (red) to 10R3/1 (dark reddish gray)

Outside : 10R5/8 (red) to 10R4/1 (dark reddish gray)

16.2 x 18.6 x 1/1.2 – 0.75/0.95 (lip) – 1.9 (wall + cord) – 4.0 (wall + lug). D.50

The jar is extremely crudely made. The outer ends of the cord are clearly visible at the lug. Therefore the lugs were placed first after which the cord was positioned in between the lugs. The CaCO<sub>3</sub> encrustations were only visible on the outside of the vessel that lay on top while excavated. Therefore it appears that this encrustation derives from post-depositional alterations of CaCO<sub>3</sub> in the soil, possibly by dissolution of seashells by acid rain and subsequent deposition on top of the sherds when the soil dried.

41. P13A.S5/28

Cylindro-ovoidal storage jar with slightly incurving wall and rim, pointed lip and horizontal notched cord decoration, rounded in section, on the transition between body and rim.

Common red impasto

Inside : 2.5 YR 4/4 (dusky red)

Outside : 10R5/8 (red)

8 x 5.8 x 1.1 – 1.1 (lip) – 1.8 (wall + cord). D.32

42. P13B.S6/01

Cylindro-ovoidal storage jar with slightly incurving wall, straight rim and convex lip.

Common red impasto

Inside : 2.5YR4/6 (dark red) to 2.5YR3/6 (dark red)

Outside : 2.5YR6/6 (red) to 2.5YR4/6 (dark red)

6.3 x 7.2 x 1.4 – 0.8 (lip). D. 56

Transition vessel in between I.1 and I.3

43. P13.SF/32

Rimfragment of jar with flaring wall, incurving rim and convex lip.

Common red impasto

Inside : 5YR4/3 (reddish brown) to 5YR3/2 (dark reddish brown)

Outside : 5YR4/3 (reddish brown)

3.4 x 2.1 x 0.8 – 0.8 (lip). D. 30

44. P13.G5.2BP/78/100

Rim- and wallfragment of storage jar with slightly flaring wall, straight rim and convex, slightly flattened lip.

Common red impasto

Inside : 5YR4/6 (yellowish red)

Outside : 2.5YR4/8 (red) to 5YR4/4 (reddish brown)

10.4 x 6.4 x 0.9/1.1 – 1.0 (lip). D. 36

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 201, no. 829; p. 210, no. 727; p. 221, no. 487; p. 222, no. 486.

Alessandri, 2000–2001: p. 20, fig.3.73 (Ficana: Malmgren, 1981); pp. 54–55, fig. 6.10,11,14 (Fossa Moscarello); pp. 58–59, fig. 4/2 (Torre Paola); pp. 68–69, fig.2.22 (Monte d'Argento: Guidi, 1991).

**Type I.4:** probably cylindro-ovoidal body with outturning/outcurving rim with interior angular transition rim to shoulder. Varieties of lips: convex, pointed flattened. Closed vessel.

45. P13E.S5/27

Cylindro-ovoidal storage jar with outturning rim with internal angle and flat lip bevelled on the outside.

Common red impasto

Inside : 5YR4/6 (yellowish red) to 5YR3/1 (very dark gray)

Outside : 2.5YR4/4 (reddish brown) to 2.5YR4/6 (red)

6.3 x 7.3 x 1.3/1.7 – 1.2 (lip). D. 47

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 231, no. 218; p. 252, no. 036.

Alessandri, 2000–2001: p. 46, US147 (Casale Nuove: Angle *et al.*, 1992; 1993; Angle 1996); pp. 50–51, fig. 5/2 (Borgo Sabotino); pp. 54–55, fig. 6,6,12,19 (Fosso Moscarello; some of the parallels are listed as jars).

**STORAGE JARS/PENTOLE MISCELLANEOUS/  
not assigned to specific type.**

46. P13DS6.L2/1

Probably cylindro-ovoidal storage jar with flaring wall, outcurving rim and convex lip. On the transition from body to rim a cord decoration, rounded in section with oblique notches and 'horned' lug incorporated (almost *a cornuto*).

Common red impasto

Inside : 5 YR 4/3 (reddish brown)

Outside : 2.5 YR 4/8 (red)

10.5 x 15.8 x 1.2 – 0.6 (lip) – 1.95 (wall + cord) – 4.6 (wall + lug).  
D. 42

47. P13E.S1/6

Cylindro-ovoidal storage jar with slightly incurving shoulder/rim and convex lip, very slightly thickening on the outside.

Common red impasto

Inside : 5YR3/4 (dark reddish brown) to 5YR4/4 (reddish brown)

Outside : 2.5YR4/4 (reddish brown) to 2.5YR4/6 (red)

5.8 x 5.6 x 1.0 – 1.1 (lip). D. 37

48. P13G5.2BR/3

Rimfragment of storage jar with slightly spreading wall, straight rim and convex lip, somewhat levelled. Thickening on the lowest part of the wall indicates the beginning of a plastic cord decoration.

Common red impasto

Inside : 5YR4/3 (reddish brown) to 2.5YR5/6 (red)

Outside : 2.5YR4/4 (red) to 2.5YR4/6 (red)

4.8 x 5.6 x 1.0/1.1 – 1.0 (lip). D. 43

49. P13H5.2/17

Rim- and wallfragment of jar with slightly flaring wall, short outturning rim and pointed lip.

Common brown impasto

Inside : 7.5YR4/4 (dark brown) to 7.5YR4/6 (strong brown)

Outside : 10YR4/3 (dark brown) to 7.5YR2/0 (black)

4.6 x 3.5 x 0.6 – 0.2 (lip). D. 30

Cfr. Fratini, 1997b: p. 84, fig. 2

50. P13G4.2BR/12

Rim- and wallfragment of storage jar with upright wall, straight rim and flattened lip, slightly thickening on the outside. Probably with cord decoration on account of typical thickening of sherds

Inside : 5YR5/6 (yellowish red)

Outside : 5YR5/8 (yellowish red)

4.4 x 5.1 x 1.0/1.1 – 1.0 (lip). D. 31

51. P13G5.2BP/79

Rimfragment of storage jar with incurving wall, outcurving rim and

convex lip, thickening on the outside.

Common red impasto

Inside : 7.5YR4/6 (strong brown) to 2.5YR4/6 (red)

Outside : 2.5YR4/4 (reddish brown) to 2.5YR4/6 (red)

3.7 x 5.6 x 1.0 – 0.6 (lip). D. 35

*Olle con accenno di colletto (o colletto breve) da verticale o leggermente svasato, labbro ingrossato, arrotondato o squadrato.*

52. P13G.S1.L1/22

Rimfragment of storage jar with straight wall, straight rim and slightly convex lip, bevelled on the inside and thickening on the outside.

Common red impasto

Inside : 2.5YR3/6 (red) to 7.5YR4/3 (brown)

Outside : 2.5YR5/6 (red)

3.9 x 5.4 x 1.2/1.4 – 1.7/1.8 (lip). D. 40

Variant of Type I.3

53. P13G5.2BP/16

Fragment of a large jar with outturning rim and flattened slightly convex lip, somewhat thickening on the outside.

Common red impasto with grayish-white discolourations

Inside : 2.5YR5/6 (red)

Outside : 2.5YR4/4 (reddish brown) – 2.5YR5/8 (red)

4.2 x 7.0 x 1.6 – 1.3 (lip). D. 32.

Possibly rim of large biconical jar.

Cfr.: Cassano *et al.*, 1978: p. 231, no. 218.

54. P13A.S5/13

Rimfragment of a jar with outturning rim and convex lip. Possibly *vaso a collo distinto*.

Common red impasto, burnished

Inside : 2.5YR6/6 (red) to 2.5YR4/6 (dark red)

Outside : 2.5YR6/6 (red) to 2.5YR4/6 (dark red)

Core: 2.5YR3/1 (reddish brown)

5.6 x 3.5 x 1.2 – 0.7 (lip). D. 35

Cfr.: Cassano *et al.*, 1978: p. 218, no. 624.

55. P13G4.2BP/170; 175

Fragment of large jar with outcurving to outturning rim with flattened lip.

Smooth common brown impasto

Inside : 5YR3/2 – 3/3 (dark reddish brown)

Exterior : 5YR4/3 (reddish brown) to 5YR3/3 (dark reddish brown)

6.3 x 13.5 x 1.6 – 1.0 (lip). D. 38

Cfr.: Cassano *et al.*, 1978: p. 221, no. 483.

56. P13G5.2BR/130; 132; P13G4.2BP/23

Jar with outturning rim and convex lip, slightly faceted on the outside as well as slightly thickening.

Smooth common red impasto

Inside : 2.5YR4/4 – 4/6 (reddish brown to yellowish red)

Outside : 2.5YR4/4 (reddish brown)  
6 x 18 x 1.0 – 1.4 (lip). D. 42

## 57. P13H5.3/15

Outcurving rim of a substantial jar with outturning convex lip, thickening on the outside and slightly undercut. The neck on the outside has two horizontal ridges.

Common red impasto

Inside : 10R4/6 (red)

Outside : 10R4/8 (red)

4.4 x 4.3 x 1.1/1.4 – 1.55 (lip). D. is uncertain.

Cfr.: No close parallel found but might be comparable to: Belardelli, 2004, Tav. IV, no. 8; Tav. IX, no. 7.

## 58. P13SF/4

Rimfragment of large jar with slightly flaring wall, outturning rim, and convex lip, bevelled on the inside.

Common red/brown impasto

Inside : 7.5YR4/3 (brown)

Outside : 7.5YR5/4 (brown)

2.2 x 4.2 x 1.1/1.2 – 1.0 (lip). D. 30

Cfr.: Cassano *et al.*, 1978: p. 218, no. 636; Fratini, 1997b: Tav. XXV, no. 3; p. 54 from Madonna degi Angeli.

## 59. P13G1.2/2

Rim- and wallfragment with upright wall, straight rim and convex, somewhat flattened lip, thickening on the in- and outside.

Common red impasto

Inside : 5YR3/3 (dark reddish brown)

Outside : 2.5YR4/8 (red)

2.8 x 4.9 x 1.05 – 1.5 (lip). D. 45

Cfr. No close parallel found but might be comparable to: Cassano *et al.*, 1978: p. 252, no. 049.

## 60. P13H6.3/26

Rim- and wallfragment of large vase with upright neck, outturning rim with internal angle and convex lip. “Vaso cilindrico a collo distinto”

Common red impasto, burnished.

Inside : 5YR4/3 (reddish brown)

Outside : 5YR4/3 (reddish brown)

5.4 x 7.6 x 1.2 – 2.9 (lip). D. 47

Confronti: Fratini, 1997b: Tav. XXII, no. 13 from Grotta dei Piccioni.

**Class II JARS/Olle/Vase**

Diameter rim is less than 30 cm.

Most of the jar types are smaller versions of the storage jar types I.2, I.3 and I.4.

**Type II.1:** probably cylindro-ovoidal body with (slightly) outcurved rim and on the inside a smooth

transition from shoulder to rim, often with a plain cord at transition from shoulder to rim. Varieties of lips: convex or flattened. Closed vessel.

## 61. P13B.S8/86,87

Probably cylindro-ovoidal jar with slightly outcurving rim and convex lip. On transition body to rim, a horizontal cord decoration, rounded to triangular in section.

Common red impasto

Inside : 2.5YR3/3 (dark reddish brown) to 2.5YR4/4 (reddish brown)

Outside : 10R3/3 (dusky red) to 10R4/6 (red)

8.9 x 6.2 x 0.8/1.1 – 0.7 (lip) – 1.7 (wall + cord). D. 28

*cf.* Pentole I.2. Stronger burnish on the in- than on the outside.

## 62. P13G6.3/44

Jar with slightly outcurving rim and convex lip

Common red impasto

Inside : 5YR4/4

Outside : 5YR4/6 (reddish brown)

4 x 3.8 x 0.7 – 0.6 (lip). D. 17

Fine ware, thin sherd, well made jar though not burnished to lustre; a *stecca* marks clearly visible.

## 63. P13D.S5.L2/93

Probably cylindro-ovoidal jar with slightly flaring wall, slightly outturning rim and convex lip.

Common red impasto

Inside : 5YR4/3 (reddish brown) to 5YR4/1 (dark gray)

Outside : 5YR5/6 (yellowish red)

3.9 x 4.0 x 0.8 – 0.65 (lip). D. 21

Stronger burnish on the in- than on the outside.

## 64. P13G4.2BP/108

Fragment of jar with outcurving rim and convex lip.

Common red impasto

Inside : 2.5YR4/4 (reddish brown)

Outside : 2.5YR3/6 (dark red)

3.7 x 3.7 x 0.8 – 0.9 (lip). D. 22

## 65. P13G4.2BR/28

Rimfragment of jar with outcurving rim and convex lip, slightly flattened on top.

Common brown impasto

Inside : 7.5YR5/4 (brown)

Outside : 7.5YR5/3 – 5/4 (brown)

2.6 x 4.5 x 0.8 – 0.8 (lip). D. 18

## 66. P13H5.2/22

Rim- and wallfragment of jar with flaring wall, outcurving rim and lip slightly bevelled on the outside.

Common red impasto

Inside : 2.5YR5/6 (red)

Outside : 2.5YR5/6 (red)  
5.6 x 4.8 x 1.3 – 0.7 (lip). D. 27

67. P13C.S3/10

Probably cylindro-ovoidal jar with with outcurving rim and flattened lip. On transition to rim a cord decoration, convex to triangular in section.

Common red impasto

Inside : 2.5YR4/2 (dusky red) to 2.5YR4/4 (dusky red)

Outside : 2.5YR5/6 (red) to 2.5YR4/4 (dusky red)

4.4 x 5.0 x 0.9/1.1 – 0.6 (lip) – 1.55 (wall + cord). D. 21

Inside stronger burnished than outside.

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 201, no. 831; p. 211, no. 713, 737; p. 212, no. 731; p. 218, no. 635; p. 236, no. 227, 230; p. 256, no. 0236.

Alessandri, 2000–2001: pp. 54–55, fig. 6,6/21 (Fosso Moscarello)

Gocchi Gennick, 1999: p. 420, fig. 14.4

**Type II.2:** cylindro-ovoidal body with slightly incurved shoulder/rim sometimes with notched cord and lug at transition from shoulder to rim. Convex or flattened lip. Closed vessel.

68. P13D.S5.L2/26

Cylindro-ovoidal jar with slightly incurved shoulder/rim and convex lip. On transition from body to rim, a horizontal, notched, cord with a notched, fingerimpressed lug.

Common red impasto

Inside : 2.5YR4/2 (weak red) to 2.5 YR 4/6 (red)

Outside : 2.5YR4/4 (reddish brown) to 2.5YR5/6 (red)

8.3 x 11.3 x 0.9 – 0.6 (lip) – 1.5 (wall + cord) – 2.8 (wall + lug).

D. 14

69. P13C.S8/14

Cylindro-ovoidal jar with incurved rim and flattened lip slightly thickening on the outside.

Common red impasto

Inside : 2.5YR4/4 (dusky red) to 2.5YR4/6 (dark red)

Outside : 2.5YR4/4 (dusky red) to 2.5YR4/6 (dark red)

4.9 x 4.8 x 1.2 – 1.3 (lip). D. 26

70. P13G4.2BP/201; 204; 210

Rim- and wallfragment of jar with flaring wall, slightly incurving rim and convex lip. Underneath the rim on the outside, a cord decoration, triangular in section and with oblique notches, probably finger impressed.

Common red impasto

Inside : 2.5YR4/4 (reddish brown) to 7.5YR2.5/1 (black)

Outside : 2.5YR4/6 (red) to 7.5YR3/1 (very dark gray)

5.7 x 9.8 x 0.8/0.9 – 0.7 (lip) – 1.4 (wall + cord). D. 22

Sherds attributed to the same vessel: P13H5.3/4; P13SF/42; P13G4.2BP/3; 96; 1.

71. P13G5.2BP/89

Rimfragment of a jar with straight wall, upright rim and convex lip. There is a shallow internal angle at the inside on the transition from body to rim.

Common red impasto

Inside : 5YR4/6 (yellowish red)

Outside : 7.5YR4/6 (strong brown)

3.9 x 5.1 x 1.1/1.2 – 1.2 (lip). D. 28

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 211, no. 726; p. 233, no. 235.

Alessandri, 2000–2001: p. 46, US 141 (Casale Nuovo: Angle *et al.*, 1992; 1993; Angle, 1996); pp. 54–55, fig. 6.9 (Fosso Moscarello);

pp. 58–59, fig. 4/2 (Fosso della Cavatella: Pascucci, 1996b); pp.

68–69, fig.2.22 (Monte d'Argento: Guidi, 1991).

**Type II.3:** probably cylindro-ovoidal/globular body with outcurving/outturning rim and convex lip, occasionally thickening on the outside. Closed vessel.

72. P13G5.2BP/84

Rimfragment of a jar with straight wall/rim and convex lip, somewhat flattened.

Common red impasto, slightly burnished

Inside : 2.5YR4/4 (reddish brown) to 2.5YR3/4 (dark reddish brown)

Outside : 2.5YR4/4 (reddish brown) to 2.5YR4/5 (red)

4.0 x 5.4 x 1.1 – 0.8 (lip). D. 26

73. P13G5.2BP/95

Rimfragment of jar with straight wall, slightly outcurving rim and convex lip, somewhat pointed.

Common red impasto, slightly burnished on the outside

Inside : 7.5YR4/6 (strong brown)

Outside : 2.5YR4/4 (reddish brown) to 2.5YR3/6 (dark red)

2.8 x 4.5 x 0.9/1.0 – 0.5 (lip). D. 28

Variant of type II.3

74. P13B.S8/19

Probably ovoidal-globular jar with strongly outcurving rim and convex lip, thickening on the outside, partly undercut and somewhat bevelled on the inside.

Common brown impasto

Inside : 7.5YR4/2 (brown) to 7.5YR4/4 (brown)

Outside : 5YR3/2 (dark reddish brown) to 10YR6/4 (light yellowish brown)

4.7 x 6.2 x 0.8/0.9 – 1.2 (lip). D. 36

## 75. P13G6.2BP/6

Rimfragment of jar with inturning spreading wall, slightly flaring, outcurving rim and convex lip thickening on the outside.

Common red impasto

Inside : 2.5YR4/3 – 4/4 (reddish brown)

Outside : 2.5YR4/4 (reddish brown) to 5YR4/4 (reddish brown)

3.2 x 3.5 x 0.8 – 0.4 (lip). D. 25

## 76. P13H6.2/26

Rimfragment of jar with flaring wall, outcurving rim and pointed lip, thickening on the inside.

Common brown impasto

Inside : 7.5YR4/4 (brown)

Outside : 7.5YR5/4 (brown)

2.6 x 3.5 x 0.9 – 1.2 (lip). D. 22

## 77. P13G4.2BP/51

Rim- and wallfragment of a jar with incurving wall, outcurving rim and somewhat pointed lip, thickening on the in- and outside.

Common red impasto

Inside : 5YR4/6 (yellowish red)

Outside : 2.5YR5/6 (red)

Core: 10R5/6 (red)

4.6 x 4.9 x 1.0/1.2 – 1.1 (lip). D. 25

*Olle con accenno di colletto, orlo leggermente svasato, distinto all'interno da uno spigolo più o meno pronunciato. Variant of II.4*

## LATE BRONZE AGE

Cassano *et al.*, 1978: p. 211, no. 707; p. 212, no. 697; p. 218, no. 631; p. 221, no. 450; p. 224, no. 454; p. 233, no. 138.

Alessandri, 2000-2001: p. 46, US112 and US 141 (Casale Nuovo: Angle *et al.*, 1992; 1993; Angle, 1996); pp.54–55, fig. 6,12,21 (Fosso Moscarello).

### JARS/OLLE/VASE MISCELLANEOUS/*sherds not assigned to specific type.*

## 78. P13F9.4/112

Rim- and wallfragment of jar with slightly outcurving rim and convex lip.

Common red impasto

Inside : 10R4/6 (red)

Outside : 10R4/6 (red)

3.3 x 2.8 x 0.9 – 0.8 (lip). D. 26

## 79. P13G4.2BR/30

Rimfragment of jar with slightly flaring wall, straight rim and convex lip. On transition from rim to body, a cord decoration, rounded in section with a triangular lug incorporated. The lug is rounded in section.

Common red impasto

Inside : 10R4/6 (red)

Outside : 10R4/6 (red)

3.9 x 5.5 x 0.9 – 0.9 (lip) – 2.1 (wall + cord) – 2.9 (wall + lug). D.15  
Irregular colouring due to secondary burning and post-depositional incrustation.

## 80. P13G4.2BP/197

Rim- and wallfragment of jar with spreading wall, straight rim and flattened lip, thickening on the outside. On transition rim to body, a cord decoration, rounded to square in section.

Common red impasto

Inside : 2.5YR4/6 (red)

Outside : 2.5YR4/4 (reddish brown)

6.0 x 6.8 x 1.2 – 1.0 (lip) – 1.8 (wall + cord). D. 28

Very irregularly made.

## 81. P13C.S10/6

Common red impasto

Rimfragment of a jar with slightly flaring wall, straight rim and flattened lip. On transition rim to body, a notched cord decoration.

Inside : 5YR4/1 (dark gray) to 5YR4/4 (reddish brown)

Outside : 5YR4/4 (reddish brown) to 5YR4/6 (red)

5.1 x 3.7 x 0.9/1.3 – 0.8 (lip) – 1.7 (wall + cord). D. 23

Well burnished on the inside, more so than on the outside.

## 82. P13G4.2BP/104

Rimfragment of jar (*vaso*) with outcurving rim and convex lip.

Common brown impasto, well burnished almost to lustre

Inside : 10YR4/2-3/2 (very) dark grayish brown

Outside : 10YR4/2-3/2 (very) dark grayish brown

3.2 x 6.0 x 0.8/1.0 (rim/wall) – 0.8 (lip). D. 28

Could be rimfragment of a large bowl on account of surface treatment (see for example: Fratini, 1997a: Tav. X no.7).

## 83. P13A.S5/35

Rimfragment of jar with slightly flaring wall, almost straight rim and flattened lip, thickening on the outside.

Smooth common red impasto

Inside : 7.5YR4/4

Outside : 7.5YR3/2

3,3 x 4,8 x 0,8 – 1,0 (lip). D. 29

Burnished on both sides and carefully made. Variant of type II.4.

## 84. P13F10.7/25; P13F9.4/102; P13F9.4/105

Rim- and wallfragment of jar with slightly convex shoulder, outcurving rim and convex lip, bevelled as well as thickening on the outside.

