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A REASSESSMENT OF THE FISH-SALTING WORKSHOPS 1 AND 2 OF TRÓIA (PORTUGAL): THE CERAMIC CONTEXTS

Archaeological work carried out in the large factory that includes Workshops 1 and 2, on the site of Tróia, between 2007 and 2010, brings new evidence to the general chronological framework that was established by the consistent work of R. Étienne, Y. Makaroun and F. Mayet published in 1994 in the monograph Un Grand Complexe Industriel à Tróia (Portugal).

Several new stratigraphic contexts confirm and give more substance to the three phases identified and allow the foundation of this factory and its abandonment to be dated slightly earlier. This article will briefly present the ceramics of these contexts, some of them already published, as a reassessment of the phasing and dating of these workshops, which for now generally date the production of this important fish-salting center.

Introduction

The site of Tróia is located on the southwestern coast of Portugal, on a sand embankment between the estuary of the Sado River and the Atlantic Ocean. The Roman remains extend along 2 km of the shoreline of the Sado River estuary.

It is the largest known fish-salting production center of the Roman Empire, with 27 workshops with vats for the preparation of salted fish and sauces.¹ It was supplied by the abundant fisheries of the neighboring ocean waters and the salt from the fruitful salt-marshes of the shores of the Sado River. The products were carried in the regional amphorae² produced in the many pottery workshops on the right bank of the river, where nine are well identified,³ even though only two have been thoroughly studied.⁴

It has been known since the 16th century⁵ and excavated from the 18th century until the present day, but only in 1994 was the first monograph dedicated to the site of Tróia published, showing the importance of this fish-salting production center and presenting a chronological framework for this activity.⁶

In 2006, a new archaeological project for the conservation and presentation of the Roman ruins to the public began, promoted by Troia Resort under the responsibility of the authors. The archaeological works carried out for establishing a visitors' circuit provided new information for the overall interpretation of the site and its rhythms of occupation and, in particular, for Workshops 1 and 2, which originally belonged to the same large factory. Some of these results have been presented previously,⁷ but the material evidence is dispersed in several specific studies. Therefore, this article will present the most significant ceramic contexts identified and studied in the past decade that allow a reassessment of the rhythms of production of Workshops 1 and 2 on the site of Tróia.

The chronology of the archaeological site of Tróia: the first framework and the new data

The first consistent chronological framework for fish-salting production on the site of Tróia was inferred by R. Étienne, Y. Makaroun and F. Mayet from the classification of the sigillata from old excavations kept at the Museu Nacional de Arqueologia (Lisbon) and the field study of Workshops 1 and 2 (*Usines 1 et 2*), as well as of the surrounding buildings like the Baths southwest of Workshop 1 (**fig. 1**).⁸

From the architectural stratigraphy of Workshops 1 and 2, three phases of construction/occupation could be deduced showing a rupture between Phases 1 and 2, with a temporary abandonment of the fish-salting installations. After this rupture, there was a segmentation of the large workshops into smaller ones and the production was reactivated, but again the superposition of structures showed a new remodeling of the workshops, which was considered to be a third phase.

¹ ÉTIENNE/MAKAROUN/MAYET 1994; PINTO/MAGALHÃES/BRUM 2011; PINTO/MAGALHÃES/BRUM 2014. In the two last articles, 25 fish-salting workshops were published. Two other workshops, next to workshops 21 and 23, were identified in 2016 and await publication.

² I. V. PINTO/R. R. ALMEIDA/A. P. MAGALHÃES/P. BRUM, Lusitanian amphorae at a fish-salting production center: Tróia (Portugal). In: I. V. PINTO/R. R. ALMEIDA/A. MARTIN, Lusitanian amphorae: production and distribution (Oxford 2016) 173–194.

³ R. R. ALMEIDA/I. V. PINTO/A. P. MAGALHÃES/P. BRUM, Ânforas piscícolas de Tróia: contextos de consumo *versus* contextos de produção. In: R. MORAIS/A. FERNÁNDEZ/M. J. SOUSA (eds.), As produções cerâmicas de imitação na Hispania (Porto 2014) 405–423.

⁴ F. MAYET/C. T. SILVA, L'atelier d'amphores de Pinheiro (Portugal) (Paris 1998); F. MAYET/C. T. SILVA, L'atelier d'amphores d'Abul (Portugal) (Paris 2002).

⁵ F. CASTELO-BRANCO, Aspectos e problemas arqueológicos de Tróia de Setúbal. Rev. Ocidente Separata 65 (Lisboa 1963).

⁶ ÉTIENNE/MAKAROUN/MAYET 1994.

⁷ PINTO/MAGALHÃES/BRUM 2014.

⁸ ÉTIENNE/MAKAROUN/MAYET 1994, 23–93.

