



UNIVERSITÀ DEGLI STUDI DI NAPOLI  
“L’ORIENTALE”

DIPARTIMENTO ASIA, AFRICA E MEDITERRANEO



ISMEO

ASSOCIAZIONE INTERNAZIONALE DI STUDI  
SUL MEDITERRANEO E L’ORIENTE

**Digital offprint from**

## DARIOSH STUDIES II

### PERSEPOLIS AND ITS SETTLEMENTS: TERRITORIAL SYSTEM AND IDEOLOGY IN THE ACHAEMENID STATE

edited by

GIAN PIETRO BASELLO and ADRIANO V. ROSSI

Napoli 2012

The following rights are strictly reserved to the Contributor on the condition that this PDF file is not modified in any part: • the right to make up to 25 prints of this PDF file, for personal use only; • the right to post the PDF file on a personal or institutional website; • the right to post the PDF file on a personal profile in platforms for the sharing of academic research; • the right to deposit it in an institutional or subject repository. Any other person accessing this PDF file has the right to make one copy of it, for personal use only, and is not allowed to post or distribute it.

The following rights are also reserved to the Contributor: • the right after publication to include the Contribution free of charge in a compilation of own works in print, such as a collection of own articles and/or lectures, provided that due acknowledgment is made of the original publication and that the original layout is used; • the right after publication to quote the Contribution and/or build on the content of the Contribution, on the condition that due acknowledgment is made of the original publication; • the right to include the Contribution in a collection by way of support to lectures and presentations given by the Contributor, on the condition that the normal exploitation of the Work by the Publisher is not harmed and that due acknowledgment is made of the original publication; • the right to make announcements of the Work public in relevant circles; • all the intellectual and industrial property rights or any similar rights with respect to (the protection of) methods, processes, designs and models described in the Contribution.

ISSN 1824-6109

ISBN 978-88-6719-034-8

© Università degli Studi di Napoli “L’Orientale”

<[www.unior.it](http://www.unior.it)>

UNIVERSITÀ DEGLI STUDI DI NAPOLI “L’ORIENTALE”

DIPARTIMENTO ASIA, AFRICA E MEDITERRANEO

*Series Minor*

LXXVIII

**DARIOSH STUDIES II**  
**PERSEPOLIS AND ITS SETTLEMENTS:**  
**TERRITORIAL SYSTEM AND IDEOLOGY**  
**IN THE ACHAEMENID STATE**

edited by

GIAN PIETRO BASELLO and ADRIANO V. ROSSI

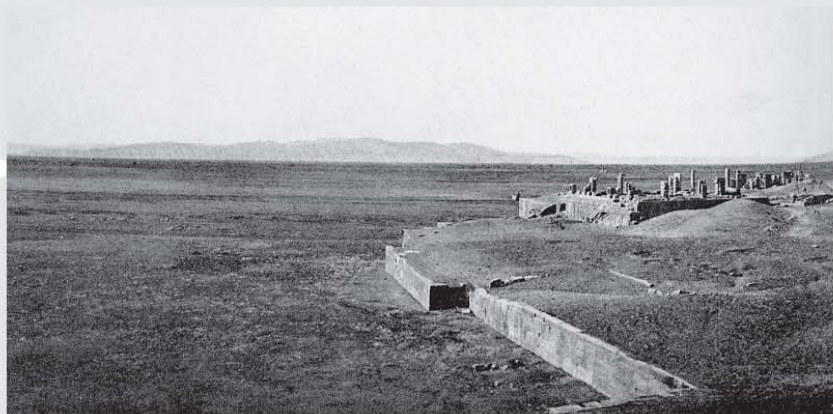


Napoli 2012

The present volume contains the Proceedings of a Conference held at La Tuscia University of Viterbo on the theme: “Territorial System and Ideology in the Achaemenid State: Persepolis and its Settlements” (16th-17th December 2010). The Conference was summoned to discuss the final results of the National Research Project (PRIN 2007ZKPPSM) on “Territorial system and ideology in the Achaemenid State: Persepolis and its settlement”, in which three Research Units have participated: “Persepolis in the archaeological, epigraphic, lexicographical documentation”, directed by Prof. A.V. Rossi at L’Orientale University; “Persepolis, the Mazdean cult and the Achaemenid kingship”, directed by Prof. A. Panaino at the University of Bologna, and “The political discourse in the Achaemenid state: linguistic and lexical studies on Persepolis trilingual inscriptions” directed by Prof. E. Filippone at La Tuscia University.

The volume contains the results of an international collaboration between Iranian, French and Italian scholarships.

The articles are enriched by over a hundred of colour plates and maps.



Persepolis in 1928 (after E. Herzfeld, *Rapport sur l'état actuel des ruines de Persépolis. Archäologische Mitteilungen aus Iran* 1 (1929), fig. 2).

Cover image: Persepolis in 2010 from the slope of the Kuh-e Rahmat (photo by G.P. Basello).  
Background: map of the Persepolis area (after A. Britt Tilia, *Studies and Restorations at Persepolis and Other Sites of Fārs*, vol. II. Rome, 1978); drawings of unpublished Achaemenid royal inscriptions on column bases in the Persepolis Museum (DARIOSH Project, drawings by G.P. Basello).

University “L’Orientale” is the name which the Oriental Institute of Naples adopted since 2002. It embodies the oldest school of Sinology and Oriental studies in Europe, being one of the main Italian universities devoted to the study and field research on the languages and cultures of extra-European countries.