Well burnished red impasto

Inside : 5YR4/4 (reddish brown)

Outside : 2.5YR4/4 (reddish brown)

8.3 x 19 x 0.9 – 1.1 (lip). D. 25

Outside burnished to lustre.

Cf. Gierow, 1984: Fig. 9, no. 1. Cassano *et al.*, 1978: p. 221, no. 483.

## 85. P13G4.2BP/268

Rim- and neckfragment of jar/vaso with outcurving rim and slightly bevelled lip on the outside as well as thickening on the outside.

Common red impasto, well burnished

Inside : 10R4/6 (red)

Outside : 10R4/6 (red)

4.2 x 6.5 x 1.0 – 1.3 (lip). D. 26

Cfr. Could be comparable to: Fratini, 1997b: Tav. XXV, no. 3. Fratini, 1997a: Tav. XV, no. 12.

## 86. P13C5.5/4

Rimfragment of jar/vaso with outcurving rim and lip bevelled on the outside.

Smooth common red burnished impasto

Inside : 10R5/8 (red) to 7.5YR2/0 (black)

Outside : 10R5/8 (red)

2.7 x 1.6 x 0.9 x 0.6. D. 28

Cfr. Fragment is small. Could be comparable to: Fratini, 1997b: p. 95, no. 5; Tav. XXV, no. 3.

## 87. P13G6.2BP/14

Rim- and wallfragment of jar with flaring wall, outcurving rim and convex lip, thickening on the outside almost overhanging.

Common red impasto

Inside : 2.5YR4/6 (red)

Outside : 2.5YR4/6 (red)

5.6 x 8.4 x 1.0/1.1 – 1.7 (lip). D. 29

Cfr. Belardelli, 2004: Tav. XXXVII, no. 2.

## 88. P13G4.2BP/26a; P13F10/12; P13G5.2BP/88; P13E21.2BR/6

Jar with outcurving, almost outturning rim and convex lip with somewhat faceted edge.

Common red impasto, burnished

Inside : 5YR4/3 – 4/4 (reddish brown)

Outside : 2.5YR4/4 (reddish brown)

4.5 x 22.5 x 0.9 – 0.8 (lip). D. 30

Cfr.: Could be comparable to: Fratini, 1997a: Tav. XVI, no. 5. Belardelli, 2004: Tav. XI, no. 1

## 89. P13H4.3/12

Rimfragment of jar with outturning rim with internal angle and lip bevelled on the outside.

Common red impasto with dark patches, burnished on the in- and outside.

Inside : 7.5YR3/1 (very dark gray)

Outside : 10R4/6 (red)

2.4 x 3.5 x 1.4 – 0.6 (lip). D. 30

Cfr.: More or less like: Cassano *et al.*, 1978: p. 232, no. 190.

## 90. P13G5.2BP/101.102

Rim-fragment of small jar with convex lip.

Smooth common brown burnished impasto

Inside : 7.5YR4/1 (dark gray)

Outside : 10YR4/3 (brown) – 10YR3/1 (very dark gray)

2.4 x 2.9 x 0.6. D. 12

Cfr.: *Ollette a orlo svassato a corpo globulare*. This type is already present in the Middle Bronze Age and known till the Final Bronze Age: Alessandri, 2001 (Fosso Moscarello); Pascucci, 1996 (Fosso della Cavaletto); Anastasia, inedito (Trattura Caniò).

## 91. P13F9.4/120

Rimfragment of a jar with flaring wall, outturning rim and convex lip.

Fine red impasto

Inside : 2.5YR4/6 (red)

Outside : 5YR3/1 (very dark gray)

3.8 x 2.9 x 0.6 – 0.5 (lip). D. 20

Cfr.: Alessandri, 2001 (Spiaggia S. Lorenzo, n. 33); *vaso biconico* in: Fratini, 1997b: Tav. XXV, no. 2.

## 92. P13F9.4/31

Rimfragment of jar with slightly flaring wall, outcurving rim and convex lip. On transition of body to rim, a notched cord decoration, rounded in section with oval, notched lug incorporated.

Common red impasto

Inside : 2.5YR4/6 (red)

Outside : 2.5YR4/8 (red)

4.6 x 6.5 x 1.5 – 2.0 (wall + cord) – 3.5 (wall + lug)- 1.0 (lip). D. 27

Lug: 2.4 x 6.0 x 2.1

Cfr.: More or less like: Cassano *et al.*, 1978: p. 231, no. 231.

## 93. P13F9.4/100

Rimfragment of jar with strongly outcurving shoulder, straight, vertical rim and flattened lip.

Common red burnished impasto

Inside : 2.5YR4/6 (red)

Outside : 2.5YR4/6 (red)

3.7 x 4.0 x 1.6 – 1.5 (lip). D. 30

Well burnished. *Olla a colletto breve verticale*.

Cfr.: More or less like: Belardelli, 2004: Tav. XLVI, no. 11. Fratini, 1997a: Tav. XVIII, no. 8. The fragment from P13 appears to be more pronounced than the two sherds listed as parallels.

## 94. P13F9.4/89

Rimfragment of jar/vaso with outturning rim and convex lip, somewhat angular on the inside.

Common red impasto

Inside : 2.5YR4/4 – 3/4 (traces of burnish) - 5YR5/4 (reddish brown to dark reddish brown)

Outside : 2.5YR4/6 – 5YR4/3 (red to reddish brown).

3.3 x 6.5 x 0.8 – 0.7 (lip). D. 40

Secondarily burnt, originally well burnished (traces on rim). *Largo vaso a collo distinto*. Possibly same type of vessel as one or both finds from Z.prof.LV (south profile surface finds).

Cfr.: Fratini, 1997b: Tav. XXV, no. 7.

## 95. P13G5.2BP/74; P13G5.2BR/51

Fragment of jar with outturning rim with internal angle and convex lip.

Smooth common red impasto. Well burnished in comparison to most other sherds from P13.

Inside : 5YR4/1 (dark gray)

Outside : 2.5YR4/6 (red) – 2.5YR4/4 (reddish brown)

5.3 x 3.5 x 0.9/1.0 – 0.8/1.1 (lip). D. 26

Cfr.: More or less like: Cassano *et al.*, 1978: Fig. 50, no. 212.

## 96. P13D.S4.L3/40

Rimfragment of jar with spreading wall, straight rim and flattened lip, slightly thickening on the outside. As storage jar type I.1 but smaller diameter

Common red impasto

Inside : 2.5YR4/6

Outside : 2.5YR4/6

4.2 x 7.0 x 1.0 – 0.7 (lip). D. 24

Cfr.: Belardelli, 2004: Tav. XII, no.4.

## 97. P13F9.4/45

Fragment of jar (*brocca*) with spreading wall, straight rim and flattened lip that protrudes into a band handle.

Smooth dark impasto, burnished on the in- and outside except on the exterior wall where the band handle was attached.

Inside : 7.5YR4/3 (brown) – 5YR4/4 (reddish brown)

Outside : 5YR3/1 (very dark gray)

2.7 x 5.9 x 0.8 – 0.9 (lip). D. 30-35.

Cfr.: Small fragment, possibly like: Cassano *et al.*, 1978: p. 231, no. 316.

## 98. P13B.S8/2

Small fragment of jar (*vaso*) or bowl with outcurving rim and convex lip.

Common red impasto, well burnished

Inside : 5YR4/2 (dark reddish gray)

Outside : 5YR4/4 (reddish brown)

2.3 x 4.0 x 1.0/1.2 – 0.7 (lip). D. 22

Cfr.: Small fragment, could also be bowl, see: Cassano *et al.*, 1978: p. 222, no. 504. Fratini, 1997a: Tav. XVIII, no. 1. Fratini, 1997b: Tav. XVII, no. 11.

## 99. P13D.S4.L2/16

Rimfragment of jar with spreading rim and convex lip, thickening on the outside, almost undercut. The transition rim to shoulder is outturning (*vaso biconico*, *vaso a collo*).

Common red impasto.

Inside : 2.5YR4/6 (dark red)

Outside : 2.5YR4/4 (dusky red)

3.7 x 4.2 x 0.9 – 1.4 (lip). D. 28

Possibly slipped.

Cfr.: Fratini, 1997b: Tav. XXV, no.3.

## 100. P13G4.2BP/122

Rimfragment of a jar with flaring wall, outturning rim and convex lip, somewhat bevelled on the outside.

Common red impasto

Inside : 5YR4/6 (yellowish red)

Outside : 2.5YR4/8 (red)

3.3 x 5.6 x 0.8 – 0.8 (lip). D. 25

Cfr.: No good parallel found though the fragment could resemble: Cassano *et al.*, 1978: p. 211, no. 722. Belardelli, 2004: Tav. IV, no. 8.

## 101. P13ZprofLV/9

Wallfragment of jar (*vaso*) with probably globular body possibly with carena and upright neck. Smooth transition body to neck.

Smooth common red burnished impasto

Inside : 5YR4/3 (reddish brown)

Outside : 2.5YR4/4 (dusky red)

9.5 x 8.9 x 0.8/0.9. Diameter at internal transition body to neck 30 cm.

Possibly *vaso a collo distinto*.

Hackly break, harder fabric than most other P13 sherds.

Cfr.: Belardelli, 2004: Tav. XIV, no. 2.

**CLASS III BOWLS/SCODELLE/CIOTOLE**

**Type III.1:** Carenated bowl. Low conical body, smoothly curved carena, short steep shoulder, slightly outcurving rim with convex lip occasionally thickening on the outside. Well burnished in comparison to class I and II. Slightly closed or open vessel.

## 102. P13D.S6.L3/1; S5.L3/4, 64; S5.L2/4

Carenated bowl with low conical body, flaring wall with smoothly curved carena, outcurving rim and convex lip.

Common red impasto

Inside : 5YR5/3 (reddish brown) to 5YR2.5/1 (black)

Outside : 2.5YR5/6 (red) to 2.5YR3/1 (dark reddish gray)

7.9 x 14.4 x 0.65/0.75 – 0.5 (lip) – 0.9 (carena). D. 23

Five fragments of this bowl were reconstructed from 14 sherds assigned to this vessel. Burnished on the in- and outside.

## 103. P13PB/3

Carenated bowl with conical body, carenated shoulder, outcurving rim and convex lip.

Smooth common brown impasto

Inside : 7.5YR4/4 (brown)

Outside : 7.5YR3/4 (dark brown)

5 x 4 x 0.9 – 0.6 (lip). D. 25

## 104. P13G4.2BP/209

Rim- and wallfragment of carenated bowl with flaring wall, carenated shoulder, outcurving rim and convex lip.



Well burnished dark brown impasto

Inside : 10YR3/1 (very dark gray)  
 Outside : 5YR4/4 (reddish brown) to 10YR3/1 (very dark gray)  
 3.1 x 3.4 x 0.5/0.7 – 0.4 (lip). D. 19

105. P13E21.2BR/18

Rim- and wallfragment of carenated bowl with outcurving rim, convex lip and shallow horizontal incised groove on exterior just above carena.

Well burnished (almost to lustre) brown impasto

Inside : 10YR3/1 (very dark gray) to 7.5YR4/4 (brown)  
 Outside : 10YR3/2 (very dark grayish brown) to 10YR5/4 (yellowish brown)  
 2.7 x 3.8 x 0.5 – 0.4 (lip). D. 24  
 Depth incision 0.05

106. P13D.S5.L2/5

Rimfragment of carenated bowl with outcurving rim and convex lip.

Common red impasto

Inside : 5YR4/4 (reddish brown)  
 Outside : 2.5YR4/6 (red) to 2.5YR4/8 (red)  
 3.8 x 3.1 x 0.8/1.1 – 0.7 (lip). D. 24

107. P13B.S8/55

Carenated bowl with low conical body with short steep shoulder, outcurving rim and convex lip.

Common red impasto

Inside : 5YR5/6 (yellowish red)  
 Outside : 5YR4/3 (reddish brown)  
 3.8 x 4.8 x 0.8/1.1 – 0.7 (lip). D. 22

108. P13G4.2BP/266

Fragment of a bowl with flaring carenated wall, outcurving rim and convex lip somewhat pointed. Slightly convex shoulder.

Common red impasto with dark gray discolorations.

Inside : 10YR4/2 (dark grayish brown) to 10YR3/1 (very dark gray)  
 Outside : 2.5YR4/8 (red) to 7.5 YR3/1 (very dark gray)  
 4.8 x 6.9 x 0.9/1.1 – 0.4/0.7 (lip). D. 23

Cfr. Difficult to find exact parallel but see: Malmgren, 2001: p. 36, Fig. 2,f. Fratini, 1997b: p. 91, Tav. XIX, no. 4 and 6.  
 Variant of III.1.

109. P13D.S5.L2/96

Rimfragment of carenated bowl with outcurving rim and convex lip.

Common red impasto

Inside : 2.5YR6/2 (pale red) to 10R5/6 (red)  
 Outside : 2.5YR6/3 (light reddish brown) to 2.5YR5/8 (red)  
 2.6 x 3.2 x 0.65 – 0.6 (lip). D. 20

110. P13A.S4/18

Rimfragment of carenated bowl with slightly outturning rim and convex lip.

Common red impasto

Inside : 2.5YR5/6 (red) to 2.5YR5/8 (red)  
 Outside : 2.5YR6/6 (red)  
 3.05 x 3.6 x 0.7 – 0.4 (lip). D. 24

Wallfragment P13A.S5/32 with carena belongs to the same vessel on account of identical fabric characteristics.

111. P13Zprof.LV/8

Wallfragment of carenated bowl or cup with flaring lower part of the body, inturning upper part with marked external angle.

Common red impasto

Inside : 2.5YR4/6 (dark red)  
 Outside : 2.5YR4/4 (dusky red)  
 7.2 x 7.7 x 0.5/0.7 – 0.9 (carena). Diameter measured at carena: 23  
 Well burnished on in- and outside. Late Bronze Age (Bronzo Recente: 12<sup>th</sup>/13<sup>th</sup> century BC; pers. communication M. Angle).

112. P13G5.2BP/91

Fragment of cup/bowl with carenated wall, outcurving rim and convex lip, somewhat pointed

Fine dark impasto

Inside : 5YR2.5/1 (black) – 5YR3/4 (dark reddish brown)  
 Outside : 5YR5/4 (reddish brown) – 5YR2.5/2 (dark reddish brown)  
 3.7 x 2.0 x 0.7/1.1 – 0.3/0.5 (lip). Diameter could not be determined due to the small size of the fragment.

Cfr.: Angle, 1992: Tav. VIII, no.5. Alessandri, 2001: p. 59, no.1. Malmgren, 1981: p. 103, B64 (Ficana), Bronzo Finale.

#### LATE BRONZE AGE

Cassano *et al.*, 1978: p. 206, no. 666.

Cocchi Genick, 1999: p. 408, fig. 4.2. See also p. 381, fig. 6.4 (Bronzo Recente).

Alessandri, 2000–2001: p. 20, fig. 3.64 (Ficana: Malmgren, 1981); p. 46, US 141 (upper drawing from Casale Nuovo: Angle *et al.*, 1992; 1993; Angle, 1996).

**Type III.2:** Oblique or spreading wall/rim, largest diameter at the rim. Open vessel. Varieties of lips: convex, flattened or thickening on the outside.

*This type could as well represent a lid. Comparable bowls are catalogued in, for example, Dolfini, 2002 and Fratini, 1997b: Tav. VI and VII. No bowls of this type are listed in Cassano et al., 1978. These vessels may often have had a double function, lid and bowl. A distinction can be made between burnished and unburnished vessels. The burnished vessels are likely to have been used as bowls.*

113. P13A.S5/19

Rimfragment of bowl with spreading wall, straight rim and convex lip, thickening on the outside.

Common red impasto

Inside : 2.5YR3/4 (dusky red) to 2.5YR4/6 (dark red)

Outside : 2.5YR4/6 (dark red) to 2.5YR4/8 (dark red)

5.0 x 4.8 x 0.9/1.0 – 0.7/0.8 (lip). D. 23

Somewhat burnished on the in- and outside.

114. P13.Ssec.B/7

Rimfragment of a bowl with spreading wall, straight rim and flattened lip, thickening on the outside.

Common red impasto

Inside : 2.5YR4/4 (reddish brown)

Outside : 2.5YR4/6 (red)

3.5 x 5.0 x 0.8/1.0 – 0.8 (lip). D. 24

115. P13F9.4/91

Rimfragment of bowl with straight rim and convex lip.

Smooth common brown burnished impasto

Inside : 7.5YR4/6 (strong brown)

Outside : 5YR4/4 (reddish brown) to 5YR4/6 (yellowish red)

5.0 x 3.0 x 0.9 – 0.9 (lip). D. 30

116. P13D.S2.L2/2

Rim- and wallfragment of lid/bowl with spreading wall, straight rim and flattened lip.

Common brown impasto

Inside : 2.5Y5/2 (greyish brown) to 2.5Y4/2 (dark greyish brown)

Outside : 2.5Y5/2 (greyish brown)

3.1 x 4.4 x 1.0 – 1.1 (lip). D. 16

117. P13G5.2BP/77

Rim- and wallfragment of lid/bowl with flaring wall, outturning rim and convex lip.

Common red/brown impasto, burnished

Inside : 5YR3/4 (dark reddish brown) to 7.5YR3/2 (dark brown)

Outside : 7.5YR3/2 (dark brown) to 7.5YR4/6 (strong brown)

3.6 x 5.4 0.8/0.9 – 0.8 (lip). D. 19

Variant of type III.2

118. P13H4.2/14

Rim- and wallfragment of probably a huge lid/bowl with spreading wall, straight rim and flattened lip, thickening on the in- and outside.

Common red impasto

Inside : 2.5YR4/6 (red)

Outside : 5YR4/4 (reddish brown)

3.0 x 5.4 x 0.9 – 1.2 (lip). D. large, possibly around 35 cm but difficult to measure on account of small size of the fragment

Variant of III.2

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 201, no. 844. Fratini, 1997b: Tav. VI and VII.

Cocchi Genick, 1999: p. 406, fig. 2.8

Alessandri, 2000/2001: p. 59, Torre Paola, fig. 4.1.

**Type III.3:** bowl with probably deep rounded body, vertical shoulder and outturning rim thickening on the outside.

119. P13A.S4/16

Rimfragment of bowl with straight wall, outcurving rim and convex, outturning lip.

Common red impasto

Inside : 2.5YR4/4 (dusky red) to 2.5YR4/6 (dark red)

Outside : 2.5YR4/8 (dark red) to 2.5YR5/8 (red)

2.1 x 2.6 x 0.6 – 0.6 (lip). D. 18

Stronger burnish on the in- than on the outside.

120. P13B.S7/3

Rimfragment of a bowl with slightly flaring wall, outturning rim and convex lip, thickening on the outside.

Common red impasto, well burnished.

Inside : 2.5YR4/4 (reddish brown) to 2.5YR4/8 (red)

Outside : 10R4/6 (red) to 2.5YR4/8 (red)

4.0 x 4.6 x 1.0/1.2 – 0.8 (lip). D. 23

LATE BRONZE AGE

Cfr.: Cassano *et al.*, 1978: p. 211, no. 712.

Fratini, 1997a: Tav.XIV, no. 10.

**Type III.4:** flaring wall with slightly curved or straight rim. Varieties of lips: flattened, thickening on the outside or convex. Open vessel. Possibly lid. Classified as bowl due to careful manufacture.

121. P13F10.7/64

Fragment of small bowl with flaring wall and convex lip, flattened on the top and slightly thickening on the outside.

Smooth dark impasto burnished on the in- and outside.

Inside : 10YR4/1 – 3/1 (dark gray- very dark gray)

Outside : 10YR4/1 – 3/1 (dark gray- very dark gray)

2.1 x 3.2 x 0.6 – 0.7 (lip). D. 13

122. P13F6.3/6

Rimfragment of jar with spreading wall, straight rim and flattened/convex lip thickening on the outside.

Common red impasto

Inside : 7.5YR5/4 (brown)

Outside : 5YR5/4 to 5YR4/4 (reddish brown)

2.9 x 2.4 x 0.9 – 1.3 (lip). D. 26

## LATE BRONZE AGE

Cfr.: Cassano *et al.*, 1978: p. 196, no. 879

**Type III.5:** bowl with slightly incurving wall and rim. A shallow horizontal groove on the exterior just underneath the lip. Closed vessel.

## 123. P13B.S7/17

Bowl with conical body, flaring wall, straight, slightly incurving rim and flattened lip, somewhat thickening. On the outside is a shallow horizontal groove just underneath the lip.

Common red impasto

Inside : 5YR7/6 (reddish yellow)

Outside : 5YR7/6 (reddish yellow)

4.4 x 3.9 x 0.7 – 0.95 (lip). D. 25

Drinking bowl on account of form, lip and surface treatment.

## 124. P13E20.2BP/19

Flaring wallfragment of bowl with straight rim, convex flattened lip, thickening on the outside with horizontal shallow groove on the outside just underneath the lip.

Well burnished brown impasto

Inside : 5YR4/2 (dark reddish gray) to 5YR3/1 (very dark gray)

Outside : 5YR3/1 (very dark gray)

Core : 7.5YR6/1 (gray)

4.6 x 3.4 x 0.8 – 0.7 (lip). D. 21

This sherd possibly belongs to the same vessel as P13B.S7/17 as diameter and thickness are comparable:

## 125. P13E23.2BR/2

Rimfragment of bowl with flaring wall, straight rim and flattened lip thickening on the outside.

Smooth common brown burnished impasto

Inside : 7.5YR5/3 (brown)

Outside : 5YR3/2 and 4/4 (reddish brown to dark reddish brown)

4.4 x 4.2 x 0.9 – 0.8 (lip). D. 25

## LATE BRONZE AGE

Cfr.: No exact type parallels found though comparable to: Fratini, 1997b: p. 24, Tav. VI, no. 4 and 6. Giardino, 1994: p. 197, no. 17 and 18.

**BOWL/LID/SCODELLA MISCELLANEOUS/not assigned to specific type.**

## 126. P13F5.3/1 (fig. 7)

Rimfragment of bowl with flaring wall possibly with slight angle on maximum diameter of the body towards the base, slightly outcurving rim and convex lip, thickening on the outside. Shallow hori-

zontal groove on the outside just underneath the lip. Slightly closed vessel. Traces of black slip on the exterior just under the lip and horizontal band on widest part of the body.