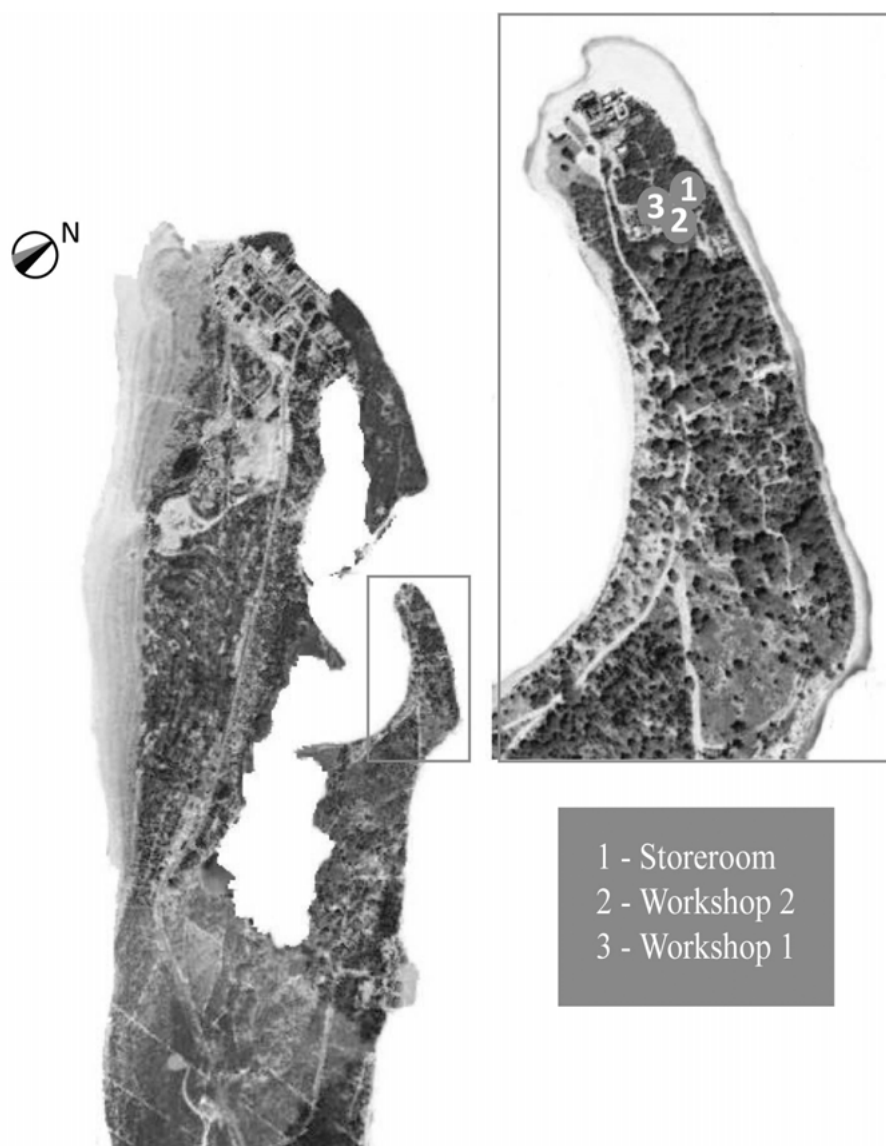


Fig. 1. Location of Workshops 1 and 2 and of the storeroom next to Workshop 2 in Tróia.

The phasing and chronology, inferred and published in 1994, proved to be correct overall. Yet the archaeological works carried out since 2007 have brought more evidence and sometimes more precision and some clarification to the previous framework. The earlier and recent data will be analyzed phase by phase, reviewing the main contexts in Workshops 1 and 2.

First Phase

In the study of 1994, in the absence of archaeological contexts, it was the study of the sigillata from earlier excavations kept at the Museu Nacional de Arqueologia (Lisbon) that pointed to the reign of Claudius, in the mid 1st century, c. 40–50 AD, for the beginning of the Roman occupation of Tróia.⁹

In 2009 and 2010, an excavation was carried out in an area immediately northeast of Workshop 2, where a storeroom was known.¹⁰ The work exposed a floor [767]=[768], on the two sides of a wall of the storeroom perpendicular to the wall of that workshop.

This floor revealed a fragment of Italian polychrome glass (**fig. 2,1**); eight small fragments of Italian type Sigillata, among which were one Consp. 22 and one Consp. 25.1 (**fig. 2,2–3**); Italian and Baetican Dressel 2–4 amphorae (**fig. 2,4–5**); two rim fragments of regional Dressel 14 variant. A or Early Lusitanian amphorae (**fig. 2,6**); three bases of Dressel 14 amphora, possibly of the same type (**fig. 2,7–8**); three fragments of lids of regional fabric (**fig. 2,9**); a bowl of coarse ware of regional fabric (**fig. 2,10**), an unidentified handle with a fabric typical of the Bay of Cadiz; a rim of a regional *dolium*; a rim of a small *dolium* with a fabric typical of the lower Guadalquivir and fragments of lids of regional fabric.

⁹ ÉTIENNE/MAKAROUN/MAYET 1994, 30.

¹⁰ PINTO/MAGALHÃES/BRUM 2011, 135–138.