ISBN 978-88-6719-034-8  
ISSN 1824-6109

€ 95,00

ISMEO  
ASSOCIAZIONE INTERNAZIONALE DI STUDI  
SUL MEDITERRANEO E L'ORIENTE

DARIOSH STUDIES II  
PERSEPOLIS AND ITS SETTLEMENTS:  
TERRITORIAL SYSTEM AND IDEOLOGY  
IN THE ACHAEMENID STATE

edited by  
GIAN PIETRO BASELLO and ADRIANO V. ROSSI



UNIVERSITÀ DEGLI STUDI DI NAPOLI “L’ORIENTALE”  
DIPARTIMENTO ASIA, AFRICA E MEDITERRANEO  
*Series Minor*  
LXXVIII

DARIOSH STUDIES II

PERSEPOLIS AND ITS SETTLEMENTS:  
TERRITORIAL SYSTEM AND IDEOLOGY  
IN THE ACHAEMENID STATE

edited by

GIAN PIETRO BASELLO and ADRIANO V. ROSSI



Napoli 2012

UNIVERSITÀ DEGLI STUDI DI NAPOLI “L’ORIENTALE”  
DIPARTIMENTO ASIA, AFRICA E MEDITERRANEO  
*Series Minor*  
LXXVIII

Volume pubblicato nell’ambito dei Programmi di ricerca  
di rilevante interesse nazionale diretti da A.V. Rossi  
PRIN 2005105580, PRIN 2007ZKPPSM e PRIN 2009JHSEE7.

Volume published in the framework of the Research Projects  
of National Interest directed by A.V. Rossi  
PRIN 2005105580, PRIN 2007ZKPPSM and PRIN2009JHSEE7.

ISSN 1824-6109  
ISBN 978-88-6719-034-8

© Università degli Studi di Napoli “L’Orientale”  
<[www.unior.it](http://www.unior.it)>

Distributed by:  
Dipartimento Asia, Africa e Mediterraneo  
e-mail: <[annas@unior.it](mailto:annas@unior.it)>

Questo volume  
è stato stampato presso  
**IL TORCOLIERE** – *Officine Grafico-Editoriali d’Ateneo*  
Università degli Studi di Napoli “L’Orientale”  
Novembre 2012

## CONTENTS

GIAN PIETRO BASELLO & ADRIANO V. ROSSI	
<i>Foreword</i> .....	VII
<b>LINGUISTICS AND PHILOLOGY</b>	
GIAN PIETRO BASELLO	
<i>Doorknobs, Nails or Pegs? The Function(s) of the Elamite and Achaemenid Inscribed Knobs</i> .....	1
MARIA CARMELA BENVENUTO	
<i>Self-discipline and the Exercise of Power. Linguistic Evidence in the Royal Achaemenid Inscriptions (DNb and XPl)</i> .....	67
CLAUDIA CIANCAGLINI	
<i>Outcomes of the Indo-Iranian Suffix *-ka- in Old Persian and Avestan</i> .....	91
ELA FILIPPONE	
<i>DPd/DPe and the Political Discourse of King Darius</i> .....	101
GRAZIA GIOVINAZZO	
<i>Gli artigiani della pietra a Persepoli</i> .....	121
ANTONIO PANAINO	
<i>No Room for the “Paradise”? About Old Persian &lt;p<sup>a</sup>-r<sup>a</sup>-d<sup>a</sup>-y<sup>a</sup>-d<sup>a</sup>-a-m<sup>a</sup>&gt;</i> .....	139
FLAVIA POMPEO	
<i>Some Syntactic and Semantic Remarks on XPl 30-31</i> .....	155
CLAUDIA ROMAGNUOLO	
<i>hutta- and kuši- in Achaemenid Elamite</i> .....	183
<b>ARCHAEOLOGY AND HISTORY</b>	
MARIA LETIZIA AMADORI, SARA BARCELLI, MARCO GALUPPI, PAOLO PALLANTE & GIULIANA RAFFAELLI	
<i>“From Palace to Town”: indagini archeometriche su ceramiche provenienti dagli scavi italo-iraniani nei siti di Persepolis West e Pasargadae (Fars, Iran)</i> .....	199
ALIREZA ASKARI CHAVERDI & PIERFRANCESCO CALLIERI	
<i>The Activities of the Iranian-Italian Joint Archaeological Mission at Persepolis West (Fars, Iran). First Results of the Studies on the Pottery of Achaemenid and Post-Achaemenid Age</i> .....	225

RÉMY BOUCHARLAT, TIJS DE SCHACHT & SÉBASTIEN GONDET <i>Surface Reconnaissance in the Persepolis Plain (2005-2008). New Data on the City Organisation and Landscape Management</i> .....	249
BIRGIT COSTAZZA <i>The Funerary Ritual as Rite of Passage</i> .....	291
ROBERTO DAN <i>Nails in the Wall: The sikkatu in Urartian Toreutic Production</i> .....	301
FRANCESCO FRANZESE & ANDREA GENITO <i>Towards an Archaeological Map of Fars. Work, Methods and Strategies: Preliminary Aspects</i> .....	313
ANDREA GARIBOLDI <i>La circolazione della moneta imperiale achemenide</i> .....	339
BRUNO GENITO <i>An “Achaemenid” Capital of the Imperial Periphery: Zrānka / Drangiana / Sistan</i> ...	365
GIOLJ FRANCESCO GUIDI, SHAHRAM RAHBAR, SAEID RAHMATI, REZA SHEIKHOLESLAMI, MARYAM SOLEIMANI, GIORGIO TROJSI & AZAM ZARE <i>Diagnostic Survey of Persepolis Terrace. Preliminary Results</i> .....	387
WALTER KUNTNER & SANDRA HEINSCH <i>The Fortress of Aramus in Achaemenid Times</i> .....	403
PAOLO OGNIBENE <i>Ai confini settentrionali dell'Iran achemenide</i> .....	417
ANDREA PIRAS <i>Ethnography of Communication in Achaemenid Iran: The Royal Correspondence</i> ....	431
ADRIANO V. ROSSI <i>Building Chronology and Epigraphic Chronology at Persepolis: DPa, DPb and XPk</i> ....	445
MIRJO SALVINI <i>Urartu e impero achemenide. Sopravvivenze culturali</i> .....	459



## *Foreword*

This is the second volume of the series *DARIOSH Studies*, published by DAAM (Dipartimento Asia, Africa e Mediterraneo), Università degli studi di Napoli “L’Orientale” with the financial support of the Italian Ministry for Education and University (PRIN 2005105580, PRIN 2007ZKPPSM and PRIN 2009JHSEE7) jointly with ISMEO/ASSOCIAZIONE INTERNAZIONALE DI STUDI SUL MEDITERRANEO E L’ORIENTE.