Depurated pale clay with inclusions

Outside and inside: 2.5Y7/1 – 8/1 (reddish gray to white)

Lip on top : 5Y8/2 (pale yellow)

Slip : 2.5Y3/1 – 2.5/1 (reddish brown to reddish black)

2.05 x 2.75 x 0.3/0.35 – 0.33 (lip). D. 15

Abraded surface, abraded slip, brown deposit on sherd, mainly on interior and on fractures. There are traces of secondary burning.

Cfr. No direct type parallels found:

- No Mycenaean parallel found though form might be related to a deep bowl FS 285 and FS 286 (Mountjoy, 1999: p. 600, 623, 634);
- In Italo-Mycenaean pottery comparable bowls are found in: Vagnetti & Panichelli, 1994: p. 376 no. 13; p. 388, no. 9; p. 402, no. 1 & 3. Bettelli, 2002: p. 203, no. 29; p. 214, no. 99;
- Form of P13F5.3/1 is related to bowls in Gray-ware: Belardelli, 1994: p. 272, Tav. 54, no. 10; p. 291, fig. 91, no.3; p. 292, fig. 92, no. 1 & 5;
- For local related bowls in *impasto*: See: Fratini, 1997b: Tav. XIX, no. 9, 11 & 18; Tav. XX, no. 9 & 10. Gatti, 2004: p. 47, Fig. 37, no. 5 & 6; p. 58, fig. 45, no. 11; p. 59, fig. 46, no. 7; p. 61, no. 3. Anastasia, 2002–2003: no. 79, Tipo 1, Tav. 63, 3 *Scodella con accenno di colletto*.

If this P13 bowl is not based on Mycenaean models it is likely that the potter worked from indigenous, Italian models such as the *Scodelle ad orlo rientrante* (bowl with incurving rim) such as published by: Fratini, 1997b: Tav. XX, no. 9 & 10, especially 10. Discussed in: Fratini, 1997b: p. 46, Tipo 8: “*Labbro appena distinto e leggermente svasato, orlo a profilo appena convesso pressoché verticale, vasca bassa a profilo convesso. Forma più aperta che nei tipi precedenti*”. Found at Madonna degli Angeli and at Collelongo (loc.tà Fondjò (l’Aquila).

Fabric: White firing fabric with well sorted quartz and feldspar (slightly more than 10% and size less than 125 on a sand ruler). In addition the fabric contains less than 1% mica (biotite, muscovite) and for a depurated clay fairly large augite bars (in size ranging from 250 to 1000). For method of fabrics research see [www.lcm.rug.nl](http://www.lcm.rug.nl) under publications.

## 127. P13E20.2BP/2

Rim- and wallfragment with horizontal cord decoration of probably very large bowl, lid or ovenlid. Spreading wall with outcurving rim and convex lip which has on top an incised groove.

Common red impasto, burnished

Inside : 2.5YR4/8 (red)

Outside : 2.5YR4/6 (red)

4.8 x 5.9 x 1.1/1.7 – 2.0 (rim) – 2.3 (wall + cord). D. 55

Sherd is burnished and carefully made in comparison with vast majority of the ceramics at P13.

Cfr.: No good type parallel found. Could be comparable to: Cassano *et al.*, 1978: p. 196, no. 891.

128. P13G1.2/7

Rimfragment of bowl/lid with spreading wall, straight rim and flattened lip thickening on the in- and outside. Plain horizontal cord decoration just below the rim.

Common red impasto

Inside : 2.5YR3/3 (dark reddish brown)

Outside : 2.5YR4/3 (reddish brown)

3.0 x 3.6 x 0.6 – 0.8 (lip). D. 16

Cfr.: No good type parallel found. Could be like Cassano *et al.*, 1978: p. 201, no. 843; p. 252, no. 049. Dolfini, 2002: Tav. 83, no. 809.

129. P13G5.2BP/72

Wallfragment with carena of large jar/bowl (possibly *scodella con orlo rientrante*).

Common red-brown impasto with traces of burnishing on in- and outside.

Inside : 10YR4/1 (dark gray) – 10YR5/6 (yellowish brown)

Outside : 2.5YR4/4 (reddish brown) – 5YR4/1 (dark gray)

4.2 x 4.8 x 0.4/0.7 (wall). D. carena 30.

Cfr.: Fratini, 1997b: Tipo 19, Tav. VIII, n.7

#### CLASS IV LARGE BOWLS/SCODELLONI

Diameter larger than 30 cm.; thickness wall larger than 1.2 cm.

**Type IV.1:** wide conical body, spreading wall, straight rim. Occasionally with an irregular cord decoration and lug just underneath rim.

130. P13F9.4/106

Rimfragment of large bowl with spreading wall, straight rim and flattened lip, thickening on the outside.

Common red impasto

Inside : 5YR4/4 (reddish brown)

Outside : 2.5YR4/4 to 5YR4/4 (reddish brown)

2.8 x 4.8 x 1.0 – 1.5 (lip). D. 45

LATE BRONZE AGE

Cfr.: Fratini, 1997b: Tav. VII, no. 2.

*The following sherds are placed under large bowl/lid. Difference between large bowl/lid and rim fragments of storage jar Type I.1 is not always obvious.*

See for parallel, *scodelloni troncoconici*, Fratini, 1997b: p. 46 and Tav. XXI.

Large bowl with conical body, spreading wall and straight rim. Varieties of lips: flattened, flattened and thickening on in- and/or outside. Open vessel.

131. P13D.S4.L2/62

Fragment of bowl with conical body, spreading wall, straight rim and flattened lip, somewhat thickening on the outside.

Common red impasto

Inside : 2.5YR5/8 (red)

Outside : 2.5YR4/6 (red) to 2.5YR5/8 (red)

3.8 x 4.6 x 1.5 – 1.6/1.7 (lip). D. 35

132. P13E.S5/3

Rimfragment of bowl with spreading wall, straight rim and flattened lip, slightly thickening on the outside.

Common red impasto

Inside : 2.5YR6/6 (light red) to 2.5YR6/8 (light red)

Outside : 2.5YR5/8 (red) to 10R3/3 (dusky red)

4.7 x 3.4 x 1.2 – 0.85 (lip). D. 37

“Salt colours” visible on the outside.

133. P13.S.sec.B/48

Rimfragment of large bowl with spreading wall, straight rim and flattened lip, slightly thickening on the outside.

Common brown impasto

Inside : 7.5YR3/2 (dark brown) to 7.5YR4/4 (brown)

Outside : 7.5YR4/3 (brown) to 7.5YR4/4 (brown)

3.2 x 4.4 x 1.0/1.2 – 1.3/1.4 (lip). D. 40

134. P13C.1f/13

Rimfragment of large lid/bowl with spreading wall, straight rim and flattened lip, thickening on the in- and outside.

Common red impasto

Inside : 5YR5/4 (reddish brown) to 5YR6/6 (reddish yellow)

Outside : 5YR5/4 (reddish brown)

4.5 x 3.9 x 1.0 (wall) – 1.6 (lip). D. 43

See: Fratini, 1997b: Tav. XVI, no.7 and no. 12.

135. P13G5.2BR/62

Rimfragment of large lid/bowl with straight rim and convex lip, slightly flattened on top.

Common red impasto

Inside : 2.5YR4/2 – 4/3 (weak red to reddish brown) to 10YR5/3 (brown)

Outside : 10R4/3 – 4/4 (weak red) to 2.5Y7.1 - 6.1 (light grey to grey)

4.4 x 5.5 x 1.2 – 1.1 (lip). D. 35

‘Salt-colours’ on in- and exterior.

LATE BRONZE AGE

Cfr.: Fratini, 1997b: p.46 *Scodelloni Troncoconici* and Tav. XXI.

**LARGE BOWL MISCELLANEOUS**

136. P13D1/1

Rimfragment of large bowl with flaring wall, outcurving rim and somewhat pointed lip, flattened on the inside. On the transition towards the wall there is an irregular cord decoration with notches and lug incorporated.

Common red impasto

Inside : 2.5 YR 5/6 (red)

Outside : 2.5 YR 4/8 (red)

9.7 x 7.5 x 1.3 - 0.3 (lip). D. 30

**CLASS V CUPS/TAZZE/COPPE**

**Type V.1:** cup with deep conical body, slightly concave base, inside concave, incurving/inturning shoulder, outcurving rim, convex lip and decorated with horizontal band with oblique shallow ridges along widest part of the body. Closed vessel.

137. P13D.S5.L2/10-14

Fragments of reconstructed cup with conical body, slightly concave base, inside concave, at *carena* incurving shoulder, outcurving rim and convex lip, slightly pointed. Decorated at the *carena* with shallow oblique ridges along widest part of the body. Burnished. Small cup almost miniature size.

Inside : 5YR3/1 (very dark gray)

Outside : 5YR4/1 (dark grey) to 5YR3/1 (very dark grey)

6.1 x 8.6 x 0.4/0.6 - 0.5 (base) - 0.2 (lip). D. 9.5 (*carena*) - D. 8.8 (lip) - D. 2.8 (base).

Reconstructed from 9 fragments deriving from various trenches and layers of P13, making 3 separate parts of the vessel (base, body and rim). Fine paste, carefully modelled and fired under reducing atmosphere. Refiring a small fragment in an oxidising atmosphere resulted in the following colour at 600 and 800°C: 7.5 YR 5/6 (strong brown). The fabric is characterised by a limited number of well sorted inclusions of small size (less than 250 on a sand ruler) including red flint and some black traces of organic inclusions. A comparable fabric that could neither be classified well was found at Torre Mordillo and dated to the final phases of the *Bronzo Recente* period (Vagnetti, 2001: pp. 329-330). The three sherds from Torre Mordillo are listed as *ceramica tornita a pasta grigia con superficie nera*. It is however unlikely that P13D.S5.L2/10-14 is formed with a wheel.

Cfr. Cassano *et al.*, 1978: p. 227, no 34. Alessandri, 2000-2001: p. 46 (Angle *et al.*, 1992; 1993: p. 195. From Casale Nuovo, US 11, settore est: *Bronzo Finale*).

138. P13G.S1.L1/26-29

Rimfragment of a cup with inturning wall, outcurving rim and convex lip.

Fine red impasto, burnished on the in- and outside.

Inside : 2.5YR5/6 (red)

Outside : 2.5YR5/6 (red)

3.2 x 4.2 x 0.4/0.5 - 0.4/0.5 (lip). D. 18

LATE BRONZE AGE

Cassano *et al.*, 1978: p. 219, no. 414; p. 227, no. 34; p. 248, no. 018.Alessandri, 2000-2001: p. 46, US 11 (Casale Nuovo: Angle *et al.*, 1992; 1993; Angle, 1996).

Malmgren, 2001: p. 38, fig. 3f.

**CUPS MISCELLANEOUS/sherds not assigned to specific type.**

139. P13D.S5.L2/7

Rimfragment of bowl/cup with incurving shoulder, short conical neck, outturning rim and convex lip, thickening on the outside and somewhat bevelled on the inside. Angular transition neck to shoulder on in- and outside (*a collo distinto*). Closed vessel.

Common red impasto. Especially burnished on the inside.

Inside : 5YR4/6 (yellowish red) to 7.5YR4/4 (brown)

Outside : 2.5YR4/8 (red) to 5YR4/6 (yellowish red)

2.5 x 2.1 x 0.4/0.6 - 0.5 (lip). D. 18

Fratini, 1997b: pp. 48-49, Tav. XXI, no. 6 and no. 13.

Carenated cup (wallfragment with *carena*).

140. P13A.S5/33

Wallfragment of a cup with *carena*. Conical lower body, steep, short neck, clear external *carena* and smooth transition neck to rim.

Smooth common red impasto, burnished on in- and outside

Inside : 5YR5/4 (reddish brown)

Outside : 5YR5/6 (yellowish red)

2.5 x 3.7 x 0.5 x 0.9 (*carena*). D. *carena*: 15

Cfr.: Malmgren, 2001: p. 38, fig. 3e and g.

141. P13C.S5/29

Rimfragment of probably a cup with outcurving rim and convex lip. Diameter is however too small to assign to a type.

Common red impasto burnished (black to gray) on in- and outside.

Inside : 2.5YR4/1 (dark reddish gray)

Outside : 2.5YR6/1 (reddish gray)

2.4 x 3.2 x 0.75 - 0.5 (lip). D. 12

**CLASS VI COOKING STAND**

142. P13A.S1/1

Small fragment of plate/grate of cooking stand with two partially preserved circular openings with slightly raised borders. Possibly the flat plate of a troncoconical stand. Only one fragment of plate/grate found at P13.

Common red impasto

Inside : 2.5YR4/8 (red)

Outside : 10R4/8 (red)  
 4.5 x 3.7 x 0.9/2.0. Diameter of openings slightly more than 1cm.  
 Cfr.: Attema *et al.*, 2001/2002: pp. 329–330 (Beijer Class I, type 2). Belardelli, 2004: p. 137, Tav. LXXIII,2. No parallel found in: Fratini, 1997a & b; Cassano *et al.*, 1978; Gierow, 1984; Malmgren, 2001; Dolfini, 2002; Alessandri, 2000–2001.

Characteristic parts of ceramic vessels excavated at Piccarreta 13 such as bases, decorations, lugs and handles. No parallels are given for the following classes unless the fragments are specific for the Late Bronze Age.

## CLASS VII BASES

### flat base, inside concave

143. P13D.S5.L2/1

Flat base, inside concave with flaring wall. Probably of a storage jar.

Common red impasto

Inside : 10R5/6 (red)

Outside : 2.5YR6/4 (light reddish brown)

13.4 x 22 x 1.3/2.1 – 2.5 (base). D. 16

Base with “salt colours”: 10R4/2, 4/3 and 5/3 (weak red) – 2.5Y8/2 (pale yellow) – 2.5Y2.5/1 (black) – 10R6/2 (pale red) – 5RP8/2 (pale pink) and 5RP4/2 (greyish red purple).

144. P13B.S8/84, 85

Flat base, inside concave with flaring wall of troncoconical storage jar.

Common red impasto

Inside : 10R4/6 (red)

Outside : 10R5/6 (red) to 10R4/6 (red)

5.2 x 12.1 x 5.5 x 1.5 x 2.3 (base). D. 18

P13B.S8/82, 83: wallfragment with cord decoration is probably part of the same vessel on account of identical fabric/ware characteristics.

145. P13A.S5/18

Flat base, inside concave with flaring wall. Of storage jar.

Common red impasto

Inside : 2.5YR5/8 (red)

Outside : 2.5YR4/6 to 2.5YR4/8 (dark red)

4.9 x 6.2 x 1.4 – 2.1 (base). D. 29

146. P13G6.3/5

Flat base, inside concave with flaring wall. Of storage jar

Common red impasto

Inside : 7.5YR6/4 (light brown discolouration) - 10R5/6 (red)

Outside : 2.5YR4/6 (red)

4.9 x 6.4 x 1.6 (base) – 1.0 (wall). D. 20

147. P13G6.3/2

Flat base, inside concave with slight ridge on the edge and slightly flaring wall.

Common red impasto

Inside : 2.5YR5/4 (reddish brown). ‘Salt colours’: 5YR8/2 (pinkish white) to 7.5YR6/4 (light brown).

Outside : 2.5YR4/8 (red)

4.6 x 8.5 x 2.2 (base) – 1.6 (wall). D. 17

### flat base raised, inside concave

148. P13B.S8/56

Flat raised base, inside concave with flaring wall. Of jar.

Common red impasto

Inside : 10R4/6 (red) to 10R3/1 (dark reddish gray)

Outside : 10R5/6 (red) to 10R4/6 (red)

5.7 x 4.2 x 1.0 – 0.9 (base). D. 8

### concave base, inside concave

149. P13B.S8/89, 44, 17, 88

Slightly concave base, inside concave with flaring wall. Of jar.

Common red impasto

Inside : 10R4/6 (red) to 10R5/6 (red)

Outside : 10R4/6 (red) to 10R5/6 (red)

5.5 x 10.5 x 1.3 – 1.5 (base). D. 11

Almost complete base

150. P13C.S13/1

Concave base, inside concave of probably a cup/bowl.

Common red impasto. Burnished on the inside, black to gray.

Inside : 2.5YR3/1 (dark reddish gray)

Outside : 5YR5/2 (reddish gray) to 2.5YR5/6 (red)

Core : 10R2.5/1 (reddish black)

6.8 x 5.9 x 1.1/1.15 – 1.1 (base). D. 5.0

### flat base, inside concave

151. P13E.S3/16

Flat base, inside concave with flaring wall. Of small, probably drinking vessel on account of smooth black interior.

Common red-brown impasto

Inside : 5YR3/1 (very dark gray)

Outside : 5YR5/4 (reddish brown) to 5YR4/2 (dark reddish gray)

3.4 x 2.6 x 0.8 – 0.7 (base). D. 5

152. P13B.S6/04

Flat base, inside concave with spreading wall.

Common red impasto

Inside : 10R4/8 (red)

Outside : 10R5/6 (red) to 10R4/8 (red)

Core : 10R4/8 (red)

3.2 x 6.9 x 0.65 – 1.0 (base). D. 14  
Burnished on in- and outside. On account of the interior finishing probably an open vessel, bowl or cup.

153. P13B.S8/6

Flat base, inside concave with flaring wall.

Common red impasto

Inside : 2.5YR2.5/1 (reddish black)

Outside : 2.5YR5/6 (red)

2.6 x 6.6 x 0.6 – 0.7 (base). D. 12

Burnished red on the outside and burnished black on the inside.

Probably base of open drinking vessel.

154. P13B.S8/66

Flat base, inside concave.

Common red-brown impasto

Inside : 5YR2.5/1 (black)

Outside : 5YR2.5/1 (black) to 2.5YR3/4 (dark reddish brown).

1.3 x 2.8 x 0.8 – 0.95 (base). D. 16

Burnished black on in- and outside, probably base of drinking vessel.

155. P13.H6.2/7

Flat base, inside concave with concave horizontal impression on the outside just above the base.

Common red impasto, very abraded and with “salt colours”, gray and light brown patches.

Inside : 5YR5/6 (yellowish red)

Outside : 5YR5/8 (yellowish red).

4 x 5.7 x 1.8 (base) – 1.4/1.5 (wall). D. 14

156. P13D.S5.L2/161, 163

Fragment of flat base, inside concave, outside somewhat convex.

Probably base of storage jar.

Common red impasto

Inside : 2.5YR5/6 (red)

Outside : 2.5YR5/6 (red)

14.3 x 4.6 x 1.8 – 2.2 (base). D. 26

### CLASS VIII CORD DECORATIONS

Plain cord decoration in section triangular, rounded, flattened and faceted.

Notched and pinched cords. Notches made by stick or fingerimpressed.

157. P13G2BP5/3

Wallfragment of large jar with horizontal plain cord decoration and outturning rim

Common red impasto

Inside : 2.5YR4/6 (red)

Outside : 5YR4/6 (yellowish red)

11.3 x 8.6 x 1.4 – 2.0 (wall + cord). D. 31 (taken on the inside of outturning rim).

### CLASS IX LUGS

#### Triangular lug

158. P13A.S5/31,38

Triangular lug, convex to triangular in section with a very irregular, partly pinched edge incorporated into notched cord decoration, possibly pinched and convex to triangular in section.

Common brown impasto

Inside : 7.5YR4/4 (brown)

Outside : 5YR3/1 (very dark gray) to 7.5YR4/4 (brown)

3.2 x 7.5 x 0.7/1.1 – 1.95/2.05 (wall + cord) - 4.8 (wall + lug)

#### Semicircular lug

159. P13A.S3/33

Circular lug, flattened, slightly concave in section with a flattened to convex edge.

Common red impasto

Outside : 10R5/8 (red) to 5YR3/1 (very dark gray)

Core : 10R5/8 (red) to 5YR6/6 (reddish yellow)

6.1 x 3.9 x 1.5/1.7 (lug) – 5.0 (wall + lug)

160. P13B.S4.F1/01

Semicircular lug with flattened edge.

Common red impasto

Outside : 5YR5/6 (yellowish red) to 5YR6/6 (reddish yellow)

4.8 x 4.1 x 1.6

#### Notched lug

161. P13S.sec.B/03

Notched lug of storage jar with faceted to convex edge placed on the maximum diameter of body (ca. 30 cm). Lug probably protrudes from notched cord, the beginning of which can be detected. Underneath the lug there are two more or less horizontal ridges.

Inside : 2.5YR5/8 (red) to 2.5YR3/6 (dark red)

Outside : 2.5YR5/8 (red) to 2.5YR3/6 (dark red)

7.4 x 8.9 x 1.2/1.7 – 2.7 (wall + cord) – 4.3 (wall + lug).

### CLASS X HANDLES

#### Bandhandle

162. P13E21.2BP/2

Flaring wallfragment of probably a mug (boccale) with outturning rim and probably convex lip with vertical bandhandle, in section

more or less oval, attached to the rim.

Common red impasto

Inside : 2.5YR/3.1 (dark reddish gray) to 10R4/6 (red)

Outside : 2.5YR/3.1 (dark reddish gray) to 10R4/6 (red)

7.6 x 4.9 x 1.8 – 1.3. D. 22

Cfr.: *Probabile boccale con corpo a botte*: Fratini, 1997b: Tav. VIII, no. 3-5, especially no. 3 with rim with slight internal angle. See also: Fratini, 1997b: p. 96, Tav. XXIV (except no. 10).

163. P13G6.3/26

Flaring wall fragment of probably a bowl with vertical bandhandle, in section more or less oval

Fine black impasto

Inside : 5YR2.5/1

Outside : 5YR2.5/1

5.2 x 2.2 x 1.0. D. 10

Cfr.: Fratini, 1997a: Tav. XIV, no. 15.

164. P13D.S4.L2/59

Bandhandle of storage jar. Handle in section rectangular with rounded edges. Surface of interior wall is not preserved.

Common red impasto

Outside : 10R5/6 (red) to 10R3/2 (dusky red)

Core : 10R5/8 (red) to 10R4/6 (red)

14.2 x 5.2 x 3.0/4.4

165. P13.G5.2BP/111; 113

Horizontal, semicircular handle in section rectangular with rounded edges, positioned on widest diameter of body.

Common red impasto, burnished on the in- and outside

Inside : 10R5/6 (red)

Outside : 10R5/6 (red)

10.7 x 12.5 x 0.9/1.0 – 5.2 (wall + handle). Interior D. 40

Handle: 2.7 x 10.8 x 2.8

## Ringhandle

166. P13E.S2/1

Horizontal semi-circular ringhandle. The ends indicate a mortise and tenon joint. Fingerimprint visible on one of the ends.