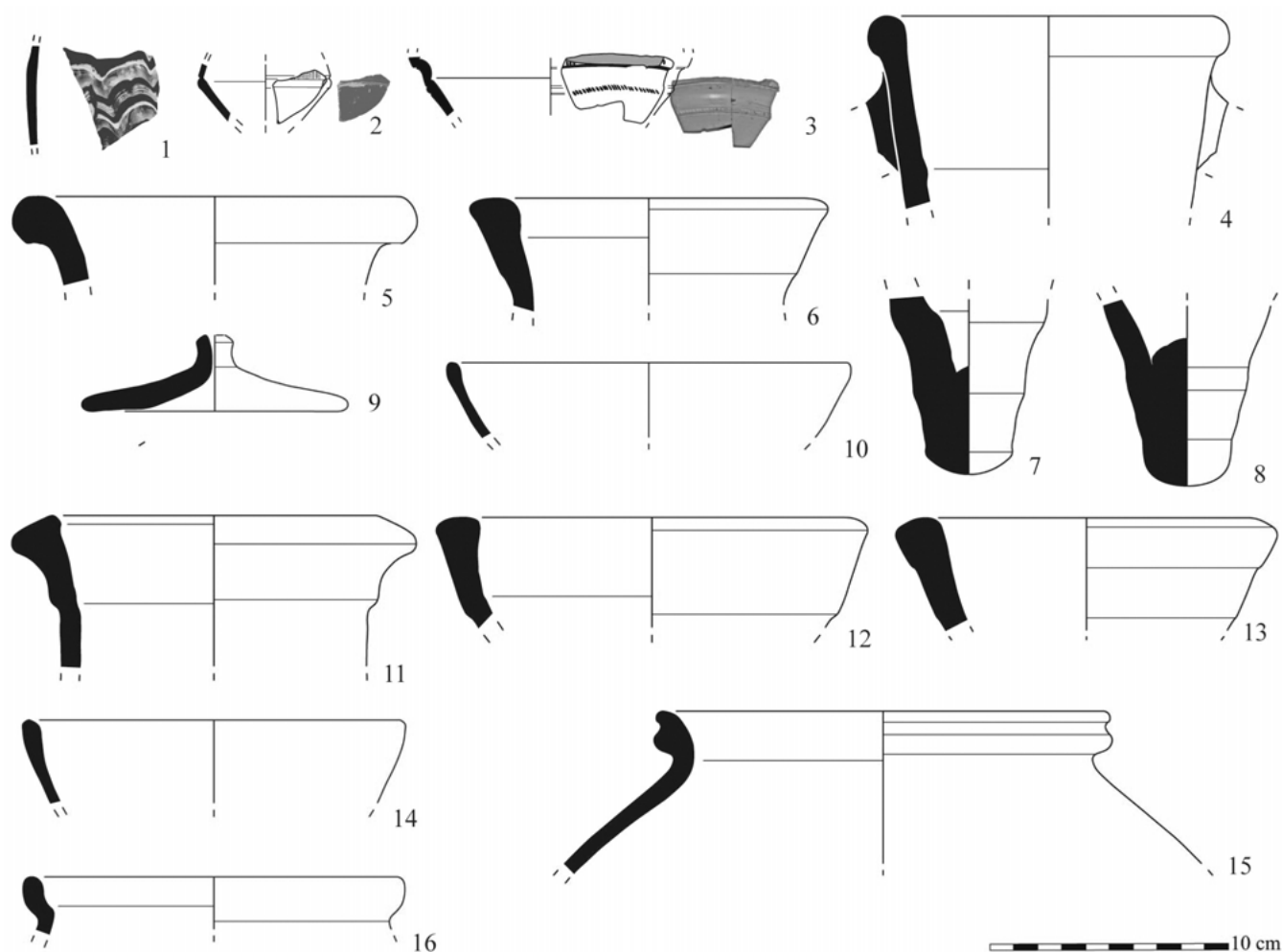


Fig. 2. Material from the foundation and floor of the storeroom next to Workshop 2.

A stratigraphic unit of preparation for this floor ([796]) gave one fragment of the South Gaulish Sigillata cup form Drag. 27 and an amphora rim of local fabric apparently of the Baetican Dressel 7–11 form (fig. 2,11).

The fill of the foundation trench of the early storeroom wall ([782] and [783]) contained a fragment of an early Drag. 27; a handle of a Haltern 70 amphora; four rims of Dressel 14 variant A or Early Lusitanian amphorae (fig. 2,12–13); a fragment of an *operculum*; a bowl of regional fabric (fig. 2,14) and two *ollae* of regional fabric (fig. 2,15–16).

This relatively homogeneous set of materials associates Italian Sigillata and one fragment of South Gaulish Sigillata with Italian polychrome glass, Dressel 2–4 wine amphorae from Campania and Baetica, a Haltern 70 amphora and regional amphorae of an early type. The Italian-type Sigillata is of Augustan-Tiberian date,¹¹ and the South Gaulish Sigillata has a very thin wall and is probably of an initial moment of the production, in the Tiberian period. The dating of this context to the Tiberian period is comforted by the non-canonical regional amphorae, perhaps of the earliest stage of the Dressel 14 form, Variant A, even though they are too incomplete to be classified precisely.

This context, of the Tiberian period, dates the construction of the storeroom, whose wall is supported by the limiting wall of Workshop 2. Therefore, the construction of Workshop 2 is contemporaneous with the storeroom or earlier than it. Assuming that the storeroom was a main part of the factory, connecting directly through a door with Workshop 2, this workshop is most likely of the same period. Either way, it allows the foundation of Workshop 2, and therefore of the industrial complex of Tróia, to be dated to a moment in the Tiberian period, slightly earlier than the Claudian period previously assumed from the study of the *terra sigillata*.

Regarding the end of Phase 1, in the early 90s, an archaeological sounding in Vat 15 of Workshop 1 showed the major rupture between the first and second phase of activity in Tróia. This vat was not reused in the later phases of activity and on its bottom (layers 5–7) there was African Red Slip Ware A Hayes 3 and 14/17 and Dressel 14 amphorae that suggested that the first phase ended towards the late 2nd century. This conclusion was comforted by the same results in the excavation of Vat 1, later integrated in the bath complex as an *apodyterium*,¹² and were confirmed by the recent revision of the LRFW Working Group, which allows the possibility that it could be even a little later.¹³

¹¹ E. ETTLINGER ET AL., *Conspectus formarum terrae sigillatae italico modo confectae*. *Mat. Röm.-Germ. Keramik* 10 (Bonn 1990) 90; 96.

¹² ÉTIENNE/MAKAROUN/MAYET 1994, 33–36.

¹³ REYNOLDS/BONIFAY/ÁNGEL CAU 2011, 16.

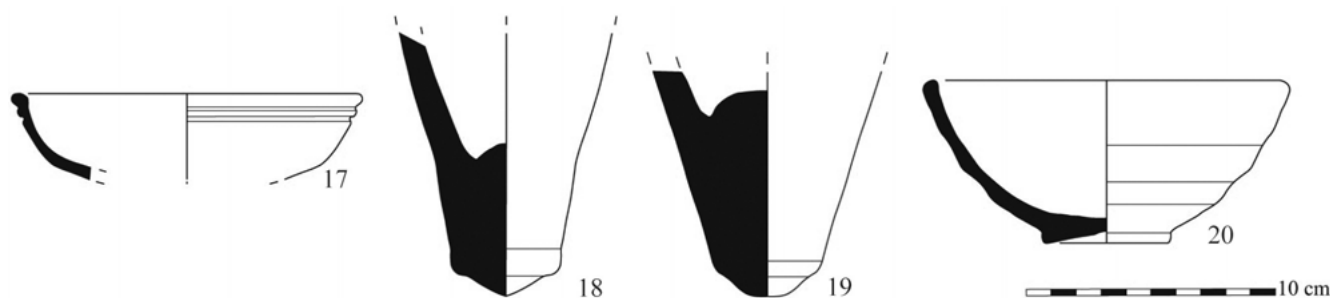


Fig. 3. Pottery from the context of abandonment of Vat 6d in Workshop 2.

In 2007 and 2008, in order to prepare Workshop 2 to be presented to the public, it was judged convenient to excavate some of its vats, and three of them, Vats 6d, 8 and 9, revealed an abandonment at an early date.

Vat 6d had been partially excavated but kept its fill on the northeast side. The stratigraphic units [128], [178] and [187], under a thick layer of large stone blocks bonded with mortar (possibly the base of a second floor) offered a rim fragment of African Red Slip Ware A, form Hayes 9B (fig. 3,17), dated to the second half of the 2nd century or first decades of the 3rd century,¹⁴ a base of Hispanic Sigillata, ten handles and bases of Dressel 14 amphorae (fig. 3,18–19) and a regional coarse-ware bowl (fig. 3,20).

The amphorae collected in these stratigraphic units, all from the early Empire, and the African Red Slip Ware from the second half of the 2nd century or early 3rd century show that this vat, just like Vat 15 of Workshop 1, was out of use at the end of the first phase.