*DARIOSH* (Digital Achaemenid Royal Inscription Open Schema Hypertext) is the denomination of a joint Italian-Iranian project, established in the early 2000s by a cooperation between the NATIONAL MUSEUM OF IRAN, the PARSA-PASARGADAE FOUNDATION and the ISTITUTO ITALIANO PER L’AFRICA E L’ORIENTE (ISIAO, now dissolved and scientifically continued by ISMEO/ASSOCIAZIONE INTERNAZIONALE DI STUDI SUL MEDITERRANEO E L’ORIENTE).

The Project is based at L’Orientale University of Naples, with the collaboration of La Tuscia University of Viterbo, and aims at the study of the trilingual corpus of the Royal Achaemenid inscriptions through a complete catalogue of the epigraphic units (with a new high-resolution photographic documentation) and an interlinguistically integrated edition of the texts (with translation, commentary and cross-linguistic dictionaries), both on-line and in print.

While the first volume of the series was dedicated to the illustration of the methods used in the new edition, translation and commentary of the Royal Inscriptions which will be carried on in the further volumes as soon as groups of inscriptions will be ready for publication, the present volume contains the Proceedings of a Conference held at La Tuscia University of Viterbo on the theme: “Territorial System and Ideology in the Achaemenid State: Persepolis and its Settlements” (16th-17th December 2010).

The Conference was summoned to discuss the final results of the National Research Project (PRIN 2007ZKPPSM) on “Territorial system and ideology in the Achaemenid State: Persepolis and its settlement”, in which three Research Units have participated: “Persepolis in the archaeological, epigraphic, lexicographical

documentation”, directed by Prof. A.V. Rossi at L’Orientale University; “Persepolis, the Mazdean Cult and the Achaemenid Kingship”, directed by Prof. A. Panaino at the University of Bologna, and “The political discourse in the Achaemenid state: linguistic and lexical studies on Persepolis trilingual inscriptions” directed by Prof. E. Filippone at La Tuscia University.

The Viterbo Conference was particularly centred on Persepolis, also because an Iranian-Italian archaeological Mission (directed by Prof. P. Callieri, University of Bologna) is active there and the epigraphic team of DARIOSH (directed by Prof. A.V. Rossi, L’Orientale University and Prof. E. Filippone, La Tuscia University) has been working since mid-2000s on its monuments, but scholars from different international institutions were also invited, and a friendly and productive atmosphere (congealed by the weather conditions prevailing in Viterbo in those December days, but surely warmed up by the human exchanges of the protagonists of the meeting) was established on the occasion.

The single scholars remain responsible for their own contributions, which the editors have not sought to change. In a subject as dynamic and complex as Achaemenid studies there are inevitably differences of opinion on single matters, and these will be reflected in the individual papers.

The Viterbo Conference would not have been possible without the help and encouragement of many people whose assistance at different phases cannot be recalled here; thanks are especially due to the host institution, represented at the opening session by Prof. G. Platania, Dean of the Faculty of Foreign Languages and Cultures.

GIAN PIETRO BASELLO

ADRIANO V. ROSSI

ALIREZA ASKARI CHAVERDI  
Shiraz University  
PIERFRANCESCO CALLIERI  
Università degli Studi di Bologna, sede di Ravenna

**The Activities of the Iranian-Italian Joint Archaeological Mission  
at Persepolis West (Fars, Iran).  
First Results of the Studies on the Pottery  
of Achaemenid and Post-Achaemenid Age**

INTRODUCTION

The first two seasons of the project “From Palace to Town” have been carried out by the joint Iranian-Italian mission of the Iranian Centre for Archaeological Research (ICAR), the Parsa-Pasargadae Research Foundation (PPRF), the University of Bologna (UNIBO) and the Italian Institute for Africa and the East (IsIAO) in 2008 and 2009 under the joint direction of Dr Alireza Askari Chaverdi (ICAR) and Prof. Pierfrancesco Callieri (UNIBO).

The project has two main objectives, respectively in the fields of conservation and archaeology. Collection of information regarding diagnostic on stone as a basis for pilot tests concerning the main problems met in the Persepolis Terrace (the “Palace”) represents the strategy of the conservation section of the project, while the archaeological section of the project concerns the first stratigraphic investigations in the site of Persepolis West, one of the supposed areas of the town, in which to study everyday life in a settlement environment (the “Town”).

The conservation section has seen three campaigns, carried out in 2008, 2009 and 2010. The first was dedicated to a survey of conservation of stone architectural elements, and to sampling in view of the application of chemical-physical, biological and mineralogical analyses. The results of this study are the objects of the paper by Giolj Guidi *et al.* in this volume.

The second campaign, directed by Architect Giuseppe Morganti for ISIAO, was devoted to the study of the methodology of architectural restoration used at Persepolis by the PPRF specialists, and brought to the suggestion to interrupt the activity of reconstructive restoration and to concentrate energies and financial resources to solve the several conservation problems of the monuments of the Terrace. A new path for the preservation of the monuments was thus traced and successive steps will proceed in this direction. A third season dedicated to *in situ* study of the analytical results of the first campaign has been carried out in November 2010 under the direction of Prof. Marisa Laurenzi Tabasso, so to prepare the ground for a series of pilot conservation tests aiming at proposing some protocols for the various problems of stone, to be carried out in 2011.