Common red impasto

Colour : 2.5YR3/3 (dark reddish brown) to 10R4/6 (red)

6.6 x 3.3 D. ring : 2.0/2.3

Cfr.: Alessandri, 2000–2001: Fosso Moscarello n.2

167. P13E.S5/1

Segmental horizontal bandhandle, faceted on the outside and positioned on the widest diameter of the body of a large jar.

Common red impasto

Inside : 10R5/4 (weak red) to 10R3/2 (dusky red)

Outside : 10R4/6 (red) to 10R5/6 (red)

7.3 x 15.4 x 1.2. Max. D. 40. Handle: 4.3 x 12.5. D. 2.5/3.2.

Burnished on in- and outside

Cfr.: Cocchi Genick, 1999: Vol. II, p. 422.

168. P13C.S7/16

Horizontal ringhandle, irregular in section, partially with raised edges on the outside with flaring wall fragment with mortise and tenon joint for inserting handle into wall

Common red/brown impasto, burnished.

Inside : 2.5YR4/4 (reddish brown)

Outside : 2.5YR4/4 (reddish brown)

5.3 x 9.6 x 0.9/1.1. Handle: 2.3 x 3.0

Surface interior wall is deteriorated.

169. P13A.S5/42

Horizontal ringhandle, in section quadrangular with rounded edges with mortise and tenon joint.

Common red impasto

Inside : 2.5YR5/8 (red)

Outside : 2.5YR4/4 (reddish brown) to 2.5YR4/8 (red)

3.8 x 7.1 x 2.4/2.7

170. P13B.S7/22

Horizontal ringhandle, quadrangular in section. Fragment of a large jar.

Common red impasto

Inside : 10R4/8 (red)

Outside : 10R3/4 (dusky red) to 10R4/8 (red)

4.1 x 6 x 2.2/3.7

Cfr.: Cocchi Genick, 1999: Vol. II. p. 416; p. 421, fig. 15, no. 3.

171. P13C.S3/1

Flaring wall fragment with a substantial, horizontal ringhandle in section somewhat rounded. Mortise and tenon joint.

Common red impasto

Inside : 10R5/6 (red) to 10R4/8 (red)

Outside : 2.5YR6/6 (red) to 2.5YR5/8 (red)

Core: 10R6/6 (light red) to 10R5/8 (red)

4.8 x 6.5 x 1.7/1.4. Handle: 9.8 x 4.3 x 2.9

172. P13F8.4/14

Horizontal ring-handle of probably a carenated bowl. Perforated lug.

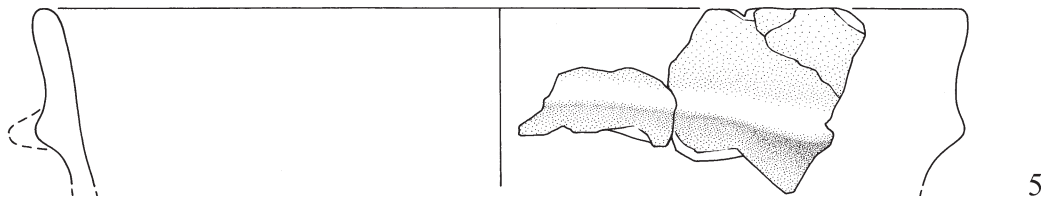
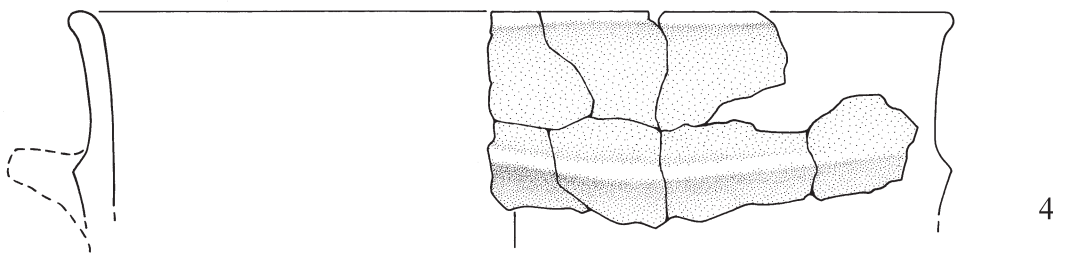
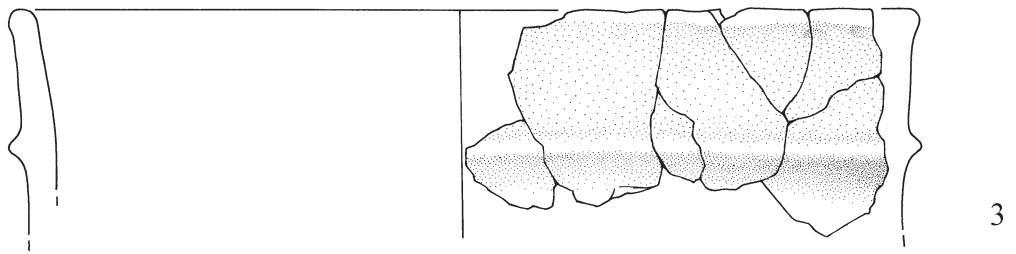
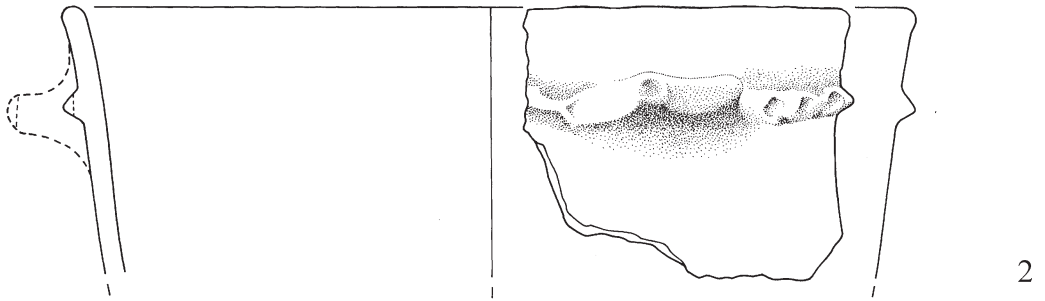
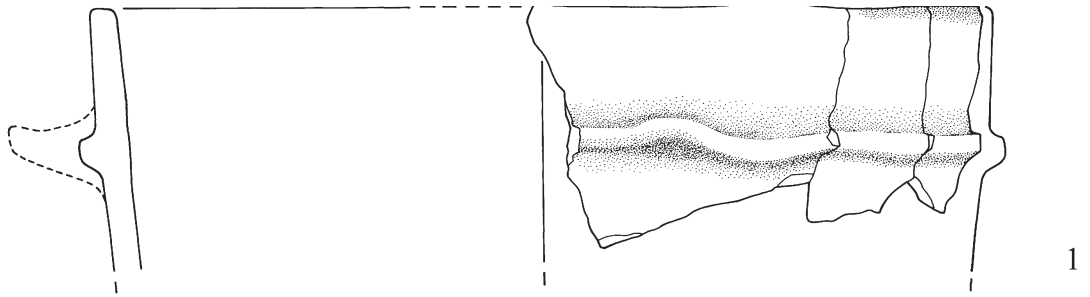
Common red impasto

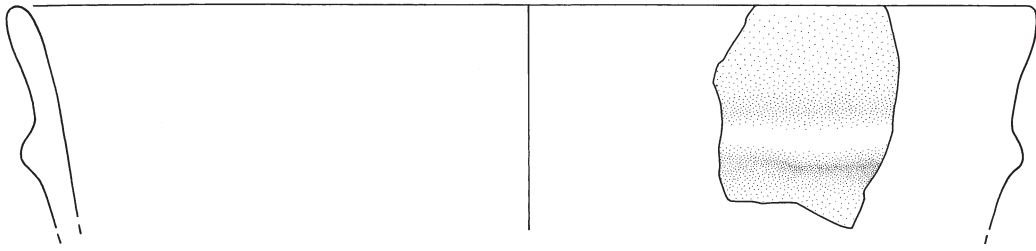
Inside : 10R4/8 (red)

Outside : 10R4/8 (red)

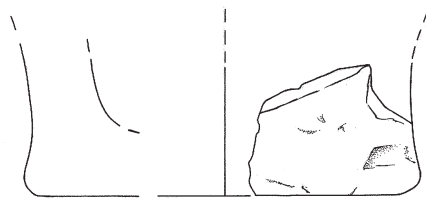
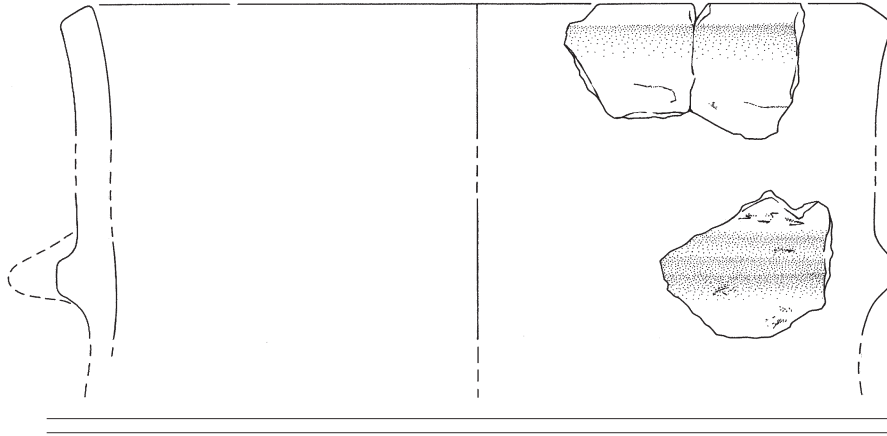
3.4 x 4.3 x 0.6/0.85 (wall). Interior diameter bowl approximately 25 cm. Handle: 2.2 x 4.4 x 1.0



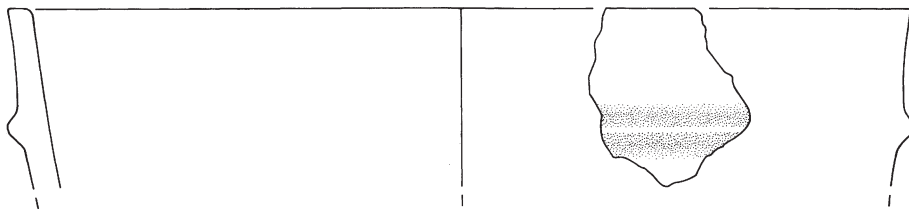




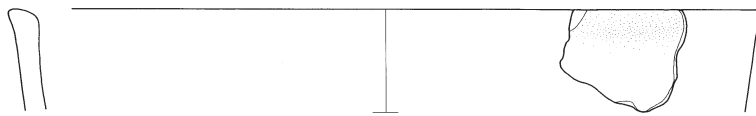
7



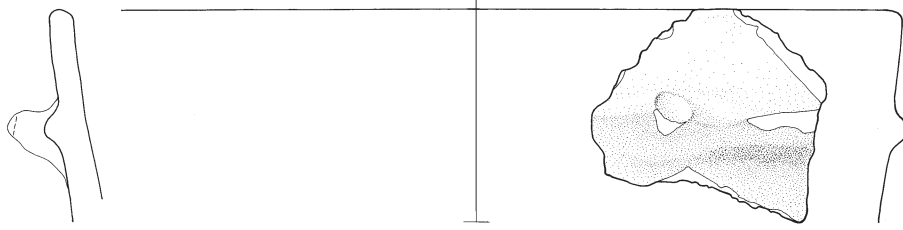
8



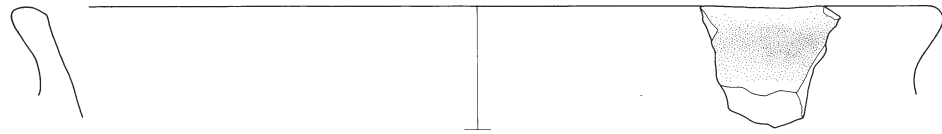
13



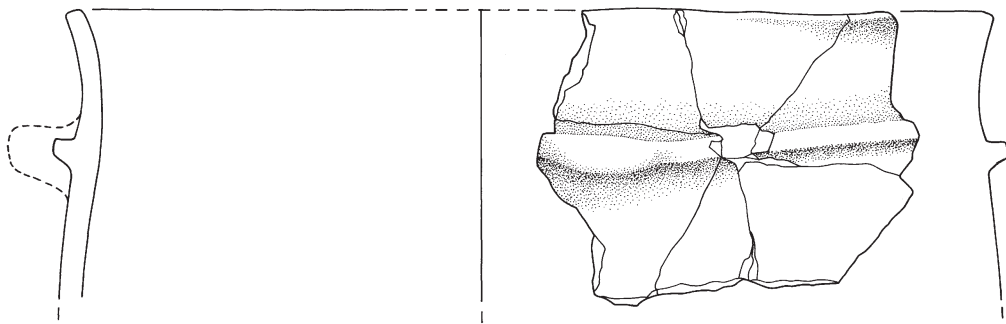
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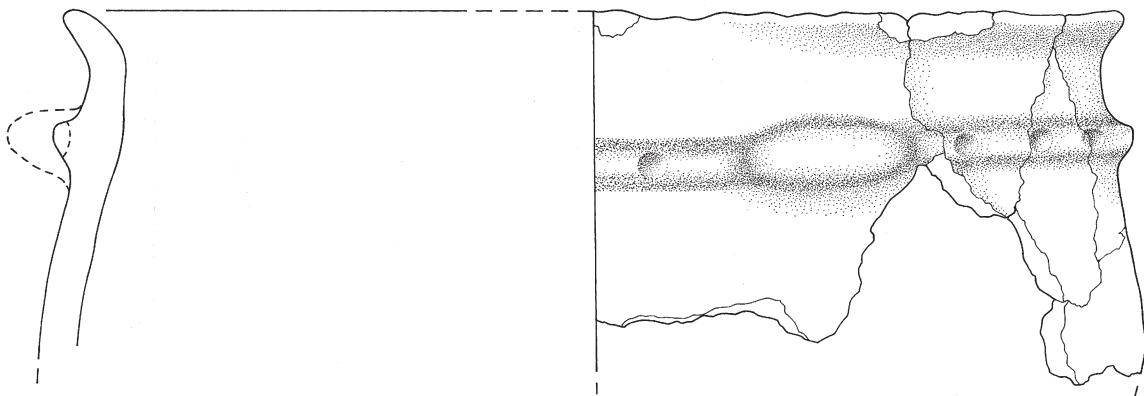
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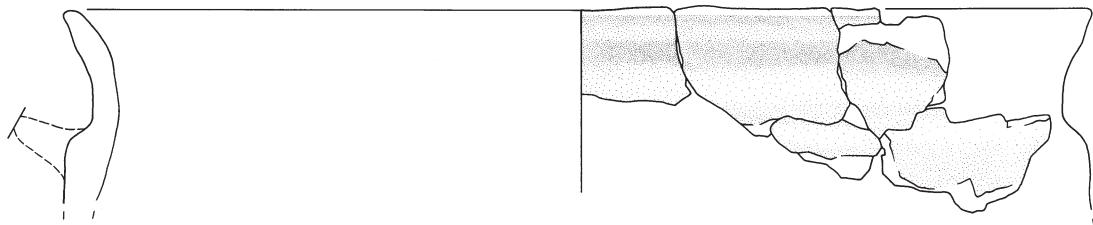
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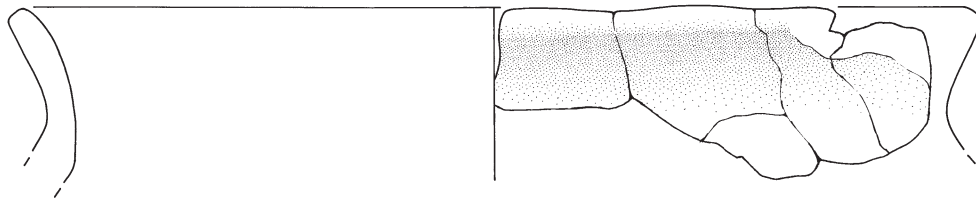
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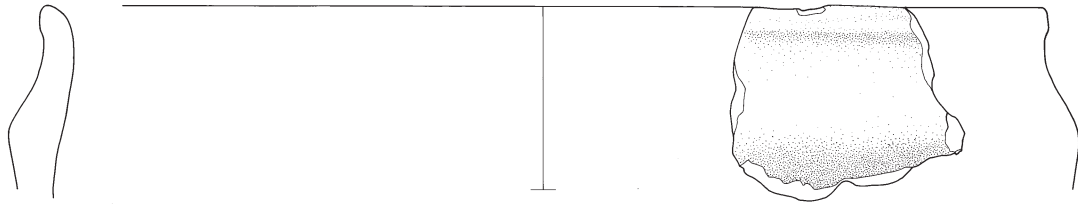
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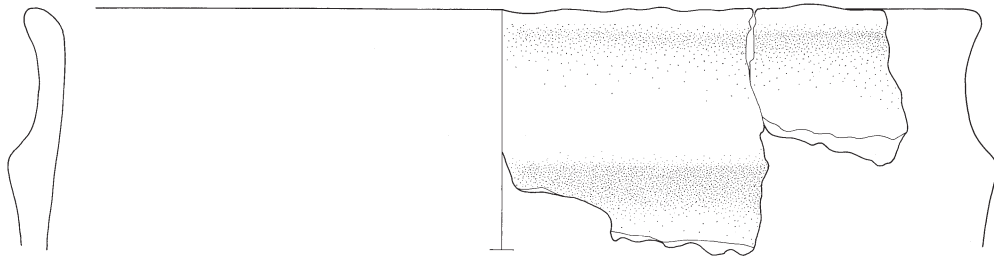
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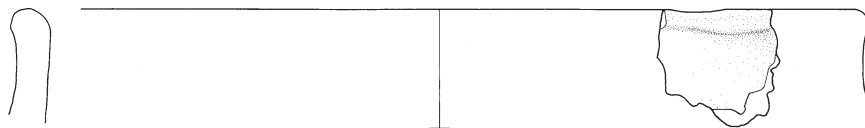
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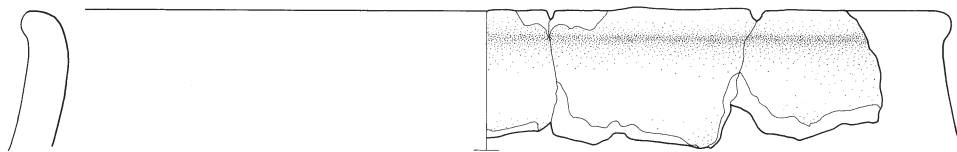
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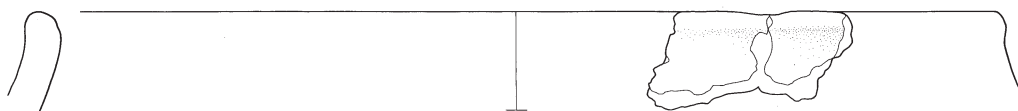
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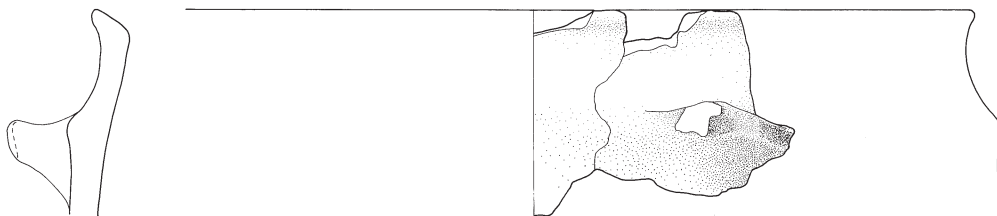
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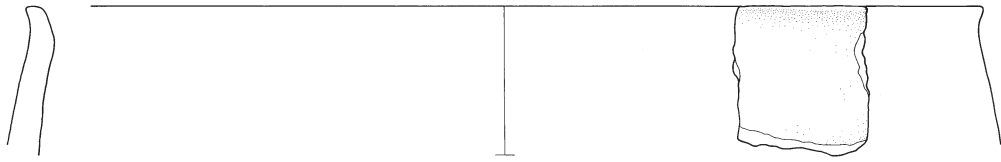
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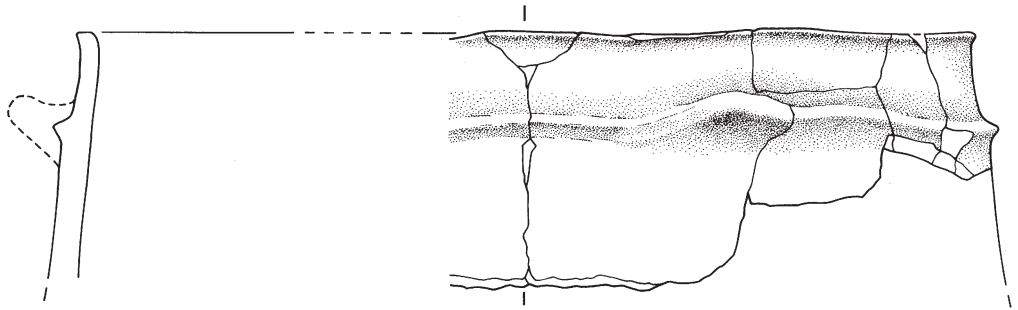
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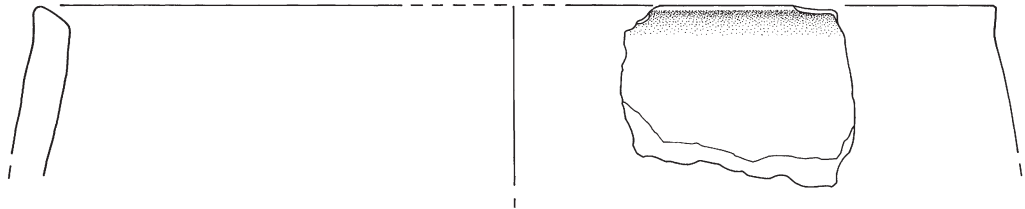
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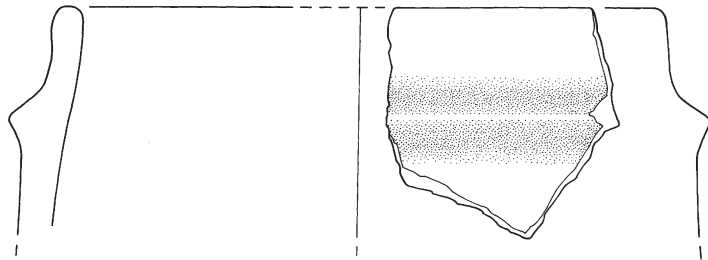
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33