Vats 8 and 9 were also excavated, and they were published in greater detail in a previous article.¹⁵ It was revealed that they went out of use at an early date, and each of them had deposits on the bottom sealed by a sand layer. A fragment of a Drag. 27 bowl, found in Vat 9 and belonging to a bowl recovered in Vat 8 (fig. 4,21), confirmed that these deposits were contemporaneous, as their contents suggested. They included a rim and neck of a glass bottle Isings 50b, dated mainly from the Flavian period to the end of the 2nd century;¹⁶ Hispanic Sigillata with a wide distribution, such as forms Drag. 27, one with the stamp C.I.C (fig. 4,21–22), the so called Aj. 1 (fig. 4,23) and Drag. 37a (fig. 4,24), more common in the second half of the 1st century until the beginning/first half of the 2nd century but still produced later.¹⁷ The stamp recovered is attested in Andújar with the formula EX OF dated to the Flavian period.¹⁸ Many fragments of Dressel

14 amphorae were recognized (21 vessels), mostly of Variant C (fig. 4,25–26), dated to the second half of the 2nd century,¹⁹ with a few of the earlier Variant B (fig. 4,27); one Late Dressel 14 (fig. 4,28), generally dated to the end of the 2nd century or early 3rd century;²⁰ one Baetican Beltrán IIB, dated from the mid 1st century to the end of the 2nd century (fig. 4,29);²¹ a handle and body fragments of Dressel 20 amphorae; and a few fragmentary coarse-ware vessels (fig. 4,30–31) with a broad date range.

Unlike Vat 15 of Workshop 1 and 6d of Workshop 2, those vats did not have African Red Slip Ware A, but they had one amphora, the Late Dressel 14 that, in one context at the pottery workshop of Pinheiro, appears together with African Red Slip Ware Hayes 14/17 and the Dressel 14 Variant C amphora.²² Therefore, despite the abundance of Hispanic Sigillata, which suggests an earlier moment of deposition, these abandonment contexts must be from the same phase as the ones in the vats mentioned (15 and 6d).

Considering that neither the African Red Slip Ware forms nor the amphorae offer a finer dating than the second half of the 2nd century and the early 3rd century AD, this is the general period when the first phase ends, unless we consider that the Hayes 14B from Vat 15 is certainly from the early third century.²³ In that case, the abandonment should be dated to this moment.

Second phase

In the 1990s, it was clear that the second period of activity had two distinct phases according to the evidence from the excavation of Vat 15 in Workshop 1. First a wall was built to divide Workshop 1 into smaller workshops, and this wall stood on the bottom of Vat 15, offering the best evidence for the beginning of the second phase. In a second moment, this wall went out of use and other walls were built over it and on the same vat for a different segmentation, materializing the beginning of the third phase.²⁴ Yet, no ceramic contexts

¹⁴ J. W. HAYES, *A supplement to late roman pottery* (London 1980) 515 and *Atlante I*, 1981, 27.

¹⁵ PINTO/MAGALHÃES/BRUM 2010a

¹⁶ C. ISINGS, *Roman glass from dated finds* (Groningen, Djakarta 1957) 66–67.

¹⁷ M. FERNÁNDEZ GARCÍA/M. ROCA ROUMENS, *Producciones de Terra Sigillata Hispánica*. In: D. Bernal Casasola/A. Ribera i Lacomba (eds.), *Cerámicas hispanorromanas. Un estado de la cuestión* (Cádiz 2008) 307–332; M. BUSTAMANTE ÁLVAREZ, *Terra Sigillata Hispánica en (Mérida, Badajoz). Valoración tipocronológica a partir de los vertederos del suburbio Norte* (Cádiz 2010).

¹⁸ F. MAYET, *Les céramiques sigillées hispaniques. Contribution à l'histoire économique de la Péninsule Ibérique sous l'Empire Romain* (Paris 1984) 43; M. SOTTOMAYOR/M. ROCA ROUMENS/I. FERNÁNDEZ GARCÍA, *Centro de*

Producción de los Villares de Andújar (Jaén). In: M. Roca Roumens/I. Fernández García, *Terra sigillata hispánica, Centros de fabricación y producciones altoimperiales* (Jaén, Málaga 1999) 40.

¹⁹ MAYET/SILVA 2002, 105–106.

²⁰ MAYET/SILVA 1998, 113–114.

²¹ ÉTIENNE/MAYET 2002, 129–130.

²² In LII 9, couche 1B, MAYET/SILVA 1998, 114–115

²³ ÉTIENNE/MAKAROUN/MAYET 1994, 53 fig. 14,19.

²⁴ ÉTIENNE/MAKAROUN/MAYET 1994, 82–93.