The archaeological section of the project was programmed on the basis of the preceding studies, carried out by the scholars who investigated the problem of Achaemenid settlement in the Marvdasht plain, through surface surveys and geomagnetic surveys. These include the seminal work by William Sumner, produced in the 1970s and based on surface survey carried out in the 1960s (Sumner 1972, 1986); the geomagnetic surveys carried out by Eng. Babak Aminpour for the Parsa-Pasargadae Research Foundation; and the activities of the Iranian-French team directed by Rémy Boucharlat and Kourosh Mohammadkhani, which included geo-morphological studies, surface surveys and geophysical surveys carried out with various methods (Boucharlat 2003; Gondet 2011; Boucharlat *et al.* in this volume).

On the basis of the excellent results produced by the geophysical surveys, it was deemed useful to start the five-years project with a series of trial trenches offering the possibility to verify the correspondence of geophysics information with archaeological evidence and at the same time aimed at ascertaining the thickness and nature of the archaeological stratification in some of the areas considered as possible locations for the town of Persepolis.

Among the latter, the nearest to Persepolis is the site known as Persepolis West, which had also been included in both the Iranian and the Iranian-French geophysical surveys. This site was selected for the first season of excavation.

## THE EXCAVATIONS (FIG. 1)

### *The 2008 campaign*

The first campaign of the activities in the site of Persepolis West, was carried out from 30th September to 5th November 2008.

The research team was composed by: Mr. Ali Asadi (PPRF), Ms. Hajar Askari, topographer (University of Tehran), Ms. Martina Battisti, archaeologist (IsIAO), Mr. Luca Colliva, archaeologist (UNIBO), Mr. Marco Galuppi, archaeologist (UNIBO), Ms. Elisa Iori, archaeologist (IsIAO), Ms. Noushin Javid, draughtsman (freelance), Mr. Hamidreza Karami, archaeologist (PPRF), Ms. Somayeh Khosh-bakht, draughtsman (freelance), Mr. Alan Mercuriali, archaeologist (University of Bologna), Mr. Mohammad Nasiri, topographer (PPRF), Mr. Abazar Shobeiri, archaeologist (PPRF), Dr. Fabrizio Sinisi, archaeologist (IsIAO), Ms. Maryam Soleimani, restorer (University of Bologna and ICAR), Mr. Mousa Zare', archaeologist (PPRF). The following students in archaeology from the University of Marvdasht took also part: Mr. Mohammad Dumari, Ms. Ghaziyeh Ganjuri, Ms. Fatemeh Karimi, Ms. Leila Khani, Mr. Reza Nazari, Ms. Soheila Yousefi, Mr. Ashkan Zare'.

A first area (Area A) was selected immediately to the W of the Persepolis Parking, where the geomagnetic surveys had shown the existence of considerable anomalies.

A second area (Area B) which was taken in consideration is about 500 m further to W, in the location to which Sumner attributed the toponym of Persepolis West. Here the Iranian-French team had carried out a series of magnetic surveys which have shown the existence of relevant anomalies suggesting the existence of structures. A visit to the area has allowed taking direct vision of a series of elongated pits excavated for agricultural needs, mentioned by Boucharlat and Mohammadkhani in their preliminary report of the 2008 season, which showed the existence of several superimposed archaeological layers with ceramics, charcoal and other materials up to a depth of about 2.00 m below the present surface.

As regards Area A, the possibility of having Eng. Aminpour at the site has represented a great opportunity for a thorough comprehension of the magnetic surveys. The results of the surveys showed in fact a dense presence of anomalies in the W part; as for the E part, it looked rather void to the S, but very regular anomalies started to the N. Also a rapid field surface exploration confirmed this picture from geophysics, because surface

pottery was rather abundant in the W part, being instead very little in the central and E parts. The fields further to the N showed a good presence of surface pottery in its W part as well. In this area, Trench 1 and Trench 2 were excavated.

At the same time, an exploration of the canal which represents the E limit of the area was carried out, bringing to light a series of archaeological features at an average depth of 1.00 m. Particularly interesting was the fact that one of the long and regular anomalies evident in the N fields of the area met at its SE limit the canal: here what seemed to be the foundation of a wall in irregular stones appeared in the N bank of the canal. Trench 3 was excavated across the canal on the line of the wall.

Trench 5 was excavated to the SE of Trench 1, in order to ascertain the possibility of surfacing structures in an area where four large stone slabs had prevented ploughing.

As for Area B, a good information came from the agricultural pits. However, none of the fields surveyed by the Iranian-French team was available for excavation, and the only available field had not been surveyed. The intervention of Eng. Aminpour allowed a geomagnetic survey of the field, and the possibility to select one of the areas of largest interest. Here Trench 4 was excavated. Trench 6 was instead excavated at the foot of the cut of one of the agricultural pits, adjacent to Trench 4 so to offer the possibility to investigate the deepest layers of the area despite the short time.

The topographic grid established for Persepolis area (PPRF) included only Area A, while Area B is beyond its W limit. Since this grid is based on squares measuring  $50 \times 50$  m, each square has been subdivided, where necessary, in four  $25 \times 25$  m squares, indicated with the letters A, B, C, D clockwise starting from the NW. Each of these squares has been subdivided further on in 20 squares measuring  $5 \times 5$  m, each indicated by a progressive number.

Trench 1 has been excavated in square SV1 667 D 20; Trench 2 has been excavated in square SV1 602 C 9; Trench 3 has been excavated in square SV1 541; Trench 5 has been excavated in square SV1 667 C.

As for Trench 4 and Trench 6, as mentioned before, Area B is out of the Persepolis grid.

All the trenches were oriented N-S, but for Trench 3, which was oriented according to the orientation of the long anomaly, from NW to SE,

and Trench 6, which was biased by the agricultural pit, being excavated at the foot of a section of one of the pits, oriented from NW to SE.

The basic unit for these trenches was a square of 5 × 5 m, with a baulk of 0.50 m all around so that the area actually excavated is 4 × 4 m. This module was not used only in Trench 3, where the trench was carried out on an area of 6 × 4.5 m, and in Trench 6, where the excavation at the foot of the cut has been carried out on a 4 × 2 m area.