35

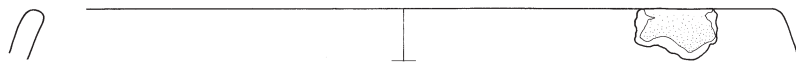


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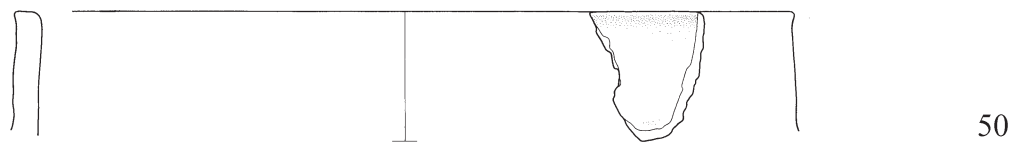
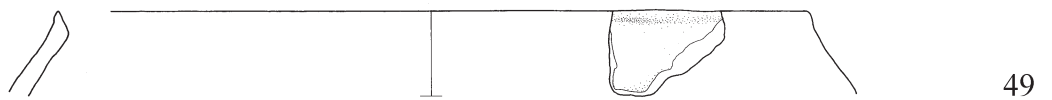
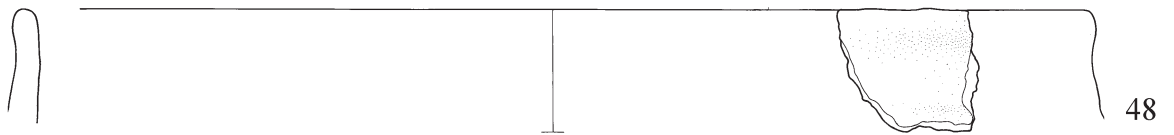
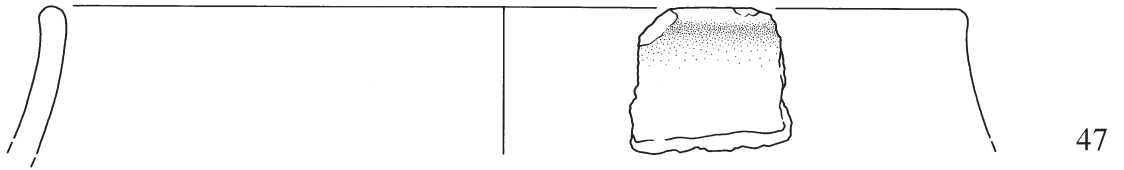
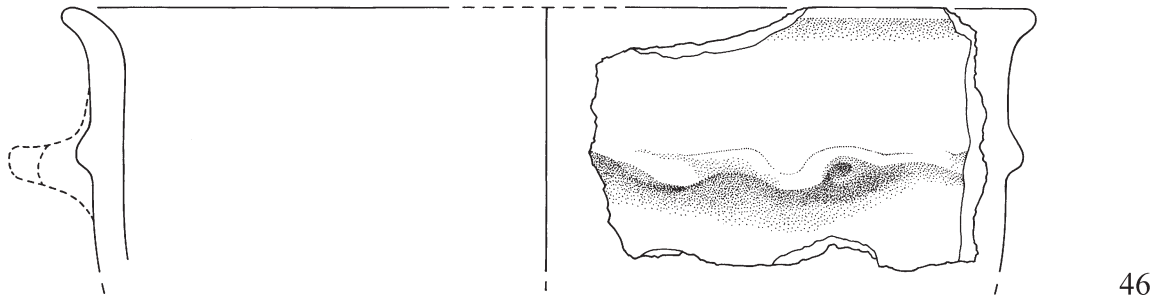
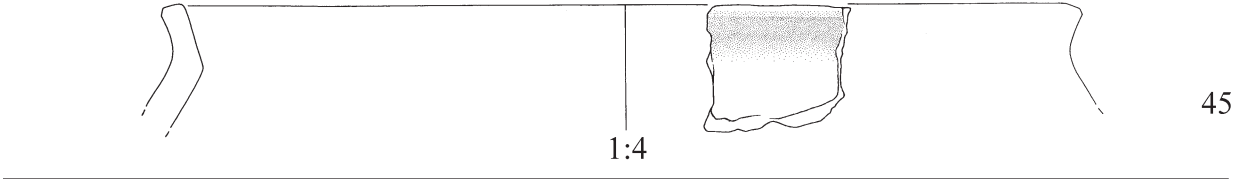
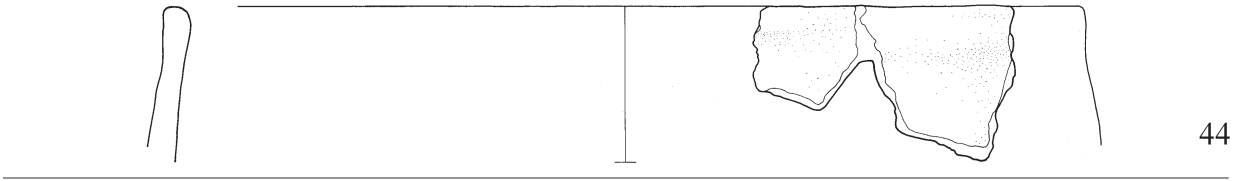


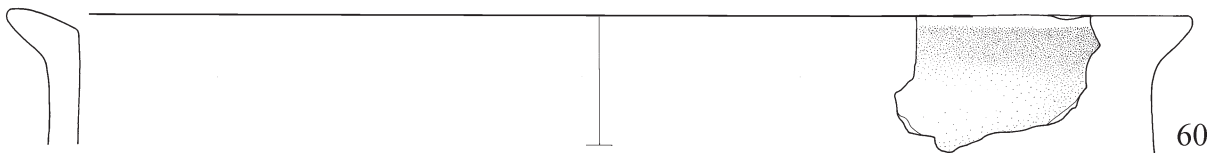
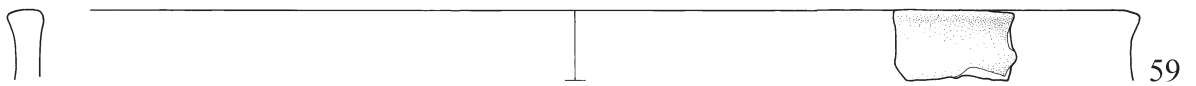
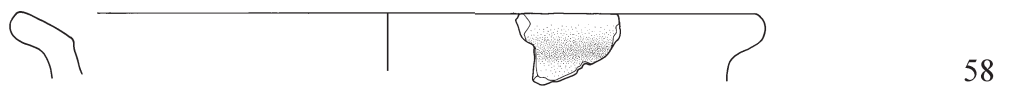
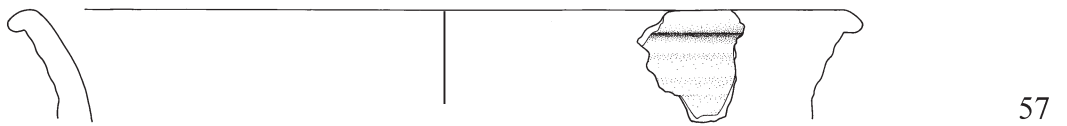
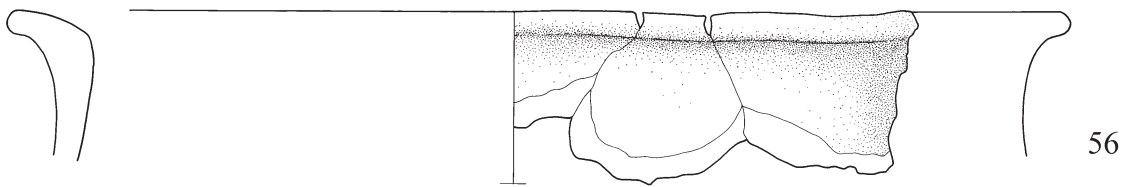
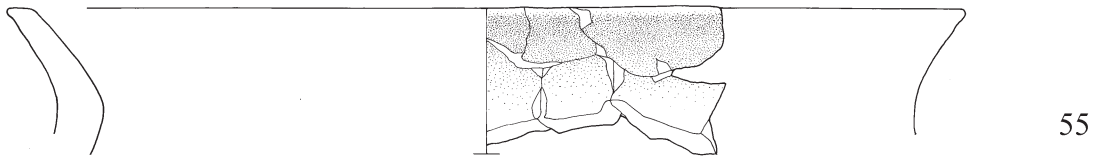
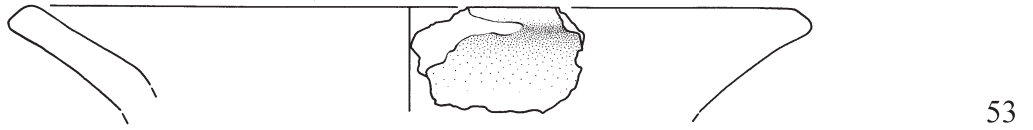
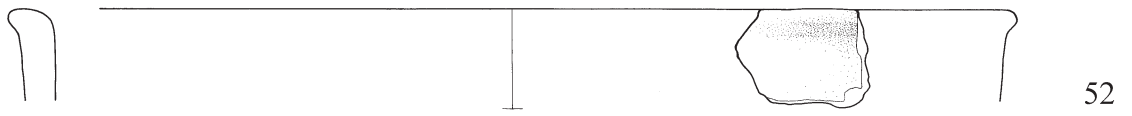
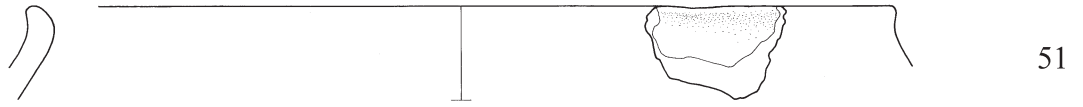
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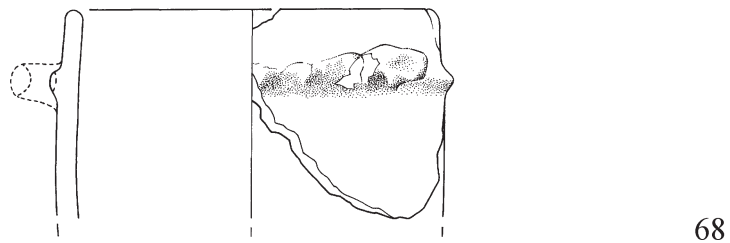
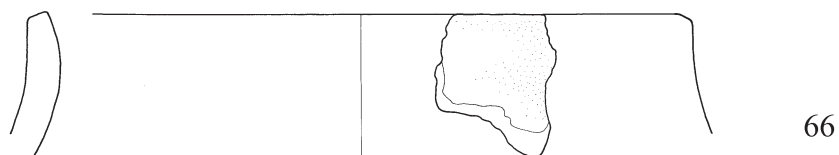
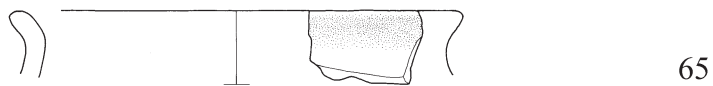
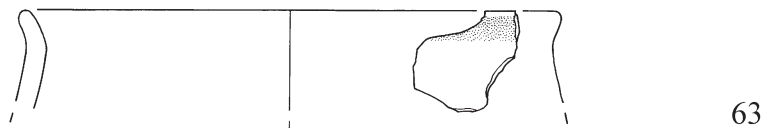
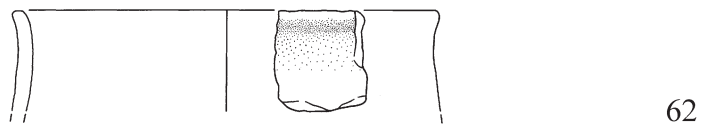
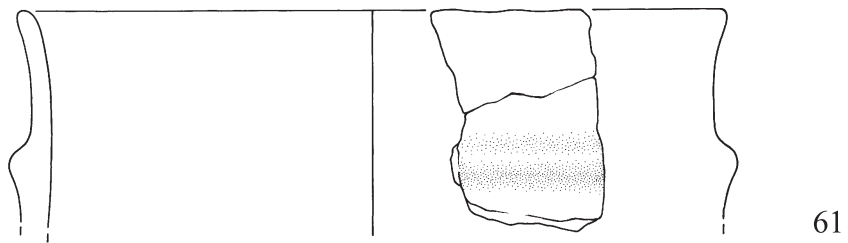
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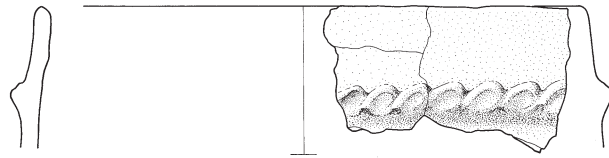
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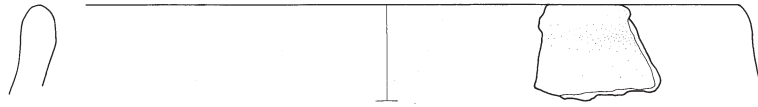




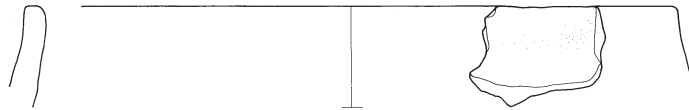




70



71



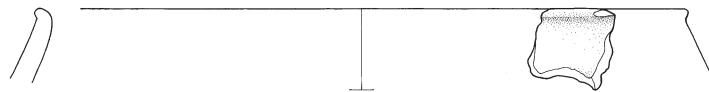
72



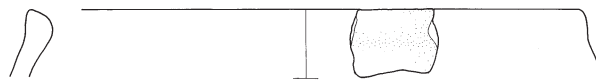
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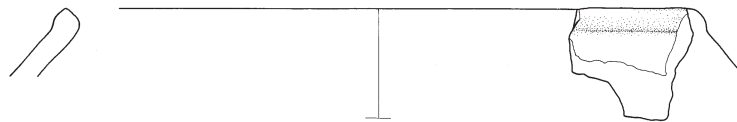
74



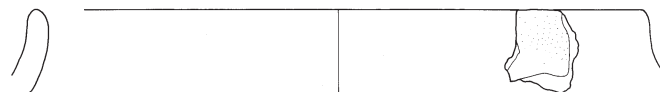
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76



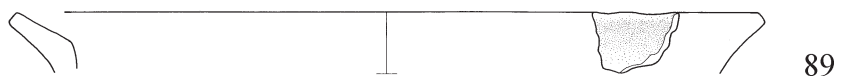
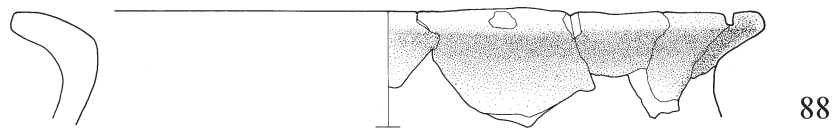
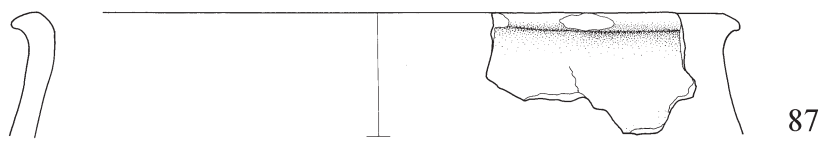
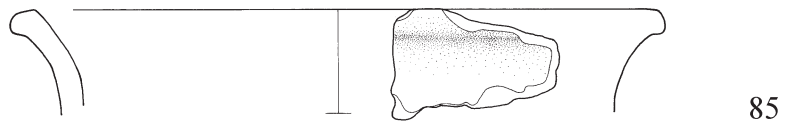
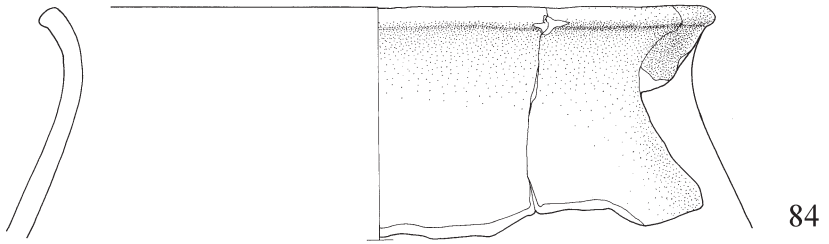
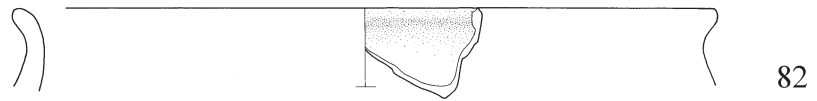
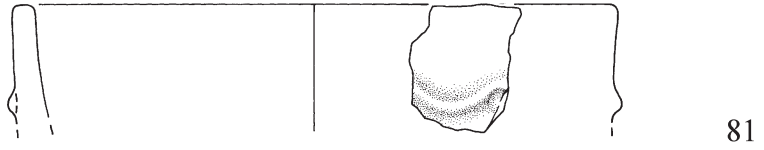
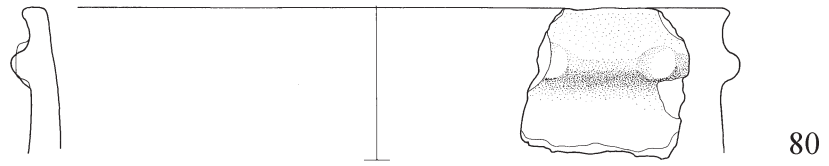
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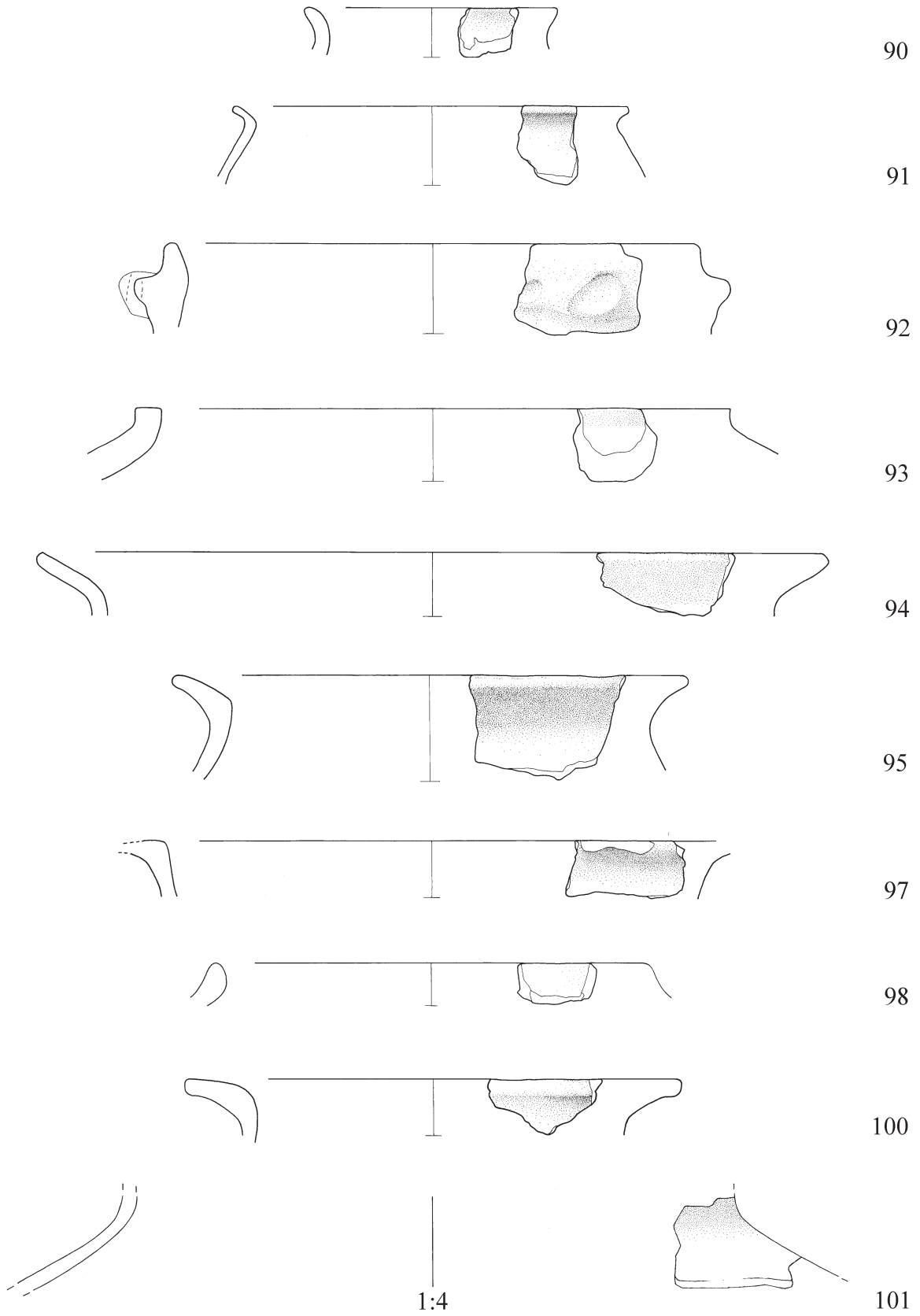


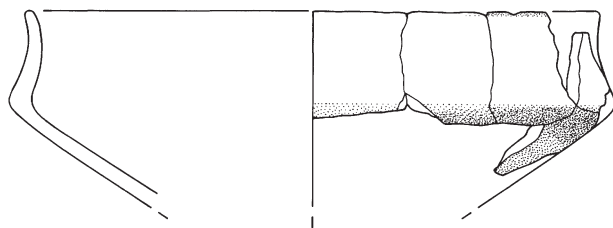
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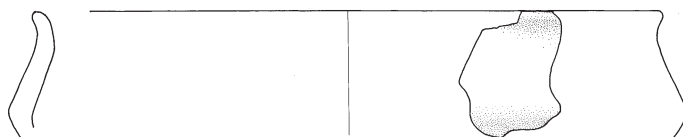
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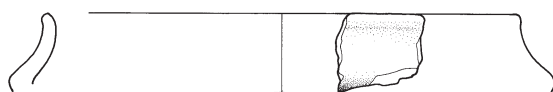