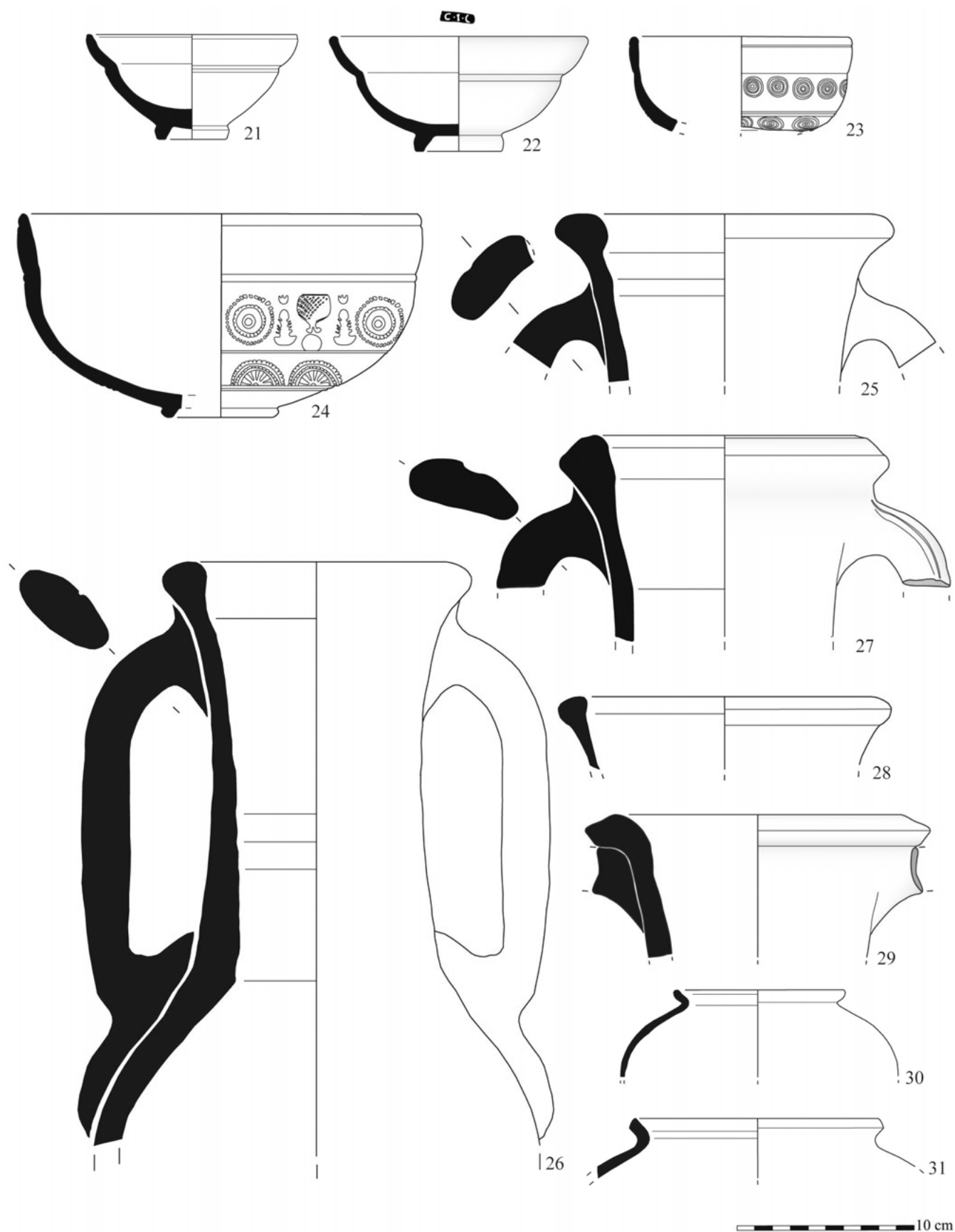


Fig. 4. Pottery from the contexts of abandonment of Vats 8 and 9 of Workshops 2.

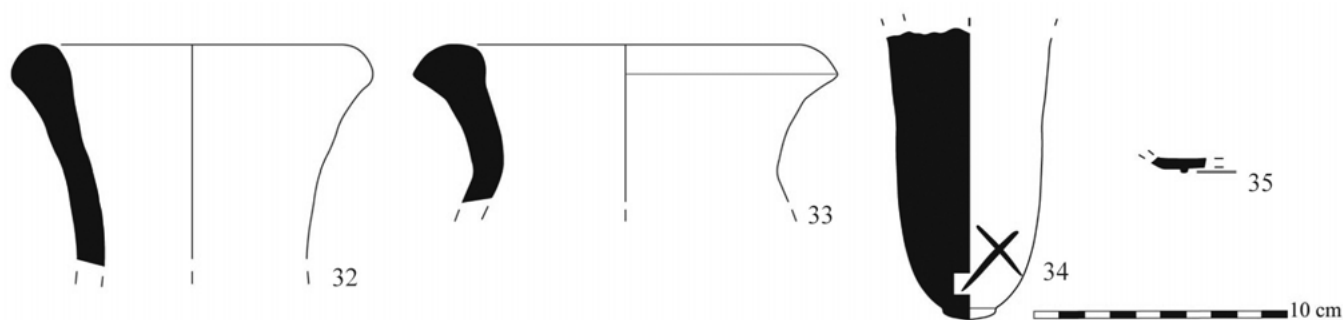


Fig. 5. Pottery from the floor of the second phase of Workshop 2.

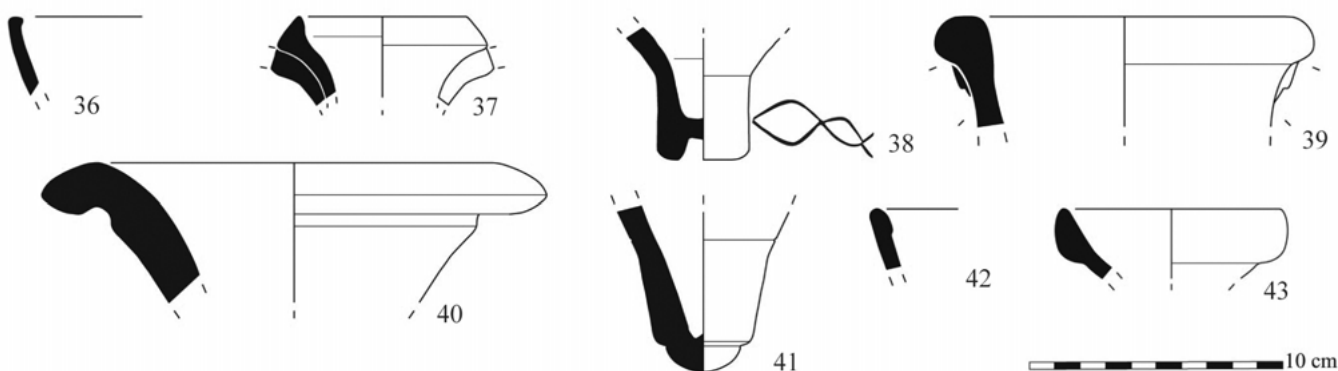


Fig. 6. Pottery from Floor [722] and the burial under it next to the well of Workshop 1.

were associated with these structures, and therefore these two phases were only tentatively dated by R. Étienne, Y. Makaroun and F. Mayet respectively to the early 3rd century and the first half of the 4th century.

In 2007, work in Workshop 2 gave the first, although scarce, dating evidence for the beginning of the second phase of activity.

Workshop 2 was divided in two smaller workshops, and the one in the east corner, Workshop 2B, had a new floor with a layer of pottery fragments ([129]) built over the earlier one. This floor was not completely excavated, but it was exposed, and many fragments of pottery were visible. Fragments of Dressel 14 amphorae (fig. 5,32), a rim of a Baetican Keay 16 (fig. 5,33) and a base of an African IIA (fig. 5,34) were collected. Particularly significant is the absence of the amphora Almagro 51c, which appears in the second quarter of the 3rd century²⁵ and is the most frequent one until the 5th century. This small group of pieces can be dated as early as the end of the 2nd century and should not be much later than the first quarter of the 3rd century due to this absence.

In a second moment, Vat 8, the same one that had a deposit of the second half of the 2nd century, was filled with a layer of sand and a floor of *opus signinum* ([112]) was built on top to make a large compartment, cutting the previous floor on one side. This floor contained a fragment of African Red Slip Ware Production C form Hayes 50A or A/B (fig. 5,35),

indicating it was not built before the second quarter of the 3rd century.