The excavation of the trenches was preceded by a collection of surface archaeological material from the topsoil, which is almost everywhere disturbed by a heavy ploughing (up to 0.60 m deep).

This information was extremely important, because pottery and other finds, rather abundant and largely pertaining to the Achaemenid period, did not always match with the materials from the layers below the topsoil. The degree of wearing of pottery, particularly, reflects a high possibility that the material was subject to a relevant topographic shift.

On the whole this suggests on one side that the archaeological material from topsoil comes from the levelling of the fields which admittedly involved the destruction of many *tepes*, on the other that the surface material can not be used for the location of the areas which must have a priority for investigation.

Before approaching the main theme of this paper, the study of pottery, it is useful to present a brief survey of the various trenches excavated.

### **Area A**

In Trench 1 a stratigraphic sequence was obtained, in which the main features were three dump pits belonging to three different phases: the natural soil was reached here at the level of 1610.59 m a.s.l. and excavated for more than 0.45 m. The results confirm the geomagnetic survey, which suggested the existence of possible pits.

While finds of Achaemenid age were recovered throughout the sequence, the presence of glazed sherds of apparent medieval age and of fragments of twisted glass bracelet suggests that the latest phase of occupation was Islamic: the presence of Achaemenid material in these layers, therefore, would be a secondary deposition of materials probably originating from the nearby site of Persepolis. The C14 datings of two samples collected in the earliest phase give a time range of 480-380 BC.

In Trench 2 the information coming from the geomagnetic survey by the Iranian-French team, showing considerable anomalies, was not confirmed. In fact, the stratigraphy showed a series of accumulation of prevailing alluvial origin, with a few heap of stones of apparent natural origin. The natural soil was reached here at the depth of 1611.05 m a.s.l., and investigated for 1.10 m.

The upper layers (SU003, SU002) have some large stones and worn pottery, such as the topsoil (SU001), with traces of ancient ploughing below the present level of ploughing.

Finds of glass bracelets in the upper layers suggest a dating to the Islamic period, perhaps recent: however, most of the pottery is worn. This evidence, summed to the fact that the nature of some of the layers seems alluvial, points to the existence of some stream or canal in the vicinity, perhaps a stream flowing into the plain from the Kuh-e Rahmat to the N of Persepolis.

Trench 3 has been the most rewarding as regards architecture, because the succession of two structural phases characterized by walls of different techniques represents an important architectural evidence.

The natural soil of compact yellow clay, reached at a depth of 1611.58 - 1611.39 m a.s.l., was the occupation surface for the walls of the earliest of the seven recovered phases, which were discovered both to the N and the S of the canal. To the N of the canal, a structure in mud-brick was identified in the cut of the canal below the structures of the successive phase: the wall, however, could not be excavated due to the lack of space. A corresponding mud-brick structure was evidenced in the SE corner of the trench, where an extension of the original limits of the trench made the excavation possible. Here the measures of the mud-bricks, 33 × 33 cm, were recorded; the bricks are in compact yellow clay, and the two discovered courses are laid with a 16 cm horizontal shift in the position of the bricks between the two courses, for a firmer construction. The size of the bricks, the accuracy in laying them and the layer of mortar between the bricks date this phase to the Achaemenid period.

The following phase sees the main construction in the area, consisting of an imposing wall running from NW to SE (Fig. 2). This structure is apparently corresponding to an anomaly visible in both the geophysics survey carried out by the Iranian-French team and by Eng. Aminpour, having a length of more than 200 m. The wall is built with a foundation of large stones, deeper to E, thrown in a foundation cavity dug from the upper sur-



face of the preceding phase. Above the foundation, the wall has a superstructure of very compact *chineh*, in which the layers of clay were separated by thin deperated deposits. The wall has a thickness of 1.80 m, and its structure was better understood in the S part of the trench, where the elevation reaches 0.80 m. The fact that this phase is built in *chineh* and that its line can be seen in the geomagnetic survey for a long stretch, suggests that it possible represented an enclosure wall.

The large wall was not the only structure of this phase. In fact, to the E of it a structure of minor dimensions, only partly excavated, was evidenced running at a distance of 1.00 m from the main wall. This structure is composed of a stone foundation thrown in a foundation cavity dug in the upper surface of the preceding deposit layers and cutting the mud-brick wall as well. To the S, the stone foundation is topped by a thin layer of small stone chips, with a row of small slabs on edge at the SW corner; to N only the stone foundation was preserved in the narrow band next to the cut in the canal. Besides, in the N part of the trench a massive layer of compact clay leaning against the *chineh* elevation of the main wall, above a thin layer of small stone chips making a regular angle at the SW, is likely to represent a buttress of the structure: to the S of the canal the layer of compact clay has a larger width. Again in the N part of the trench, a wall in *chineh*, partly cut by the canal and badly preserved, starts to the W of the main structure running towards W.

As we mentioned, the wall is likely to have represented an enclosure or fortification, therefore with a scanty chance to retrieve evidence of occupation near it. As for its dating, the recovered pottery is too small in quantity for a clear definition, but the close connection of the large wall with the preceding phase on one side and the long duration of its life, suggest a dating to the Achaemenid period.

A brief series of clayey deposits, brought to light only to the W of the wall (SU042, SU041 in the S part of the trench, SU018 in the N part of the trench), represent a phase of accumulation. The following phases represent successive episodes of accumulation and collapse layers. C14 dating of a sample collected from the phase of the first collapse has a range of 700-400 BC, while the sample from the second collapse has a time range of 400-50 BC.

Trench 5 was centred on the understanding of the possible existence of structures as suggested by the four large stone slabs in a non-ploughed stretch of Area A. The trench was therefore laid around one of the slabs,

which presented two regular sides and conspicuous traces of Achaemenid stone working and was seemingly *in situ*. However, it was understood that the slab was not *in situ*, and had no connection with the underlying stratigraphy, at least in the excavated area.