102



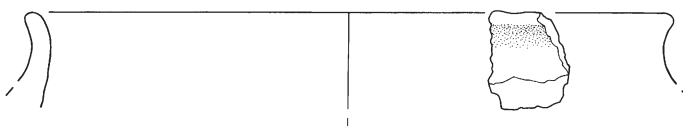
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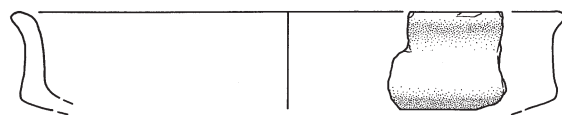
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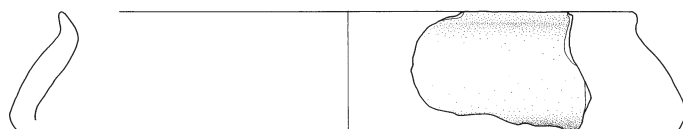
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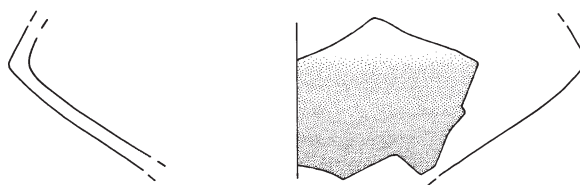
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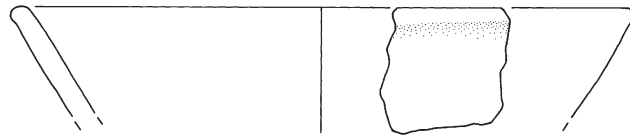
107



108



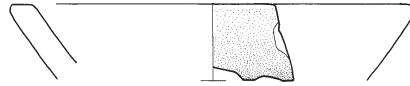
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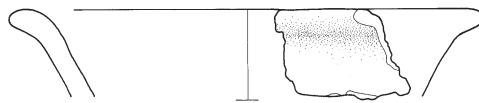
113



115



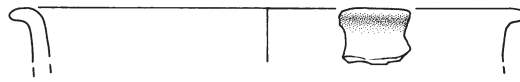
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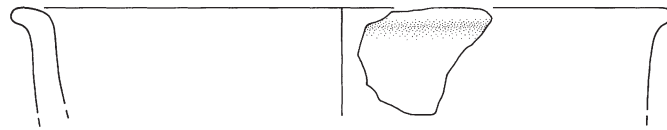
117



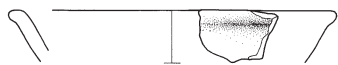
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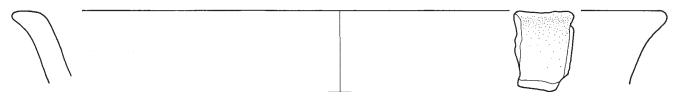
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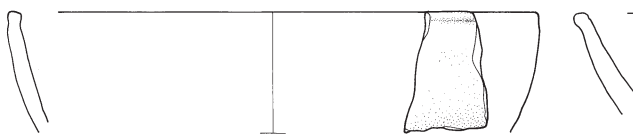
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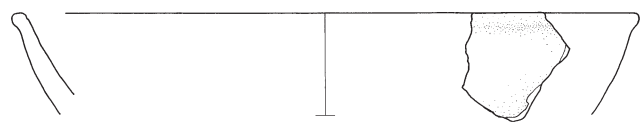
121



122



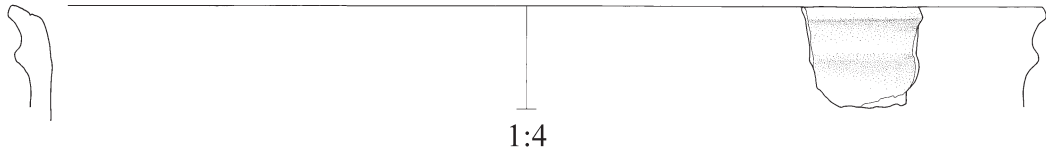
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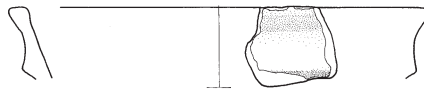
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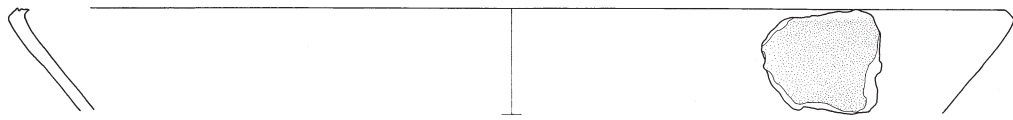
126



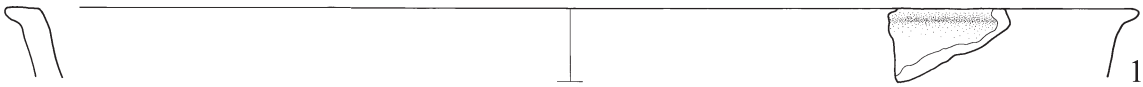
127



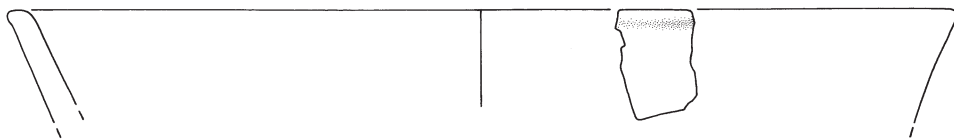
128



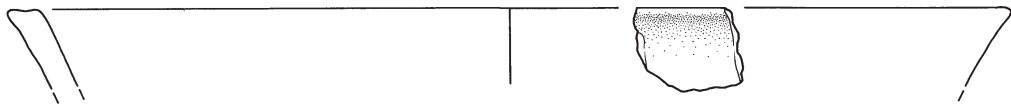
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130



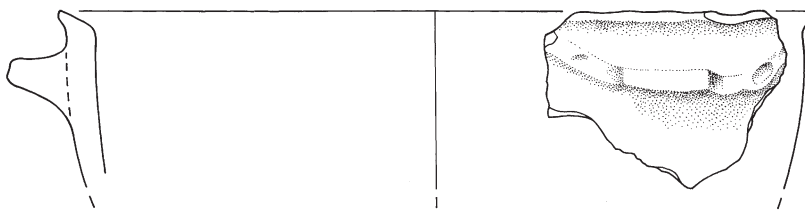
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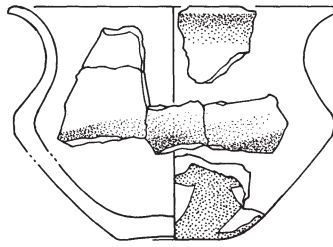
133



135

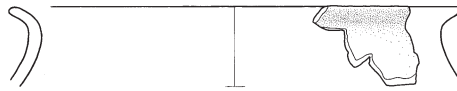


136

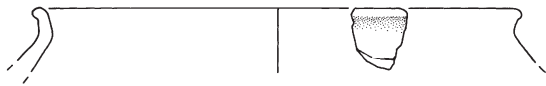


137

1:2



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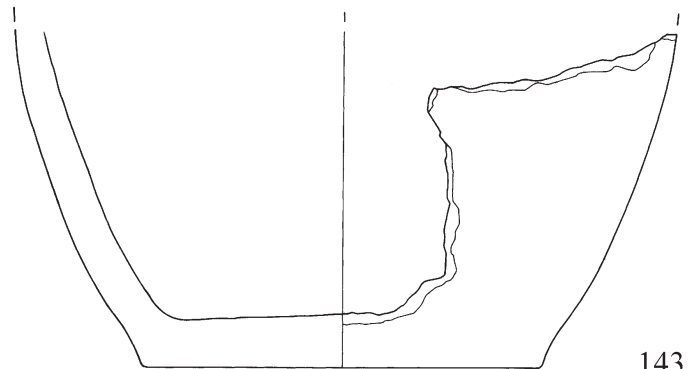
139



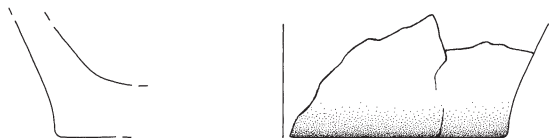
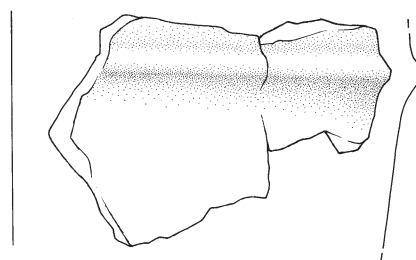
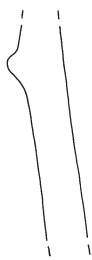
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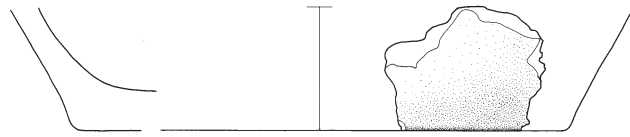
142



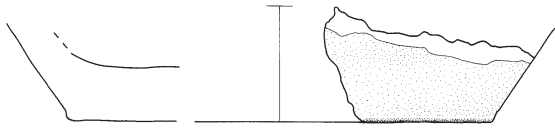
143



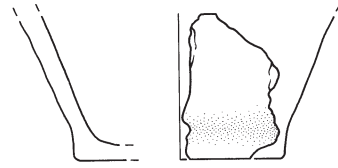
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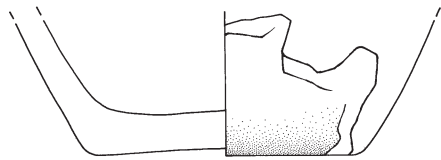
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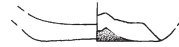
147



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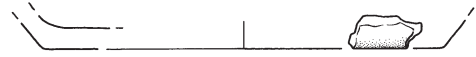
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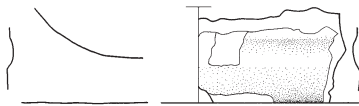
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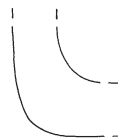
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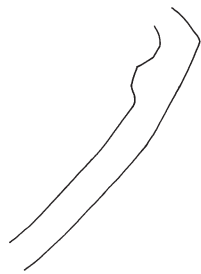
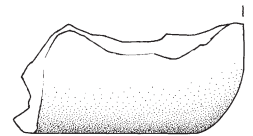
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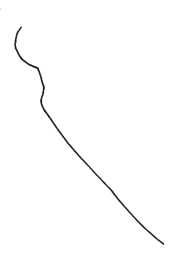
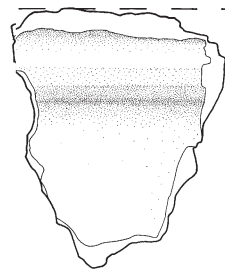
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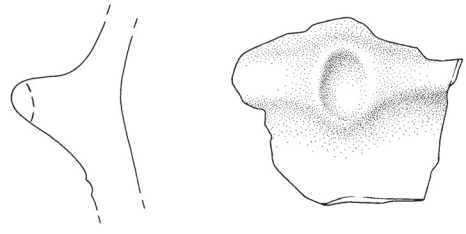
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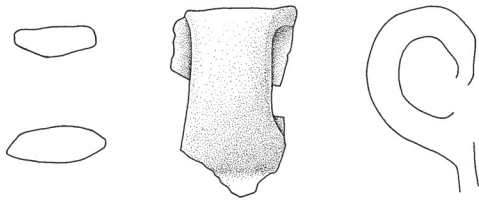




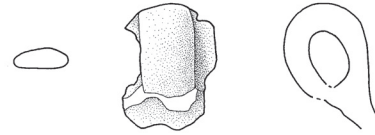
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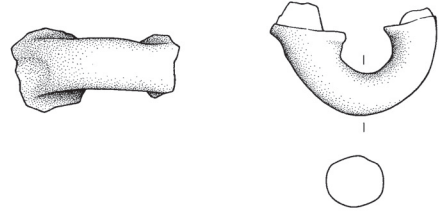
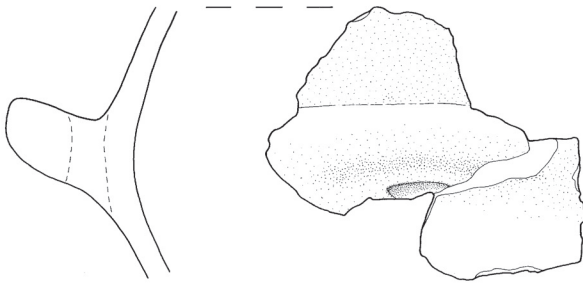
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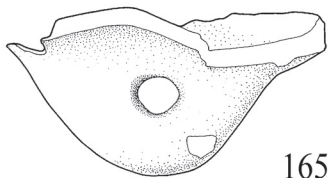
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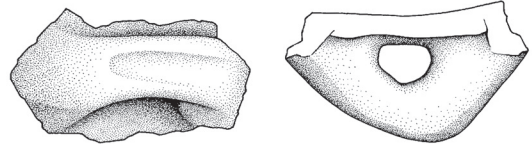
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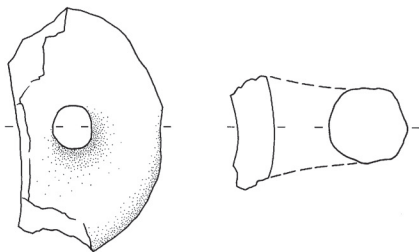
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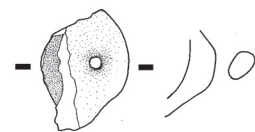
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## 8. NOTES ON THE FABRICS OF DIAGNOSTIC SHERDS FROM P13

### 8.1. Aims

Diagnostic impasto sherds from P13 were analysed to establish possible variations occurring in their fabrics. During the study of the P13 ceramics it was noted that there were various distinct groups of fabrics. As such it resembles the characteristics of the ceramics excavated at Casale Nuovo where also several pastes are reported leading to speculations regarding the unsystematic production of the pottery (Loney, 2000; Mater, 2005: pp. 96–97). Unfortunately the fabrics encountered at Casale Nuovo are not yet published in detail.

Fabric analysis may also give data on technological aspects and their relation to function and form of pottery. As such fabric analysis complements pottery typologies and in combination it may result in a detailed image of continuity and development in local pottery production. For two reasons fabric analysis of the pottery of P13 seemed useful. Firstly to establish whether the fabrics would reveal specific characteristics that could be related to their supposed function in the salt production process. Secondly to compare the fabrics to those of the nearby located protohistorical settlement of Satricum as published in Attema *et al.* (2001/2002). This was done in order to detect any differences and analogies that might exist between the Late Bronze Age fabrics found at P13 and the Iron Age fabrics from Satricum.

The fabrics were analysed by the Laboratory of Conservation and Material studies of the University of Groningen. On its website one can find colour photographs of the black and white plates reproduced here. The website also relates the fabrics to the P13 pottery typology in order to make clear which ceramics were produced from specific P13 fabrics ([www.lcm.rug.nl/Research](http://www.lcm.rug.nl/Research)). The P13 fabrics are described as NETTUNO fabric 1, NETTUNO fabric 2, etc.

### 8.2. Method

The descriptions of the fabrics of P13 are based on both the macro- and microscopical study of fresh fractures. Fresh fractures were studied with a magnification between 6x and 30x and list measurable characteristics such as colour and hardness as well as quantity and type of inclusions, their sorting and particle size. In addition, of each fabric a minimum of two thin-sections is given to back up these descriptions with microscopical observations. It must be noted that generally speaking the thin-sections confirm the

characteristics described on basis of the fresh cross-sections, be it that in thin-sections structurally a higher percentage of inclusions is detected than in fresh cross-sections. This is especially the case with fabrics having percentages above 20% inclusions. The number of diagnostic impasto sherds studied in this way was 235 on a total of 43,929 sherds. Of these 235 sherds or sherd assemblages, 210 (89%) could be grouped in one of six fabrics (see table 3). NETTUNO fabric 1 is represented best with 99 sherds (42%). Descriptions follow the method used for the fabrics of Satricum by which the characteristics are given in coded form (*cf.* Attema *et al.*, 2001/2002: [www.lcm.rug.nl/research](http://www.lcm.rug.nl/research) under 'Fabrics of architectural terracottas and pottery from Satricum'). An example of such a code in the present study is NETI/(II).AD\*.ms-ps(2-4).a, variety of characteristics, whereby NET stands for the location code (Nettuno); the Roman numerals for the colour family, (in this case red and orange); A and D for the most important inclusions; ms and ps for sorting characteristics of inclusions, with 2-4 denoting particle size and a referring to the total percentage of inclusions. Fabrics with comparable characteristics will, generally speaking, also have comparable codes. This, however, does not hold for fabrics with only few inclusions, as these lack the discriminating factors of dominance of certain inclusions, sorting and particle size. A full description of the six fabrics that were discerned in the diagnostic sherds of P13 is given in section 8.5, as well as black and white photographs of the cross-sections and thin-sections.

### 8.3. Results

From the fabric descriptions given in section 8.5, it results that the vessels of P13 were hand made. As regards NETTUNO fabric 1, this conclusion is based on the relatively large but few inclusions present in the clay, their uneven distribution, the random orientation of clay pellets and the specific patterns in shrinkage fissures. With NETTUNO fabric 2 it is especially the sorting, the variety in fissures and the variety in orientation of clay pellets that indicates that we deal with hand made pottery. In the case of NETTUNO fabric 3, it is the random orientation of fissures in different sizes, supported by the weak micaceousness of the clay pellets in all directions under crossed polarizers in thin-section that points to handmade vessels. This is assumed in spite of the preferential orientation of fissures noted in the thin-section that might indicate the use of a slow wheel. In the case of NETTUNO fabric 4, it was impossible to establish whether the vessels of this fabric were modelled by hand and/or

Table 3. The six main fabrics found at P13

|   |  |     |
|---|--|-----|
| 1 | NET I=.ws*(1-4*).d, (large) FeMn nodules / (large) Augite / (hardness +)                 | 99  |
| 2 | NET I.(ad*)eq.ps-vps(1-4).c, (large) FeMn nodules / (large) Augite                       | 48  |
| 3 | NET I/(II).AD*.ms(-ps)(2-4).b, ((large) FeMn nodules), ((large) Augite), ((large) Flint) | 12  |
| 4 | NET I/(II).AD*.ms(-ps)(2-4).a, variety of characteristics                                | 36  |
| 5 | NET I.EH.vps(1-4).b, (large) FeMn / crumbling  | 9   |
| 6 | NET I.eh.vps(1-4).c, (large) FeMn nodules / (hardness+)                                  | 6   |
|   | Total number of sherds   | 210 |

by slow wheel due to the high proportion of inclusions and the anhedral shape of the minerals that does not facilitate preferential orientation. It was observed, however, that the clay matrix of this fabric is hardly micaceous and that, where visible, the pellets are orientated randomly. Furthermore, it was observed that there is no difference in orientation between inclusions just beneath the surface and in the core that would indicate finishing by slow wheel. The many small and multidirectional fissures in the clay matrix moreover suggest the absence of preferential orientation. In combination these factors lead to the conclusion that also the vessels of this fabric were modelled by hand. Finally, in the clay matrices of NETTUNO fabric 5 and NETTUNO fabric 6, traces of insufficient blending, relatively large Ferro-Manganese nodules and fissures going in variable directions were noted suggesting that also the vessels of these fabrics were handmade.

Indications for surface treatment of P13 pottery was noted in a thin-section of NETTUNO fabric 2 (plate 2.4), which showed a zone with a changing clay colour and increase of small inclusions just below the surface at the interior side of the sherd. It may be that a fine tempered variety of the clay was used to finish the surface. This, we would, however, not call a veritable slip, even though the surface was treated with care. The observed difference could as well be caused by insufficient blending of the clay-pastes used. A comparable characteristic was observed in a thin-section of NETTUNO fabric 3. Here a zone just beneath the surface was identified in which exclusively smaller inclusions were present, indicating that the object was finished with a clay containing different tempers. The transition between the two areas is characterized by a slight colour change and a shifting average size of inclusions. Surface treatment appears, however, not to be a structural characteristic of the sherds of P13.

In the fabric descriptions of both NETTUNO fabrics 1 and 2, it is mentioned that the clay used to form the vessels seems hardly processed. The insufficiently

blended clays of NETTUNO fabrics 5 and 6 also testify to the poor attention paid to the preparation of the clay.

As to the issue of the preparation of the clay, we may turn to tables 4 and 5 in which a summary of the characteristics of the fabrics is given. On basis of these data we suggest that, while Ferro/Manganese and Augite may have been natural inclusions of the unprepared or hardly prepared clay, sand consisting of Quartz and Feldspars may have been added intentionally to improve its workability and/or firing characteristics. This is based on the observation that NETTUNO fabrics 1 to 4 show an increasing percentage from less than 5% for NETTUNO fabric 1 to more than 20% for NETTUNO fabric 4. This increase regards Quartz and Feldspars only, with Ferro-Manganese nodules and Augite remaining rather constant and even decreasing in fabrics with higher total percentages. Therefore it is assumed that Ferro-Manganese nodules and Augite were natural ingredients and that Quartz and Feldspars may have been added. Apparently the modelling of pottery was not hampered by the occasional to frequent presence of large inclusions, as table 4 shows, though during the preparation of the paste the largest inclusions will have been removed.

#### 8.4. Comparison of P13 fabrics 1 to 6 with fabrics described for ceramics from Satricum

The analysis of the diagnostic impasto sherds of P13 was done using the same method to analyse the impasto finds from the protohistorical settlement of Satricum, located 10 kilometers inland from P13. Table 6 represents the correlation between NETTUNO fabrics 1 to 4 and the Satricum fabrics. It appears that, despite some variety in details, the general characteristics are homogeneous to a high degree. The differences in fabric code for NETTUNO fabric 3 and the related fabric from Satricum must be attributed to the limited number of sherds in the P13 fabric.

We note that NETTUNO fabrics 5 and 6 correspond strongly on the level of inclusions, but less so

Table 4. Characteristics of NETTUNO fabrics 1 to 4 in fresh cross section (x6-x30).

| FABRIC (fresh cross section)      | Nº 1                | Nº 2          | Nº 3   | Nº 4      |
|-----------------------------------|---------------------|---------------|--|-----------|
| total volume of inclusions in %   | < 5 %               | 5 – 10 %      | 10 – 20 %  | > 20 %    |
| sorting                           | “ws” <sup>21)</sup> | ps – vps      | ms (– ps)  | ms – ps   |
| range in particle size            | < 90 – > 2000       | < 90 – > 2000 | < 500, regularly up to 1400/2000 < 710, frequently up to 1400/2000 |           |
| Quartz <sup>2)</sup>              | x – p               | p – 5 %       | 5 – 15 %   | 15 – 30 % |
| Feldspar <sup>2)</sup>            | x – p               | p – 5 %       | 5 – 15 %   | 15 – 30 % |
| Augite                            | p – 2 %             | 2 – 7 %       | p – 3 %  | p – 5 %   |
| Olivine                           | x – p               |               |  |           |
| Biotite Mica                      |                     |               |  | x – p     |
| Leucite                           |                     |               |  |           |
| Garnet                            |                     |               |  |           |
| Flint                             |                     | x – p         | 1 – 3 %  | p – 2 %   |
| Quartzite                         |                     |               |  |           |
| Leucite-Tuff or Leucite-Lava      |                     |               |  |           |
| Tuff                              |                     |               |  |           |
| Lava                              |                     | p (once)      |  |           |
| Volcanic glass                    |                     |               |  |           |
| Calcite                           |                     |               |  |           |
| FerroManganese nodules and stains | p – 3 %             | 2 – 7 %       | 1 – 3 %  | 2 – 5 %   |
| Crushed pottery                   |                     |               |  | possibly  |
| Organic inclusions                |                     |               |  |           |

1. Due to the very low volume of inclusions sorting is not relevant. By eye most of the fabric types with that characteristic appear as well sorted. The fabric codes summarize characteristics detectable by eye.