Therefore, according to the evidence of the new floor of Workshop 2B, the second phase may have started in the first quarter of the 3rd century. Yet, the remodeling of the workshop, with Vat 8 and 7c transformed into a paved room, was only made later, in an uncertain moment that could be placed from the last decades of the first half of the 3rd to the first half of the 4th century.²⁶ However, it is unlikely that the 2nd-century deposits in those vats remained for decades without contamination, and therefore we believe this second phase of remodeling took place in the second quarter of the 3rd century.

An archaeological sounding made in 2010²⁷ along the northeast wall of the staircase of the well in the courtyard of Workshop 1 revealed, over the burial of a child, a clayey floor ([722]) with various material, of which the most important are: one fragment of South Gaulish Sigillata form Drag. 15/17 no later than the Flavian period;²⁸ African Red Slip Ware Production A, one of form Hayes 14A (fig. 6,36) from the end of the 2nd century to the early 3rd century;²⁹ 13 fragments of Almagro 51b amphorae with four bases of Variant B (fig. 6,37–38); five rims of the Dressel 14 Variant C amphora and one possible Late Dressel 14 (fig. 6,39); a Baetican Beltrán IIB amphora (fig. 6,40), the base of a Baetican Almagro 50/

²⁵ Almagro 51c Variant B appears in the pottery workshop of Abul in the context XVII 2/7 (1A-2A) of the third quarter/mid 3rd century, MAYET/SILVA 2002, 168–169.

²⁶ J. W. HAYES, *Late Roman Pottery* (London 1972) 73 and *Atlante I*, 1981, 65.

²⁷ PINTO/MAGALHÃES/BRUM 2010b.

²⁸ M. POLAK, *South Gaulish terra sigillata from Vechten*. *Acta RCRF Suppl.* 9 (Nijmegen 2000) 82–87.

²⁹ BONIFAY 2004, 159.

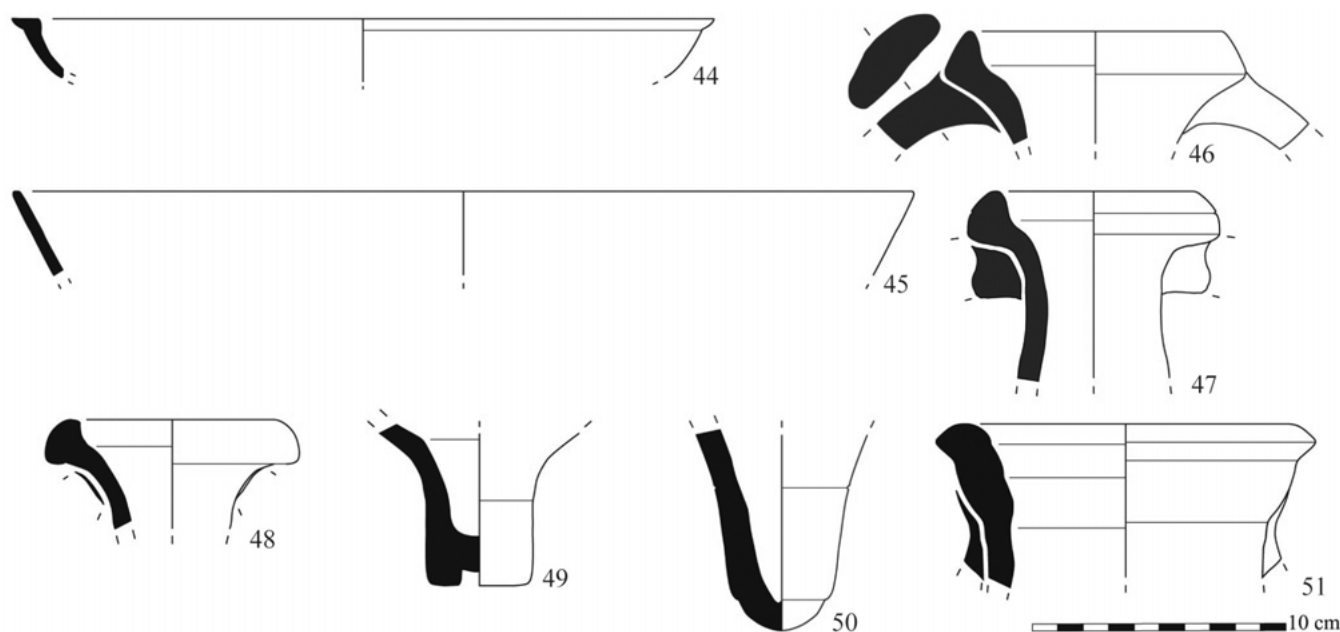


Fig. 7. Pottery from Floor [721] next to the well of Workshop 1.

Keay 16 amphora (fig. 6,41); a Hayes 23B in African Cooking Ware with a wide date range (fig. 6,42) and a few other less significant pieces. In this context, Almagro 51c Variant B is the latest material, since it appears, as referred above, only in the second quarter of the 3rd century, while all the other amphorae, sigillata and African Cooking Ware may be earlier. Based on this evidence, we proposed to date this floor, probably made of clay with some residual material, to the second quarter of the 3rd century.³⁰

Inside the tomb under that floor, in the unit on the bottom ([736]), only one classifiable piece of pottery was found, an Almagro 51c amphora rim (fig. 6,43), difficult to date with precision but most probably of the same date as the ones in the floor.

Therefore, this clayey floor could be contemporaneous with the floor built over Vat 8 in Workshop 2, and most probably it is the floor matching the segmentation of the workshop and its reactivation in the beginning of the second phase, during the first half of the 3rd century.

Third phase

The third phase, as mentioned above, was deduced from the latest walls over the out-of-use Vat 15 in Workshop 1, but the earlier scholars studying these workshops did not have any context to date these changes.

It was in the area next to the well of Workshop 1 that, in 2010, over floor [722], which was considered to be from the beginning of the second phase, a later floor was excavated, a mortar floor with a number of pottery pieces to strengthen its surface, including pottery of different types and dates: a Hayes 58A (fig. 7,44) and two Hayes 50A/B in African Red Slip Ware Production C (fig. 7,45); a few small fragments of

African Red Slip Ware Production D, one of them classifiable as Hayes 58; nine rims of regional Almagro 51c (fig. 7,46–48) and three bases of Almagro 51c Variant B (fig. 7,49); other Lusitanian amphorae such as Dressel 14, Late Dressel 14, a possible imitation of Dressel 7–11 and a base of Keay 78/Sado 1; Baetican amphorae of forms Almagro 50 (fig. 7,50) and Almagro 51c; African amphorae such as a rim probably of Tripolitana III (3rd–4th century) (fig. 7,51) and two bases of African II or III and not very significant coarse ware.