Only one structural phase, pertaining to a later occupation, was brought to light. Excavation was in fact halted on a layer of compact clay with small stones which represents the first occupation floor of the phase. On this floor is a small circle of medium size stones, which had an elevation in *chineh* almost completely disappeared: the only possible usage is an enclosure for poultry or other small animals. In the NW corner, indeed, a layer of compact clay could represent the upper surface of a *chineh* wall, which was not explored.

As for the dating of the phase, the pottery recovered does not allow a safe proposal. However, on the basis of the level likeness with Phase 1 in Trench 1, it is possible to hypothesise that the Phase of occupation was Islamic.

### **Area B**

Trench 4, dug in Area B, has yielded a rich stratigraphic sequence including four phases, which will prove of great importance for the study of pottery. At any rate, Trench 4 suggests that Area B was an area dedicated to craft activities of various sort, because, besides the kiln brought to light by the excavation, the geomagnetic survey shows important anomalies interpreted as kilns or ovens.

The layers at the bottom of the sequence consist of depurated and compact clay of pinkish colour discovered at the bottom of the kiln of the following phase, along the E limit of the trench and in the NW corner. This soil could be tested only for a small depth (0.15 m), with no pottery recovered: the elevation of this soil is 1609.40 m a.s.l., lower than in the trenches of Area A, and we can safely state that this is the virgin soil thanks to comparison with the natural soil in the nearby Trench 6.

On top of this soil is the first human occupation of the area, consisting in a large kiln, which also represents the main architectural feature of the whole Area B (Figs. 3, 4). The kiln was partly dug in the existing deposits, partly built, in a rather sophisticated system: however, only three of its sides are completely inside the limits of the trench, while the remaining S side could not be traced, including the main opening/entrance.

The cut has a curvilinear profile throughout, and included also the shaping of a pillar like support for the ceiling of one of the chambers to the

SE, as well as the main smoke exhaust rising high in the N wall. The surface of the layers in which the kiln was dug turned green due to the ashes of the following deposits. Above the upper face of this dug portion, the kiln was completed with a superstructure, consisting in side walls and ceiling. The side walls were built in clay and small stones and make up the horse-shoe plan of the kiln. At the middle of the N side, a wall in clay runs straight to S, dividing the W chamber from the two chambers on the E and the intermediate space between them: two openings allow communication between the W chamber and the NE chamber: further to S, the same wall separates the W chamber from the SE chamber. The SE chamber is limited to the N by an E-W wall, while to SE a pillar is dug in the existing clay. The NE chamber has on its S side a wall, as well as a simple bench of stones. Combustion chamber was likely to be the NE chamber: indeed, the smoke exhaust channel was on its N side, while three air intakes of various diameter were dug in successive stages in its S sides, as well as a channel for removal of ashes crossing below the S wall. The three chambers were covered with a clay ceiling, of which some remains were rescued still in situ, while other sectors had collapsed on the top of the filling of ashes. The larger W chamber was likely to be the firing chamber, despite the fact that its floor was not level but convex. No artefact was recovered in the kiln, and the peculiar shape, different from all other known Iranian pottery kilns (Alden 1978; Mercuriali 2009) points to a use connected to the production of some sort of artificial material.

The use of the kiln produced a large amount of ashes and charcoal, and the situation recovered in the excavation refers probably to the gradual accumulation of ashes, which however could be distinguished in two main units: a lower one, of greenish colour, with very thin ashes, and an upper one, of darker colour and with burnt material of larger dimensions. This accumulation has been considered as a phase distinct from that of the kiln construction, because we cannot be sure about its chronological relationship with the kiln itself.

The following phase is characterised mainly by the collapse or perhaps intentional removing of the clay ceilings of the chambers. These units are in fact all of depurated clay, of rather mixed colours and with presence of ashes and charcoal.

The following phase sees a series of successive occupation surfaces. The final study of pottery will allow a subdivision according to the cultural material. In each of these occupation surfaces, of very irregular nature, the

features consisted of dump pits with bones and pottery. This presence of pits in the same area can be possibly explained with the existence of some craft activity in the area, suggested by the abundant iron and other metals slags and by the large anomaly evidenced in the geomagnetic survey to the N of the Trench.

We had the chance to collect a few samples for C14 dating. A sample from the first filling of the kiln has a range of 150 BC – AD 100, while a sample from the kiln collapse has a range of AD 0-150.

Trench 6 has been carried out in an area characterised by the presence of a thick succession of dump pits (Fig. 5), and has yielded the most abundant ceramic material, retrieved in the pits along with bones and bricks fragments.

As mentioned before, Trench 6 was excavated at the bottom of one of the large pits used presently for corn storage, which had removed the upper part of the deposits: it will be interesting to compare the ceramic material from this trench with that of the adjacent Trench 4.

In Trench 6 virgin soil was discovered at a level of 1608.84 m a.s.l.: it consists of depurated and compact clay of pinkish colour, with an irregular surface, overlying a similar but more compact layer. Both the layers are sterile, but for a few sherds on the upper surface of the latter which are likely to belong to the overlying layer.

Trench 6 has not yielded structures in the lower levels, but a succession of dump pits excavated from successive occupation surfaces. As a preliminary setting of the stratigraphy, it is proposed here to consider each of the five occupation surfaces as representing a different phase. It is noteworthy that each of the pits has been found filled with layers rich in potsherds, brick fragments, bone fragments and in some cases ashes, charcoal and even organic substance giving a very strong smell.

The stratigraphic sequence is well characterised and samples were available for C14 datings throughout its lowest phases. Time range of the earliest phase (Phase 5) is 600-400 BC, the second phase (Phase 4) has a range of 400-200 BC, while the third phase (Phase 3) has a range of 250-50 BC.

On the whole, the strong presence of dump pits suggests that the area of Trench 6 was a dump area for the nearby craft area, despite the fact that the earliest dated sample from Trench 4 is later to the earliest three phases of Trench 6: the fact that here the natural soil is lower than in Trench 4 may be the reason for this use of the area of Trench 6.