2. Quartz and Feldspars are hardly separable in fresh cross section due to erosion/abrasion. Thin-section analysis offers the means to distinguish individual types.

Table 5. Characteristics of NETTUNO fabrics 1 to 4 in thin section (x15-x87,5).

| FABRIC (thin section)             | Nº 1          | Nº 2       | Nº 3   | Nº 4                |
|-----------------------------------|---------------|------------|--|---------------------|
| total volume of inclusions in %   | 2-3 %         | 5-10%      | 15-20%   | >20%, possibly >40% |
| Sorting                           | indescribable | ps-vps     | ms(-ps)  | ms-ps               |
| range in particle size            | <90 -> 2000   | <90 ->2000 | < 500, regularly up to 1400/2000 < 710, frequently up to 1400/2000 |                     |
| Quartz                            | P             | p-1%       | 7-10%  | 15-25%              |
| Feldspar                          | P             | p-1%       | 5-10%  | 15-25%              |
| Augite                            | p-2%          | 2-3%       | p-1%   | 3-5%                |
| Olivine                           |               |            |  |                     |
| Biotite Mica                      |               |            |  |                     |
| Leucite                           |               |            |  |                     |
| Garnet                            | P             | P          | P  |                     |
| Flint                             |               | P          | 1-2%   | p-1%                |
| Quartzite                         |               |            |  |                     |
| Leucite-Tuff or Leucite-Lava      |               |            |  |                     |
| Tuff                              |               |            |  |                     |
| Lava                              |               |            |  |                     |
| Volcanic glass                    |               |            | P  | p                   |
| Calcite                           |               |            |  |                     |
| FerroManganese nodules and stains | p-3%          | 3-5%       | 1%   | p                   |
| Crushed pottery                   |               |            |  |                     |
| Organic inclusions                |               |            |  |                     |

Table 6. Correlation between fabrics of P13 and Satricum.

|     |  |      |   |
|-----|--|------|---|
| № 1 | NET I.=.ws*(1-4*).d,<br>(large) FeMn nodules / (large) Augite / (hardness +)               | ◀ ▶  | SAT I.=.ws*(1-4*).d,<br>((large) FeMn nodules)                                  |
|     | ▲<br>▼   |      | ▲<br>▼  |
| № 2 | NET I.(ad*)eq.ps-vps(1-4).c,<br>(large) FeMn nodules / (large) Augite                      | ◀ ▶  | SAT I.ad*eq.ps-vps*(1-4).c,<br>(large) FeMn nodules                             |
|     | ▲<br>▼   |      | ▲<br>▼  |
| № 3 | NET I/(II).AD*.ms(-ps)(2-4).b,<br>((large) FeMn nodules), ((large) Augite), ((large) Flint | ◀ ▶* | SAT I/(II).AD*.ms-ps(1-4).b,<br>variety of characteristics                      |
|     | ▲<br>▼   |      | ▲<br>▼  |
| № 4 | NET I/(II).AD*.ms-ps(2-4).a,<br>variety of characteristics                                 | ◀ ▶  | SAT I/(II).AD*.ms-vps(1-4).a,<br>variety of characteristics / (slightly) gritty |

as regards characteristics of their clay matrices. This difference is largely caused by the ratio clay and inclusions, which in the case of NETTUNO fabric 5 (NET I.EH.vps(1-4).b, (large) FeMn / crumbling) apparently leads to a less coherent fabric. NETTUNO fabric 6 (NET I.eh.vps(1-4).c, (large) FeMn nodules / (hardness+)) has on account of its low content of inclusions and structure of the clay matrix on microscopical level a relationship with NET I.=.ws\*(1-4\*).d, (large) FeMn nodules / (large) Augite / (hardness +). NETTUNO fabrics 5 and 6 have no relation with the fabrics of Satricum.

Table 7 shows the numbers of impasto fabrics from Satricum. The total number of diagnostic sherds from Satricum classified as fabric is 5350 distributed over five colour families: reddish (I), reddish/orange (I/II), orange (II), orange/pale (II/III) and pale (III) covering about 5 centuries of local pottery production. The current four fabrics are classified under two colour families (I and I/II), of which the total number of described sherds and sherd-assemblages is 4249. They cover 83% of the material described in these two colour families red, red/orange, and 66% of all of the sherds described for Satricum. SAT I/(II).AD\*.ms-vps(1-4).a, variety of characteristics / (slightly) gritty is by far the most dominant fabric for Satricum, while NET I.=.ws\*(1-4\*).d, (large) FeMn nodules / (large) Augite / (hardness +) is the dominant fabric for Piccarreta 13.

Regarding the difference in chronology between P13 and Satricum, the predominance of a scarcely prepared clay for a Late Bronze Age site and the predominance of an intentionally tempered clay for an Iron Age site, indicates a gradual shift in ceramic technology. This is underlined by fabrics from Satricum

where the majority of ceramics from the earliest phase is made from a paste almost identical to the dominant P13 fabric.

#### 8.5. Fabric descriptions and summary of fabric characteristics

##### NETTUNO fabric 1

NET I.=.ws\*(1-4\*).d, (large) FeMn nodules/(large) Augite / (hardness +)

Description on basis of macroscopical observation (see table 8.1 and plate 1.1)

The fabric is reddish to brownish and occasionally fired to almost black. Predominant Munsell colours are 2.5 YR 3/3-3/4 (dusky red) and 10 YR 2/1 (black). The impression by naked eye of a very low percentage of inclusions is confirmed under the microscope as the total volume of inclusions never exceeds 5% with the majority of the sherds having only 1-2%. The distribution of inclusions over the clay is very uneven. The low volume of inclusions and their distribution make it impossible to describe sorting in detail though the fabric seems well sorted by eye. The fabric contains some fragments of relatively large shiny, black Augite and spheroidal rust brown Ferro-Manganese nodules, as well as occasionally reddish brown Flint, colourless or transparent Feldspars and Quartz. The particles are rounded to sub-angular. The structure of the fresh cross section is extremely variable: from smooth to hackly. Under the microscope, the fracture appears hackly due to the combination of a very dense clay matrix with a very low percentage of inclusions with a relatively coarse fraction. The paste for this type of ceramic seems to have been hardly processed before

Table 7. Numbers of impasto finds from Satricum.

|  |       |      |
|--|-------|------|
| SAT I.=ws*(1-4*).d, ((large) FeMn nodules)                                   | 17,1% | 602  |
| SAT I.ad*eq.ps-vps*(1-4).c, (large) FeMn nodules                             | 14,6% | 516  |
| SAT I/(II).AD*.ms-ps(1-4).b, variety of characteristics                      | 19,8% | 699  |
| SAT I/(II).AD*.ms-vps(1-4).a, variety of characteristics / (slightly) gritty | 48,5% | 1712 |
| Total  |       | 3529 |

\*(Satricum colour family I: 1810 sherds; Satricum colour family I/II: 2439 sherds; Satricum colour family II: 732 sherds; Satricum colour family II/III: 321 sherds and Satricum colour family III: 48: In total 5350 sherds)

modelling the vessel. A few sherds are locally harder compared to the average hardness of 2-3 on Mohs' scale.

This fabric shares characteristics with fabric number 2: NET I.(ad\*)eq.ps-vps(1-4).c, (large) FeMn nodules/(large) Augite.

*Description on basis of thin-section (see table 8.2 and plates 1.2 and 1.3)*

Observation of the thin-section shows that this fabric has very few inclusions except for some brownish black Ferro-Manganese nodules (with inclusions) and Augite fragments that can also be detected by the naked eye (both have sizes up to around 2000 = 0,2 cm). The Ferro-Manganese nodules are rounded, while the more frequently occurring tiny Ferro-Manganese stains in the clay matrix (up to 500 = 0,05 cm) are rounded to sub-angular. The section hardly contains other inclusions. It has, however, a rich variety of shrinkage fissures, the majority following the shape of the section. Towards the centre of the section these fissures tend to have random orientations. The clay matrix is composed of randomly orientated clay pellets, as can be observed under crossed polarizers: the faint micaceousness of the clay shows variety in orientation when turning the rotation table. Even in the fresh cross section diversity in red to brown colour of individual clay pellets is visible, indicating that the paste was poorly blended. The colour variety should not be interpreted as temper composed of crushed pottery. Description of sorting is impossible on account of the low percentage of inclusions.

The relatively large but few inclusions, the uneven distribution, the random orientation of clay pellets and the fissure patterns indicate that vessels of this fabric were handmade.

### NETTUNO fabric 2

NET I.(ad\*)eq.ps-vps(1-4).c, (large) FeMn nodules/(large) Augite

Description on basis of macroscopical observation (table 9.1 and plate 2.1)

The fabric is reddish to brownish and occasionally fired to almost black. The predominant Munsell colour is 2.5 YR 3/3-4/6 (dusky – dark red). The impression by naked eye of a low percentage of poorly to very poorly sorted inclusions is confirmed under the microscope, the total volume being between 5 and 10%. Black Augite and rust brown coloured Ferro-Manganese nodules and occasionally Quartz, Feldspars and Flint occur. Most of the sherds have a slight predominance of Augite and Ferro-Manganese nodules, other also of Quartz and Feldspars. The particles are rounded to angular.

The structure of the fresh cross-section is extremely variable: from smooth to hackly. Under the microscope the fracture appears hackly due to the combination of a dense clay matrix and a low percentage of relatively coarse inclusions. Like fabric 1, also this paste seems to have been hardly processed before the clay was used to shape the vessel. The variety in hardness noticed in fabric 1 is not detected in this fabric; all sherds fall within the average range of Mohs' scale hardness 2-3. Fabric number 2 shares characteristics with number 1 NET I.=ws\*(1-4\*).d, (large) FeMn nodules / (large) Augite / (hardness +) and number 3 NET I/(II).AD\*.ms(-ps)(2-4).b, ((large) FeMn nodules), ((large) Augite), ((large) Flint).

*Thin-section (table 9.2 and plates 2.2, 2.3 and 2.4)*

In general the fabric gives the impression of a low percentage of inclusions with a substantial variety in size. Very poorly sorted brownish black Ferro-Manganese nodules with inclusions (up to 0,5 cm) can be detected (also visible by naked eye), and to a lesser extent Augite fragments (up to 1400 = 0,14 cm.). The Ferro-Manganese nodules are rounded, while the tiny Ferro-Manganese stains, also present in the clay matrix, are rounded to sub-angular. The Augite is rounded to angular, but rarely euhedral. Ferro-Manganese nodules and Augite are predominantly present. Furthermore

some small Quartz and Feldspar are detectable (<355  $\mu\text{m} = < 0,0355 \text{ cm.}$ ). The clay matrix is somewhat micaceous with clay pellets varying in orientation. Very small to large shrinkage fissures run more or less parallel with the shape of the section. Towards the centre of the section, these fissures tend to have a more random orientation. The sorting, variety in fissures and variety in orientation of clay pellets indicate modelling by hand only.

A second thin-section shows a zone with changing clay colour and increase of small inclusions just below the surface. This zone is located at the interior side of the object. There is however no clear transition in density or structure between the two areas, nor are shrinkage fissures present. It seems as if a purified or purified/fine tempered paste has been applied to finish the surface (plate 2.4). Although it appears that the interior was treated with special attention, this surface treatment can not be described as a veritable slip.

### NETTUNO fabric 3

NET I/(II).AD\*.ms(-ps)(2-4).b, ((large) FeMn nodules), ((large) Augite), ((large) Flint

Description on basis of macroscopical observation (table 10.1, plate 3.1)

The fabric is reddish/orange to brownish firing, occasionally with a dark inner core. The predominant colour is Munsell 2.5 YR 3/4 (dusky red) (25%), although this is based on a relatively low number of sherds assigned to this fabric. The total amount of inclusions is between 10 and 20%. Fine, mainly rounded to sub-angular Quartz and Feldspar is predominant in the clay matrix, though this is hardly detectable by naked eye. In general the sorting is moderate to poor, with an emphasis on moderate. The distribution of inclusions is fairly equal.

Besides Quartz and Feldspars, occasionally Augite, Ferro-Manganese nodules and Flint occur. The Ferro-Manganese nodules and to a lesser extent the Augite are visible by naked eye.

This fabric shares characteristics with NET I.(ad\*)eq.ps-vps(1-4).c, (large) FeMn nodules / (large) Augite and NET I/(II).AD\*.ms-ps(2-4).a, variety of characteristics.

*Description of thin-section (see table 10.2 and plates 3.2 and 3.3)*

This fabric is considered slightly more sorted when compared to the related fabric number 4: NET I/(II).AD\*.ms-ps(2-4).a, variety of characteristics (compare the thin-sections of fabric 3 and 4, which have the same size in field of view). In the fabric codes this is

expressed in ms (-ps) versus ms-ps. The total amount of inclusions is between 15 and 20%. Although Ferro-Manganese nodules and Augite, characteristic for fabric numbers 1 and 2, are present here, its volume is less and the maximum size of the particles ranges up to only 1000 ( $=0,1 \text{ cm.}$ ). Abundantly present is a mixture of fine, rounded to sub-angular Quartz and Feldspar with a slight emphasis on Feldspar (<355 - 500  $= < 0,035 - 0,05 \text{ cm.}$ ). About half of the inclusions show traces of initial weathering, with (polycrystalline) Quartz being affected most. Thin-sections from Iron Age impasto sherds from Satricum show comparable levels of weathering (Delvigne, 1998: p. 15). The shape of the majority of inclusions is rounded to sub-angular.

The clay matrix is somewhat micaceous and shows many small fissures running parallel with the shape of the section. Furthermore, large shrinkage fissures throughout the section are noteworthy.

Size and distribution of the inclusions in this section compare to those observed in the thin-sections of fabric number 4 (NET I/(II).AD\*.ms-ps(2-4).a, variety of characteristics). This confirms the mutual relation between both fabrics.

Of special interest in the second thin-section is a zone just beneath the surface in which only smaller inclusions are present, indicating that the object was finished with tempered clay of a different composition. A transition between the two areas is visible in a slight colour change and shifting average size of inclusions. It is comparable to an example described under fabric number 2: NET I.(ad\*)eq.ps-vps(1-4).c, (large) FeMn nodules / (large) Augite.

The fissures visible in the thin-section (plate 3.2) show a strong preferential orientation, which might indicate the use of a slow wheel in shaping the vessels of this fabric. The zone in the right, however, reveals a random orientation of fissures in different sizes. This randomness is supported by the weak micaceousness of the clay pellets in all directions under crossed polarizers. In spite of the preferential orientation of fissures noted in the thin-section, it is, therefore, noted that the vessels of this fabric were also modelled by hand.

### NETTUNO fabric 4

NET I/(II).AD\*.ms-ps(2-4).a, variety of characteristics

Description on basis of macroscopical observation (see table 11.1 and plate 4.1)

The fabric is characterized by a reddish/brownish/orange to black colour, occasionally with a dark core or

dark interior side. Most important colours (67% of the measured colours of the P13 sherds) are Munsell: 2.5 YR 3/4 (dusky red), 2.5 YR 4/6 (dark red), 5 YR 3/4 (dark reddish brown) and 10 YR 2/1 (black).

By naked eye the fresh section gives the impression of a low to medium percentage of inclusions based on the predominance of fine, mainly rounded Quartz and Feldspar. Microscopical investigation on the other hand reveals the presence of a medium to high number of inclusions (>20%), hardly detectable by eye. The feel of the majority of sherds is sandy though: an empirical indicator for above-medium percentages of inclusions. The variety in colour in this group of sherds influences to a high degree the possibility to detect inclusions.

Occasionally brown to black coloured, medium to large sized Ferro-Manganese nodules (up to 2000 = 0,2 cm.) are present and sporadically large Augite or large Flint (up to 1000 = 0,1 cm). Sorting is comparable to the former fabric: moderately to poorly sorted, but with an emphasis on poorly sorted. The average size of the inclusions is somewhat larger compared to fabric number 3.

The clay matrix shows only fine shrinkage fissures in a random orientation, probably related to the high percentage of inclusions.

*Description of thin-section (see table 11.2 and plates 4.2 and 4.3)*

The thin-section in general gives the impression of a high percentage of inclusions, moderately to poorly sorted, with locally a tendency to very poorly sorted. On average the particle size is <710 (<0,017 cm) but frequently ranges up to 1400/2000 (0,14–0,2 cm). Due to the high percentage of inclusions, the clay appears sufficiently and evenly blended. As in fabric 3, about half of the inclusions shows initial weathering with Quartz being affected most. The predominant inclusions are Quartz and Feldspars in equal proportion. Also Ferro-Manganese nodules, Augite and reddish flint can be detected. The high proportion of inclusions and the anhedral shape of the minerals do not facilitate preferential orientation. The clay matrix is hardly micaceous and where visible, the pellets are orientated randomly. Furthermore there is no difference in orientation between inclusions just beneath the surface and in the core that could indicate a finishing operation by slow wheel. The many small and multidirectional fissures in the clay matrix moreover underline the absence of preferential orientation. In combination these factors lead to the conclusion that the vessels of this fabric were modelled by hand.

### NETTUNO fabric 5

NET I.EH.vps(1-4).b, (large) FeMn / crumbling  
Description on basis of macroscopical observation (table 12.1, plate 5.1).

The fabric is characterized by a reddish colour, prevailing Munsell colour 2.5 YR 3/4 (dusky red). A medium percentage 10–20% black Augite and yellowish white but powdery Leucite is well detectable by naked eye. Occasionally Ferro-Manganese nodules can be seen. The inclusions are angular to rounded, unevenly distributed throughout the clay matrix and very poorly sorted in size. All sherds show a variety in fracture: from smooth to hackly. Sherds crumble very easy. This is probably caused by the deterioration of the Leucite, which undermines the internal bond of the material.

*Description of thin-section (table 12.2 and plate 5.2)*

In general this fabric gives the impression of medium percentage inclusions. The particle size ranges from small to large (<90 – >2000) with occasionally relatively very large Ferro-Manganese nodules. Predominantly present are Augite and Leucite inclusions that may be (partially) weathered. The total volume of inclusions lies between 15 and 20%. The thin-section gives a restricted range in presence for both these inclusions, but this is due to the relatively small area represented in thin-section. The clay matrix seems insufficiently blended or even hardly prepared, with lighter and darker zones and fine fissures in varying directions.

The clay matrix with traces of insufficient blending, the relatively large Ferro-Manganese nodules, and fissures in varying directions indicate that vessels of this fabric were handmade.

### NETTUNO fabric 6

NET I.eh.vps(1-4).c, (large) FeMn nodules / (hardness+)  
Description on basis of macroscopical observation (table 13.1, plate 6.1)

The fabric is characterized by a reddish colour, with emphasis on Munsell colour 2.5 YR 3/3 (dusky red). A low total volume of inclusions with a modest predominance of black Augite and yellowish white, powdery Leucite is well detectable by eye. Occasionally Ferro-Manganese nodules can be seen. The inclusions are angular to rounded and unevenly distributed throughout the clay matrix and very poorly sorted in size. Mica seems present substantially in the smoothed surface but is hardly present in the fresh cross sec-



tion. When the vessel was shaped, the mica flakes in the clay tended to become orientated along the surface plane. As with the previous fabric, the sherds crumble, though only on surface areas, not on fresh cross-sections. In fresh cross-sections the ceramic appears somewhat harder compared to average 2-3 on Mohs' scale.

#### *Description of thin-section*

The fabric in general gives the impression of a low percentage of inclusions, though some large to very large Ferro-Manganese nodules can easily be detected, even by naked eye. The total volume of inclusions is between 5 and 10%. The Ferro-Manganese nodules are 1–6 millimeters in size and possess a concentric structure. Inclusions are found within them.

The clay matrix seems insufficiently blended or even hardly prepared, with lighter and darker zones and fine fissures in variable directions. Besides Ferro-Manganese nodules, mainly Augite and Leucite are present, that may be (partially) weathered. Inclusions vary in shape from euhedral to abraded and rounded. As in fabric number 5, the Leucite present is recognized better in sections. At the proper thickness of 30 micron the (partial) weathering erases the already hardly detectable complex twinning under crossed polars. The weathering of Leucite at grain boundaries is

visible as a cloudy structure under plain polarizers, very much resembling what is found in thin-sections from Tuff stone at Satricum. Most of the inclusions seem to show several stages of weathering. The areas in full transition are isotropic while some not fully transformed areas show traces of twinning considered characteristic for Leucite. However, Delvigne mentions: "This pattern of twinning, related to a phase transition during cooling, may be considered a characteristic of leucite crystals, although it is observed also in some crystals of garnet". (Delvigne, 1998: p. 15). None of the weathered inclusions possesses a high relief though, which is an essential characteristic of Garnet (Gribble & Hall, 1992: pp. 87–88; MacKenzie & Guilford, 1980: p. 8). Besides this, the sporadically detected Garnet in this section shows no traces of weathering, is more brownish yellow under plain polarized light and clearly isotropic under crossed polarizers. Therefore the ((partially) weathered) inclusions are considered to be Leucite. In the fresh cross-section of sherds this Leucite is detectable as partially milky white particles with clear white (occasionally powdery) opaque areas.

The clay matrix with traces of insufficient blending, the relatively large Ferro-Manganese nodules, and fissures in varying directions, indicate that the vessels of this fabric were modelled by hand only.