This mortar floor cannot be earlier than the end of the 3rd century, due to the presence of African Red Slip Ware Production D, and no later than the mid 4th century, since the African Red Slip Ware forms typical of the end of the 4th century are missing and Almagro 51c Variant C is also absent.³¹

If floor [722] corresponds to the beginning of the second phase, this later floor may very well correspond to the third phase, this later floor may very well correspond to the third phase that was inferred from the last walls built on Vat 15. It corresponds roughly to the date in the first half of the 4th century proposed by R. Étienne, Y. Makaroun and F. Mayet in 1994.

Workshop 2 did not provide any context that might date a third phase in that workshop.

The end of the fish-processing activity in Workshop 1 was revealed, in the early 1990s, by the excavation of part of Vat 19, where a bottom unit of fish remains with a number of regional and African amphorae, African Red Slip Ware Production C and D was found, suggesting an abandonment in the mid 5th century.³² A recent revision by the LRFW Working Group³³ proposed an earlier dating at the end of the 4th century, despite the presence of a Hayes 67B in African Red Slip Ware Production D, more common in the contexts of the first half of the 5th century.³⁴

³⁰ PINTO/MAGALHÃES/BRUM 2010b, 139–140.

³¹ PINTO/MAGALHÃES/BRUM 2010b, 145–146.

³² ÉTIENNE/MAKAROUN/MAYET 1994, 39–41.

³³ REYNOLDS/BONIFAY/CAU 2011, 18.

³⁴ BONIFAY 2004, 173.

The work carried out by the authors in 2007, 2008 and 2009 offered a great amount of new evidence for the abandonment of these fish-salting workshops that it will not be possible to present here extensively, but the information will be summarized and three contexts will be given as examples.

In Workshop 1, the excavation of part of a garbage dump, deposited over the courtyard, uncovered the best contexts to document the abandonment of this workshop. The study of the terra sigillata and the amphorae from Units [488] and [519], superposed and only separated by a deposit of sand, revealed the same type of material and showed a massive presence of African Red Slip Ware Production D with forms typical of the second half of the 4th century and the first half of the 5th century, such as Hayes 59A and B, Hayes 60, Hayes 61A but also Variants A/B, A/B3 and one closer to A/B4, Hayes 62/El Mahrine 5, Hayes 62/64, Variant Fulford 6, Hayes 63, Hayes 67A and B, El Mahrine 14, Hayes 71, Hayes 73 and Hayes 91, the latest forms being Hayes 80A and B/Hayes 81 B and Hayes 76, exclusive of the 5th century. The well represented regional amphorae are Almagro 51c Variants B and C, Keay 78/Sado 1 Variant B and Almagro 51a-b, a form not earlier than the end of the 4th century. The imported amphorae are Dressel 23, Keay 19, Keay 35B and Late Roman 1a, and some residual types.

The predominant presence of African Red Slip Ware forms that date from the end of the 4th century to the first quarter of the 5th century, a significant number of forms that reach and surpass the mid 5th century and the absence of forms exclusively of the second half of the 5th century indicate that this dump must have accumulated during the first half of the 5th century, probably toward the end of the first third of this century,³⁵ in other words, during the second quarter of the 5th century.³⁶

In Workshop 2, in the excavation of 2007, Vats 1, 5 and 7c revealed late fills, but only Vat 7c was thoroughly studied and published.³⁷ It showed the association of Hayes 80 with Hayes 73A and 91A or B, suggesting a date in the mid 5th century, but considering the deposits mentioned before, with a bigger ceramic assemblage, and the coexistence in the other two vats of form Hayes 76, it is possible that the abandonment of those vats occurred in the same phase of the garbage dump mentioned before, in moments not too far apart from each other.

In 2008, the northwestern part of Workshop 2 was excavated for the first time, and it was possible to document, in an area of c. 85m², several units of roof and wall debris alternating with wind-blown sand deposits, showing a long process of decay with episodes of collapse of the structures.

From these debris levels, only three stratigraphic units will be briefly presented: [445], [438] and [435]. The first one is roof debris in the south corner of the workshop, with African Red Slip Ware, mostly of Production D, with the presence of some very typical forms such as Hayes 61, Hayes 63

and El Mahrine 14 (fig. 8,52). The most abundant amphora, as in most of the abandonment levels, is Almagro 51c, with a good example of Variant C (fig. 8,53), but Almagro 51a-b (fig. 8,54) and Keay 78/Sado 1 Variant B (fig. 8,55) and are also present, as usual. Coarse ware was also very abundant but will not be presented here.

Unit [438] is debris resulting from the collapse of the northwest wall of the workshop over the vats, already full of sediment and materials. The African Red Slip Ware pieces are of Production D and forms Hayes 67, Hayes 59 and Hayes 76 (fig. 8,56) which are not earlier than the second quarter of the 5th century.³⁸ The amphorae are, once more, quite typical of the abandonment levels with the presence of the regional amphorae Almagro 51c (fig. 8,57), by far the most abundant; Almagro 51a-b (fig. 8,58), Keay 78/Sado 1 Variant B (fig. 8,59), and, much less common, Almagro 50 (fig. 8,60). Keay 19 (fig. 8,61), from eastern Baetica, also appears fairly often in these abandonment levels. Coarse ware was also abundant but will not be presented here.

Unit [435] was deposited on top of [438] and under the thick sand dune that covered the abandonment layers of Workshop 2. It was another debris deposit resulting from another wall collapse episode but less compact than the one below. It had a fair amount of construction material and ceramics. The classifiable African Red Slip Ware vessels were Hayes 61B3 (fig. 8,62) and Hayes 80A, which at Tróia are documented in contexts from the first half of the 5th century as demonstrated above. Several Almagro 51c amphorae were recovered, some of Variant C (fig. 8,63). An unexpected carot amphora from the Black Sea region, classifiable as Kassab Tezgör C Snp III, Variant 1³⁹ (fig. 8,64) was also collected in this unit. This type was first produced probably in the last quarter of the 4th century and continued in use throughout the first half of the 5th century.⁴⁰ This dating agrees perfectly with the date range assumed for the end of fish-salting production at Tróia, which here may be placed in the middle of the 5th century.