### The 2009 campaign

The second season of archaeological activities was carried out from October 20th to November 13th 2009.

The research team was composed by: Ms. Hajar Askari, topographer (University of Tehran), Ms. Martina Battisti, archaeologist (IsIAO), Mr. Luca Colliva, archaeologist (UNIBO), Mr. Marco Galuppi, archaeologist (UNIBO), Mr Nabil Ibnoerrida, archaeologist (UNIBO), Ms. Elisa Iori, archaeologist (IsIAO), Mr. Hamidreza Karami, archaeologist (PPRF), Ms. Somayeh Khoshbakht, draughtsman (freelance), Mr. Alan Mercuriali, archaeologist (University of Bologna), Mr. Sina Noe'i, conservator (ICAR and UNIBO), Mr. Abazar Shobeiri, archaeologist (PPRF), Mr. Mousa Zare', archaeologist (PPRF).

In 2009 the areas for excavations were selected on the basis of the results of the geomagnetic surveys, according to the main orientation of the whole programme, but the availability of land from the owners in some cases biased the choice.

Since the available information regarded the easternmost part of the site of Persepolis West, in an area at the distance of c. 500 m to the NW of the Terrace, the activity was concentrated in three fields in this part of the site, despite the fact that the centre of Persepolis West is further to W.

A first area (Area C) was selected in the field immediately to the N of Trench 3, in which an imposing structure in *chineh* had been brought to light in 2008. The main anomalies evidenced in the field were represented by a series of long lines, some of which having a parallel alignment, other crossing in a net pattern. Since one of the parallel anomalies was evidently the continuation of the structure brought to light in Trench 3, it was deemed more important at this stage investigating the other series of anomalies, the one forming a net of large rectangles of more than 50 × 30 m in side.

In this field two trenches were excavated. Trench 7 was placed across one of the lines going from SW to NE, with the aim of understanding the nature of the main linear anomaly as well as of minor anomalies: in order to be able to intercept the anomaly, the trench had a width of 5 m but a length of 10 m, i.e. the double of the module of 5 × 5 m chosen for the project. To the E of Trench 7, along the E border of the field, Trench 8, measuring 5 × 5 m, was placed on top of a similar anomaly of minor length.

A second area (Area D) which was taken in consideration is about 200 m further to E, in a large field separated from the first one by a canal, to the

W of the “Temple of the Fratarakas”. Here the magnetic surveys carried out by Eng. Aminpour showed some interesting anomalies. Trench 9 (5 × 5 m) was placed across a minor linear anomaly, whereas Trench 10 (5 × 5 m) had the aim to investigate a large and strong circular anomaly.

Finally a third area where the geomagnetic surveys by Aminpour showed relevant anomalies suggesting a large building, was located in the field to the N of Area C (Area E). Here the geophysical evidence was matched by an imposing architectural remain, a large block of limestone stairway of evident Achaemenid date. Since the field was cultivated with corn, it was accessible only when the end of the season was approaching. It was anyway deemed useful to check whether the repeated ploughing with deep plough (reaching up to 0.60 m) had completely washed away any structures around the stairway.

### Area C

In Trench 7, the main feature which could be studied is a stretch of a ditch running from SW to NE, corresponding to one of the long anomalies discovered by geomagnetic surveys. Three occupation phases were evidenced below the natural soil, very hard brown-reddish and brown-yellowish clayey soil with level surface, which was discovered at a depth of 1607.60 m a.s.l. and was excavated for a depth of 0.22 m.

The first occupation phase yielded an interesting information: the C14 dating on a bone sample from this phase has given a time range of 800-600 BC.

From its upper surface, the ditch representing the second phase was excavated, having a width of 0.75-0.80 m, with almost flat bottom and sloping sides (Fig. 6). The slope of the bottom was from W to E, i.e. contrariwise to the present slope of the ground. The ditch was filled by a successive series of deposits, rich in potsherds and bones. The lowest one has a considerable thickness, filling a good part of the canal: the C14 dating on one bone sample from this context has given a time range of 500-400 BC, which allows us to interpret the ditch as an ancient feature.

On the top of the filling, the S bank of the ditch collapsed, whereas the N bank remained intact. This collapse reduced the width of the ditch by 0.40-0.50 m: the new S bank is irregular, but the ditch was still carrying water. Above this level, a further series of filling episodes were evidenced, one leaning upon and against the other: they filled completely the canal.

This piece of evidence, complemented by the stretch of *chineh* wall brought to light in Trench 3 – which suggested a possible enclosure wall –

pushes us to the hypothesis that the area with regular anomalies represents an ancient garden belonging to the Achaemenid inhabited settlement of Persepolis.

In Trench 8 the information coming from the geomagnetic survey by Eng. Aminpour, showing considerable anomalies possibly consisting in canals, was confirmed. In fact, the main recovered evidence was represented by two stretches of a possible small canal, which ploughing work had considerably damaged (Fig. 7). Two occupation phases were evidenced below the topsoil. The natural soil is hard dark yellow deperated clayey soil with surface sloping eastwards, at a depth of 1607.85 m a.s.l.; it was excavated for a depth of 0.65 m. The first human occupation consists in a small oven modelled in deperated clay, with an irregular shape including two coves for fire. The presence of patches of ashes and fragments of charcoal in the surrounding deposits, even though of slight importance, confirm its use; C14 dating gives a time range of 500-400 BC. The presence of gravel on the surface of a successive layer of the following phase suggests that this is an occupation surface, which C14 analyses dates to 500-400 BC: on this surface two short stretches of a small canal were built. They are separated by a void which is likely to be due to the destruction by plough: the fact that they belong to the same structure is however confirmed by the alignment on the same line from SW to NE, similar to that found in Trench 7, where however a ditch is dug.

The first stretch, to E, is made up by two small parallel walls built with small stones on the surface of SU006; the second stretch, to W, is preserved only in two fired bricks placed in a row, while the second parallel row is missing. The bricks show traces of bitumen coating and are evidently re-used here from a primary use; they measure respectively l.  $0.325 \times 0.08$  m thickness and l.  $0.325 \times 0.085$  thickness.