Table 8.1. Properties of NETTUNO fabric 1 in a fresh cross section.

| fabric | Volume incl. | sorting | part. Size  | q/fsp | flint | augite | olivine | mica | FeMn  |
|--------|--------------|---------|-------------|-------|-------|--------|---------|------|-------|
| № 1    | < 5 %        | "ws"    | <90 - >2000 | x-p   |       | p-2 %  | x-p     |      | p-3 % |

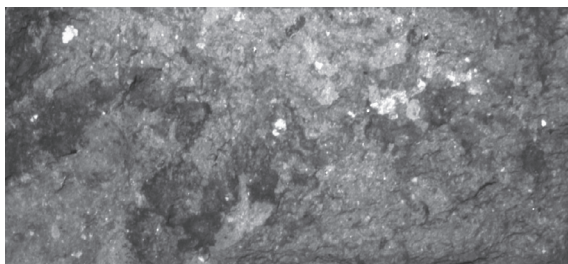


Plate 1.1. Microscopic appearance of NETTUNO fabric 1 in a fresh cross section / field of view: 1,1 x 3,0 cm.

Table 8.2. Properties of NETTUNO fabric 1 in thin section.

| fabric | volume incl. | sorting       | Part. Size  | quartz | feldspar | augite | garnet | FeMn  |
|--------|--------------|---------------|-------------|--------|----------|--------|--------|-------|
| № 1    | 2-3 %        | indescribable | <90 - >2000 | p      | p        | p-2 %  | p      | p-3 % |

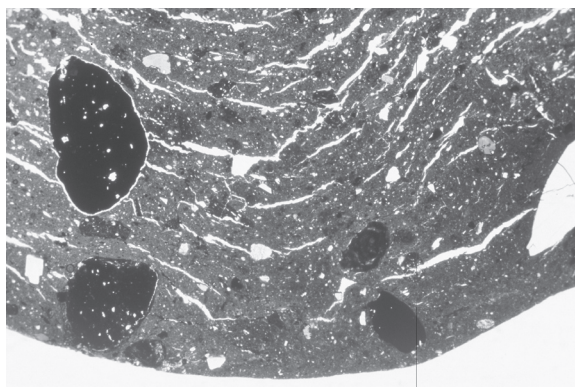


Plate 1.2. Microscopic appearance of NETTUNO fabric 1 in thin section under plain polarized light / field of view: 0,5 x 0,8 cm.

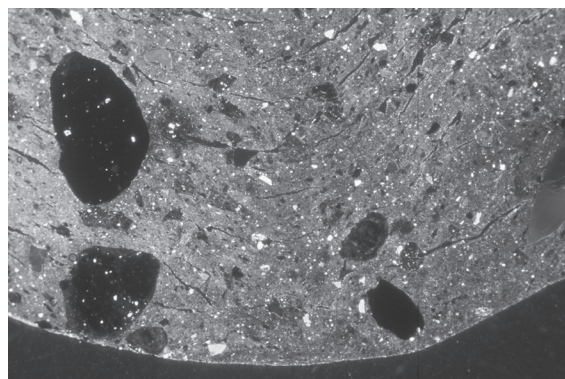


Plate 1.3. Microscopic appearance of NETTUNO fabric 1 in thin section under crossed polarizers / field of view: 0,5 x 0,8 cm.

Table 9.1. Properties of NETTUNO fabric 2 in a fresh cross section.

| fabric | volume incl. | sorting | part. size  | quartz | feldspar | flint | augite | FeMn  |
|--------|--------------|---------|-------------|--------|----------|-------|--------|-------|
| № 2    | 5-10 %       | ps-vps  | <90 - >2000 | p-5 %  | p-5 %    | x-p   | 2-7 %  | 2-7 % |

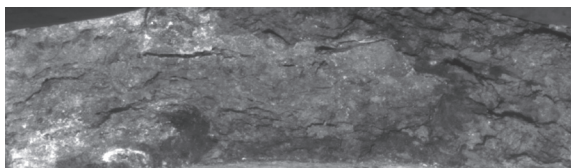


Plate 2.1. Microscopic appearance of NETTUNO fabric 2 in a fresh cross section / field of view: 0,9 x 3,5 cm.

Table 9.2. Properties of NETTUNO fabric 2 in thin section.

| fabric | vol. incl. | sorting | part. size  | quartz | feldspar | flint | augite | garnet | FeMn  |
|--------|------------|---------|-------------|--------|----------|-------|--------|--------|-------|
| № 2    | 5-10 %     | ps-vps  | <90 - >2000 | p-1 %  | p-1 %    | p     | 2-3 %  | p      | 3-5 % |

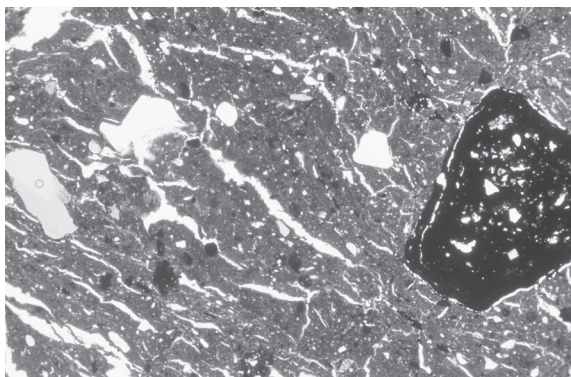


Plate 2.2. Microscopic appearance of NETTUNO fabric 2 in thin section under plain polarized light / field of view: 0,5 x 0,8 cm.

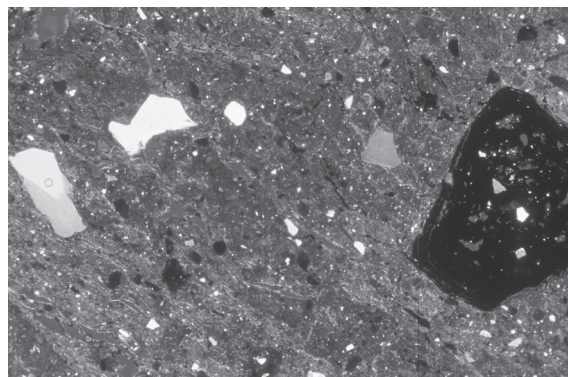


Plate 2.3. Microscopic appearance of NETTUNO fabric 2 in thin section under crossed polarizers / field of view: 0,5 x 0,8 cm.

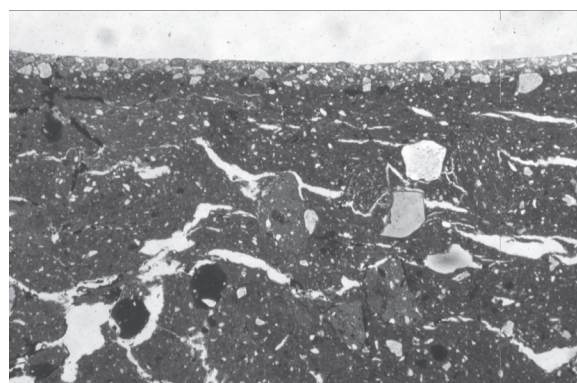


Plate 2.4. Microscopic appearance of NETTUNO fabric 2 in thin section under plain polarized light / field of view: 0,25 x 0,38 cm.

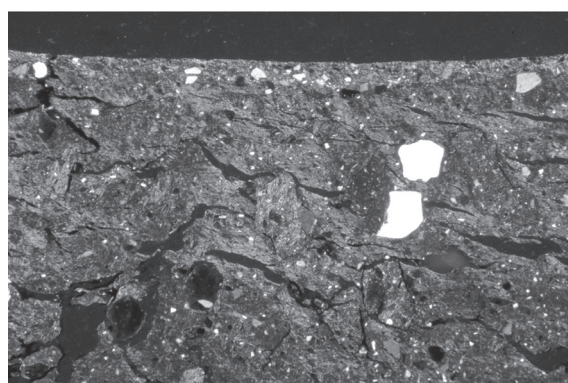


Plate 2.5. Microscopic appearance of NETTUNO fabric 2 in thin section under crossed polarizers / field of view: 0,25 x 0,38 cm.

Table 10.1. Properties of NETTUNO fabric 3 in a fresh cross section.

| fabric | volume incl. | sorting | part. size                              | quartz | feldspar | flint | augite | FeMn  |
|--------|--------------|---------|---|--------|----------|-------|--------|-------|
| № 3    | 10-20 %      | ms(-ps) | general <500, regularly up to 1400/2000 | 5-15 % | 5-15 %   | 1-3 % | p-3 %  | 1-3 % |

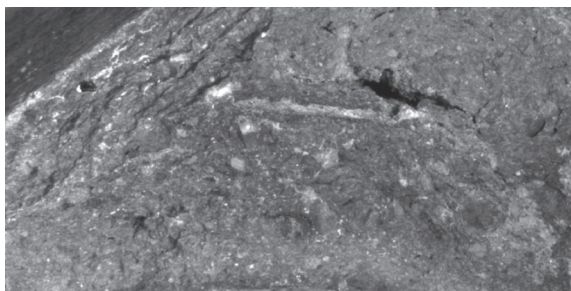


Plate 3.1. Microscopic appearance of NETTUNO fabric 3 in a fresh cross section / field of view: 1,4 x 2,7 cm.

Table 10.2. Properties of NETTUNO fabric 3 in thin section.

| fabric | vol. incl. | Sorting | part. size                              | quartz | feldspar | flint | augite | garnet | FeMn |
|--------|------------|---------|---|--------|----------|-------|--------|--------|------|
| № 3    | 15-20 %    | ms(-ps) | General <500, regularly up to 1400/2000 | 7-10 % | 5-10 %   | 1-2%  | p-1 %  | p      | 1 %  |

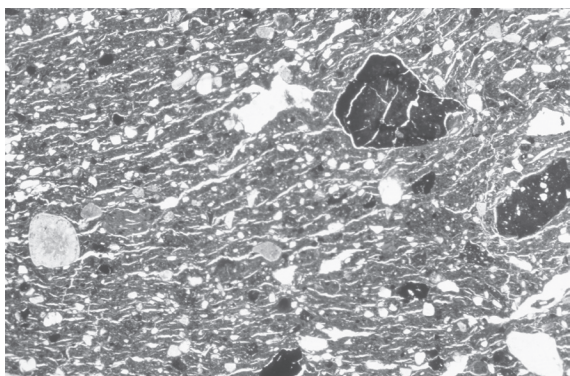


Plate 3.2. Microscopic appearance of NETTUNO fabric 3 in thin section under plain polarized light / field of view: 0,5 x 0,8 cm.

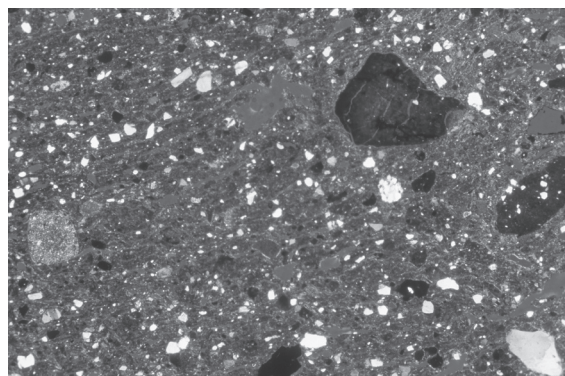


Plate 3.3. Microscopic appearance of NETTUNO fabric 3 in thin section under crossed polarizers / field of view: 0,5 x 0,8 cm.

Table 11.1. Properties of NETTUNO fabric 4 in a fresh cross section.

| fabric | volume incl. | Sorting | Part. size                               | Quartz  | feldspar | flint | augite | mica | FeMn |
|--------|--------------|---------|--|---------|----------|-------|--------|------|------|
| № 4    | >20 %        | ms-ps   | general <710, frequently up to 1400/2000 | 15-30 % | 15-30 %  | p-2 % | p-5 %  | x-p  | 2-5% |

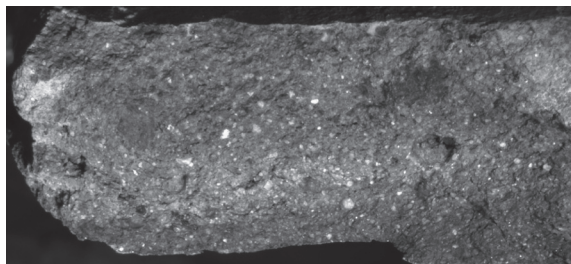


Plate 4.1. Microscopic appearance of NETTUNO fabric 4 in a fresh cross section / field of view: 1,6 x 3,4 cm.

Table 11.2. Properties of NETTUNO fabric 4 in thin section.

| fabric | volume incl.         | sorting | part. size                               | Quartz  | feldspar | flint | augite | mica | FeMn |
|--------|----------------------|---------|--|---------|----------|-------|--------|------|------|
| № 4    | >20 %, possibly >40% | ms-ps   | General <710, frequently up to 1400/2000 | 15-25 % | 15-25 %  | p-1 % | 3-5 %  |      | P    |

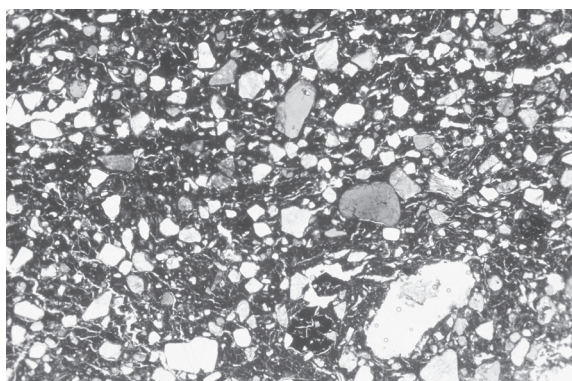


Plate 4.2. Microscopic appearance of NETTUNO fabric 4 in thin section under plain polarized light / field of view: 0,5 x 0,8 cm.

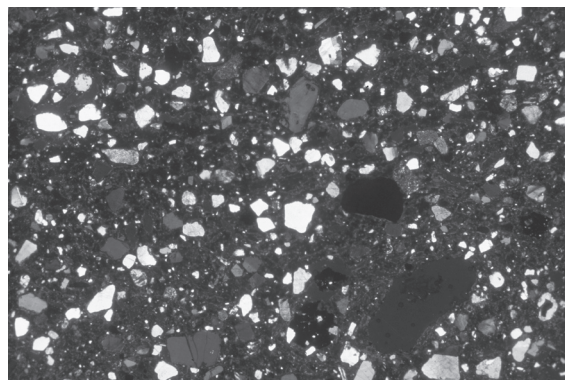


Plate 4.3. Microscopic appearance of NETTUNO fabric 4 in thin section under crossed polarizers / field of view: 0,5 x 0,8 cm.

Table 12.1. Properties of NETTUNO fabric 5 in a fresh cross section.

| fabric | Volume incl. | sort | part. size  | qtz/fsp | Flint | aug    | oliv | mica  | femn  | leu    | leu/tuff | lava  |
|--------|--------------|------|-------------|---------|-------|--------|------|-------|-------|--------|----------|-------|
| № 5    | 10-20 %      | vps  | <90 - >2000 | p-1 %   | x-p   | 3-15 % |      | p-1 % | p-3 % | 3-15 % | x-1 %    | x-1 % |

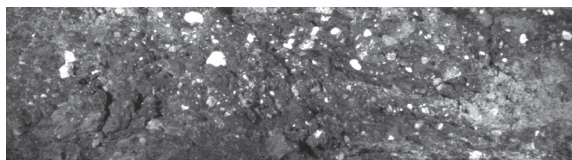


Plate 5.1. Microscopic appearance of NETTUNO fabric 5 in a fresh cross section / field of view: 1,2 x 4,5 cm.

Table 12.2. Properties of NETTUNO fabric 5 in thin section.

| fabric | Volume incl. | sort | part. size  | qtz/fsp | Flint | aug    | oliv | mica  | femn  | leu   | leu/tuff | lava |
|--------|--------------|------|-------------|---------|-------|--------|------|-------|-------|-------|----------|------|
| № 5    | 15-20 %      | vps  | <90 - >2000 | P       |       | 7-10 % |      | p-1 % | p-1 % | 5-7 % | 1-3 %    | p    |

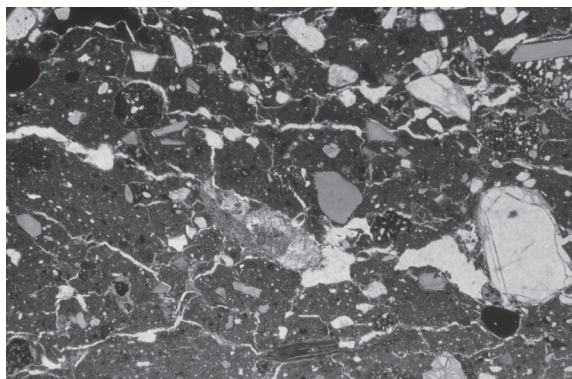


Plate 5.2. Microscopic appearance of NETTUNO fabric 5 in thin section under plain polarized light / field of view: 0,5 x 0,8 cm.

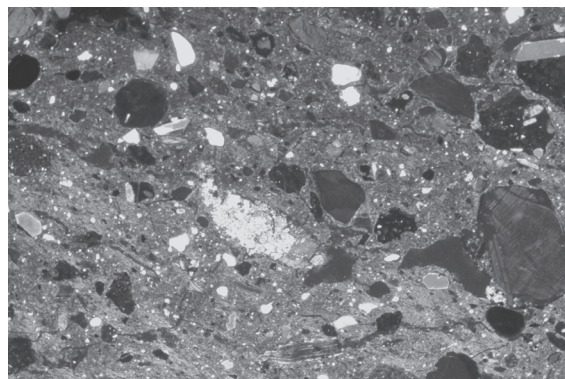


Plate 5.3. Microscopic appearance of NETTUNO fabric 5 in thin section under crossed polarizers / field of view: 0,5 x 0,8 cm.

Table 13.1. Properties of NETTUNO fabric 6 in a fresh cross section.

| fabric | Volume incl. | sort | part. size  | qtz/fsp | flint | aug   | oliv | mica  | femn  | leu   | leu/tuff | lava |
|--------|--------------|------|-------------|---------|-------|-------|------|-------|-------|-------|----------|------|
| № 6    | 5-10 %       | vps  | <90 - >2000 | P       |       | 3-7 % |      | p-1 % | p-3 % | 3-7 % |          |      |

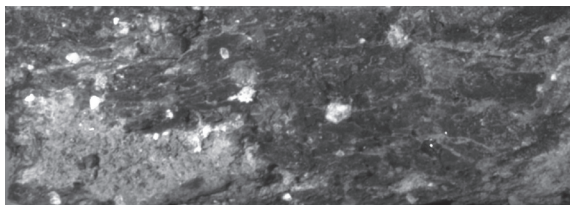


Plate 6.1. Microscopic appearance of NETTUNO fabric 6 in a fresh cross section / field of view: 0,8 x 2,2 cm.

Table 13.2. Properties of NETTUNO fabric 6 in thin section.

| fabric | Volume incl. | sort | part. size  | qtz/fsp | flint | aug   | oliv | mica  | femn  | leu   | leu/tuff | lava |
|--------|--------------|------|-------------|---------|-------|-------|------|-------|-------|-------|----------|------|
| № 6    | 5-10 %       | vps  | <90 - >2000 | P       |       | 2-7 % | x-p  | p-1 % | p-5 % | 2-5 % | x-1%     |      |

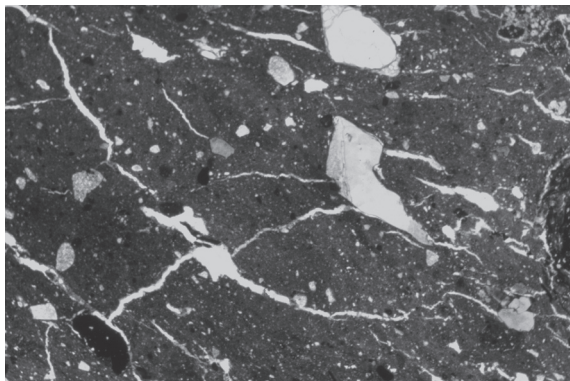


Plate 6.2. Microscopic appearance of NETTUNO fabric 6 in thin section under plain polarized light / field of view: 0,5 x 0,8 cm.

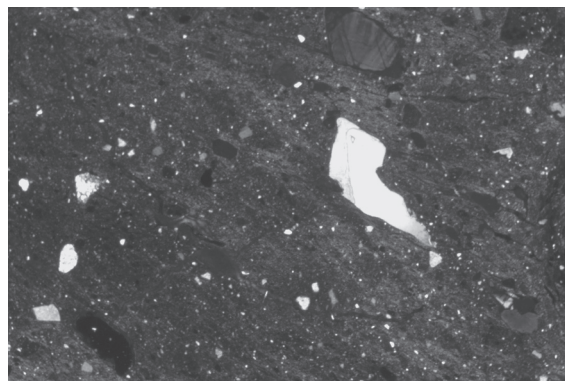


Plate 6.3. Microscopic appearance of NETTUNO fabric 6 in thin section under crossed polarizers / field of view: 0,5 x 0,8 cm.

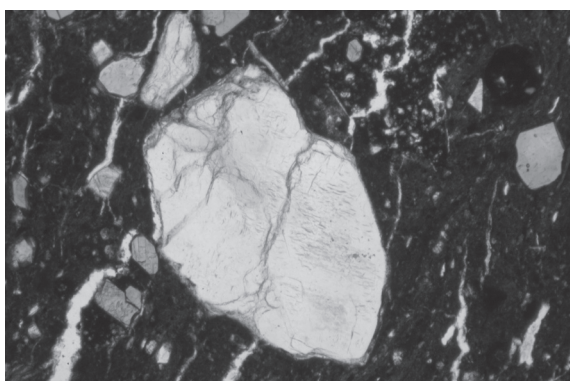


Plate 6.5. Microscopic appearance of NETTUNO fabric 6 in thin section under crossed polarizers, detail of weathered leucite / field of view: 0,15 x 0,22 cm.

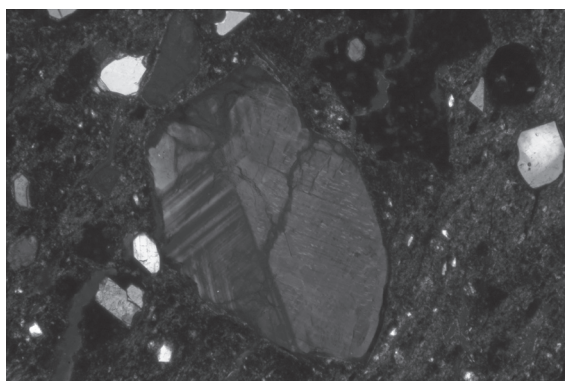


Plate 6.4. Microscopic appearance of NETTUNO fabric 6 in thin section under plain polarized light, detail of partially weathered leucite / field of view: 0,15 x 0,22 cm.

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