Although ceramics of the second half of the 5th, 6th and even of the 7th century have been documented in Tróia, even if in very low quantity, these abandonment levels show that the fish-salting production may have reached the second quarter of the 5th century but did not surpass that quarter in the case of Workshops 1 and 2. To the present day, no later production context has been identified at Tróia.

Conclusion

The archaeological work since 2007 brought new data to the general dating and phasing of Workshops 1 and 2 of Tróia. An early context of the Tiberian period is the first one to date the construction of a workshop in Tróia and takes the foundation of this production center slightly earlier. The evidence of the

³⁵ I. V. PINTO/A. P. MAGALHÃES/P. BRUM, Un dépotoir du V^e siècle dans l'officine de salaisons 1 de Tróia, Portugal. *Acta RCRF* 42, 2012, 397–406.

³⁶ A. P. MAGALHÃES, Late sigillata from fish-salting workshop 1 in Tróia (Portugal). *Acta RCRF* 42, 2012, 363–371.

³⁷ PINTO/MAGALHÃES/BRUM 2010a.

³⁸ HAYES 1972, 125.

³⁹ D. KASSAB TEZGÖR, Typologie des amphores sinopéennes. In: D. Kassab Tezgör (ed.), *Les fouilles et le matériel de l'atelier amphorique de Demirci près de Sinope*. *Varia Anatolica* 22 (Istanbul, Paris 2010) 121–140.

⁴⁰ We thank D. Dobrova for the classification and datation of this amphora.

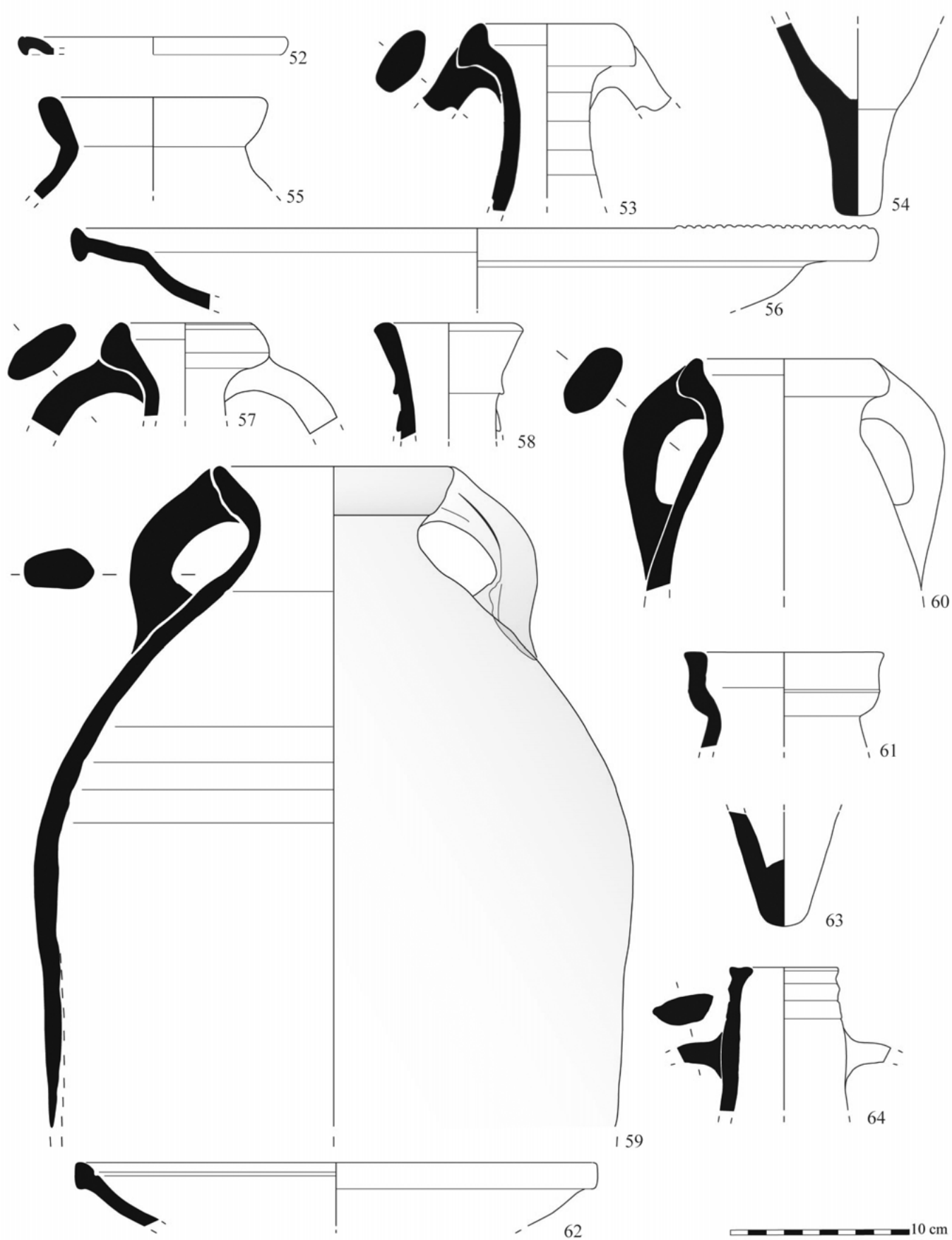


Fig. 8. Pottery from debris and abandonment contexts in Workshop 2.

abandonment at the end of the first phase is enriched by the fills of three vats from Workshop 2, and it is confirmed it was a general phenomenon in both workshops. The new floors of Workshops 1 and 2 give the sole evidence for a reactivation of the workshops in the first half of the 3rd century AD and it is also a floor that indicates the beginning of the third phase in the late 3rd or first half of the 4th century. The abandonment levels are very well documented in the area of Workshops 1 and 2, and African Red Slip Ware Production D, present in a number of forms from the late 4th/first half of the 5th century, indicates that the end of production must date to the second quarter of the 5th century.

This reassessment of the data of this nucleus of the large fish-salting center of Tróia allows the beginning and the end of the fish-salting activity to be dated slightly earlier but otherwise proves the accuracy of the phasing proposed in 1994.⁴¹

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⁴¹ We thank A. Martin for revising the English text of this article.

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