#### **Area D**

In Trench 9, dug in Area D, no structures or other features were brought to light, and the anomaly suggested in the geomagnetic survey has resulted to correspond to some weak natural feature. However, the area has yielded several interesting artefacts. Two occupation phases were evidenced above the natural soil, hard light-brown clayey soil with level surface, at a depth of 1607.95 m a.s.l., which was excavated for a depth of 0.50 m.

Trench 10, dug in Area D to the W of the “Temple of the Fratarakas”, has yielded interesting features corresponding to one of the large anomalies evidenced in the geomagnetic survey: a large and deep pit, extremely rich

in bones and potsherds, a fireplace and a pottery basin with inner coating of bitumen. All these features belong to the second of the three occupation phases. The natural soil is hard dark yellow depurated clayey soil which was excavated in two restricted areas along the rim and on the bottom of the pit, for a depth of 0.20 m, at a depth of 1608.95 m a.s.l.

The first phase enjoys a C14 dating of 400-380 BC and ends with an occupation surface in which the pit was dug. The topsoil here is very rich in corroded fragments of cream ware which point to an extensive occupation of Post-Achaemenid date, linked very probably to the nearby "Temple of the Fratarakas".

### Area E

Trench 11 was dug in Area E, outside the presumed N limit of Persepolis West, to the SW of Toll-e Jalyan, a *tepe* with Elamite occupation, where the famous "Marvdasht silver cup" was reportedly found. Here the results of the geomagnetic survey show the existence of a large building with regular structures. On the present surface of the field, three grey limestone architectural elements appear and had been identified since 26 years by Mr. Hassan Rahsaz, conservator in chief of Persepolis: one large block of staircase, now broken in two parts; one square slab of threshold, quite well preserved; and one large block very damaged by ploughing.

Trench 11 aimed at ascertaining whether the action of the plough had destroyed the structures near the staircase block or whether they were still preserved to some extent. The imposing dimensions of the staircase (w. 2.65 m) and its weight suggested that it could not have moved too much. At the same time, 26 years ago Mr. Rahsaz had discovered whole floor areas paved with bricks, on both sides of the staircase: and many fragments of bricks were discovered in the lower layers.

Three phases were evidenced in the trench, which could not achieve its final aim due to lack of time, but which nevertheless showed that the destruction was limited to 0.50 m below the surface and to some pits dug in the attempt at breaking and removing the larger stairway block.

### An Overview

To sum up the results from the first two excavations seasons, geomagnetic surveys resulted in all their usefulness as well as in their limits.

Areas A and D, where the existence of anomalies had suggested the possible existence of structures or considerable features, showed that below



the superficial layers very rich in potsherds, the only archaeological features were some pits dug in the soil: the abundant material from the upper layers, therefore, has its origin in the levelling of the fields with surfacing archaeological remains described by Herzfeld 1929-30 and eventually completely destroyed.

The regular and well-evidenced grid pattern which geophysical surveys have shown in Area C has resulted originated from a series of ditches, which may suggest the existence of a large orchard/garden to the immediate North of the Terrace. The possibility that the *chineh* wall discovered in Trench 3 is an enclosure wall, and its position at the S limit of the grid area, could suggest that the wall represented the fence of the orchard/garden evidenced by the geophysical surveys and confirmed by the excavations. This feature matches with the tentative reconstruction proposed by S. Gondet (2011: 614-16) for the town of Persepolis, which alternated densely built up areas with large green zones hosting the aristocratic or royal settlements.

The only evidence of a built up settlement is the possible craft area in Area B, where the kiln and the area of dumps spanning from the Achaemenid through the Post-Achaemenid period is a significant indicator of craft activities, as also other strong anomalies appearing from the geomagnetic surveys confirm.

Area B lies at about 1 km to the W of the Terrace, and judging from the recorded evidence the settlement of Persepolis West should be located from Area B westwards. From Area B Eastwards, on the contrary, there is a probable belt of gardens around the Terrace, as excavations in Area C has suggested: the well excavated in 2008-09 at the W limit of the present Parking by the PPRF under the direction of Mr. Afshin Yazdani (personal communication) must be probably connected to this function.

### **Stratigraphic sequences and their dating**

From this short review of the archaeological situation of the area investigated, it is clear that the most useful stratigraphic sequences for the study of pottery are those in Area B, where the succession of phases is dense and the material recovered in primary context abundant.

Let us again review shortly the sequences of the two trenches excavated in Area B, Trench 4 and Trench 6.

In Trench 4, on the surface of the natural soil the kiln is built (Phase 4). The kiln is then filled by deposits (Phase 3). The structure collapses (Phase 2) and the collapses are covered by a new series of deposit (Phase 1).

In Trench 6, on the surface of the natural soil is the first occupation (Phase 5). The second occupation (Phase 4) has the first two pits, followed by three more pits in the third occupation (Phase 3) and a single pit in the fourth occupation (Phase 2), covered by surface levels (Phase 1).

The results of the C14 analyses carried out on bone samples by the Laboratory of the Second University of Naples, under the direction of prof. Filippo Terrasi, are as follows.

#### **Trench 4**

Phase 3 has been dated through two samples, dating respectively to  $2041 \pm 33$  B.P. and  $1970 \pm 32$  B.P. Also the calibrated datings indicate a time span between the end of the 2nd century BC and the end of the 1st century AD.

Phase 2 has two contrasting samples, the first dating to  $1929 \pm 46$  B.P. and the second to  $1591 \pm 57$  B.P.; the respective calibrated dating indicate for the first the time span between the mid-1st century BC and the end of the 2nd century AD, for the second the time span between the end of the 4th and the end of the 6th century AD.

Phase 1 seems to contain material of earlier provenance, since the two samples date respectively to  $2192 \pm 18$  B.P. and to  $2115 \pm 28$  B.P., with calibrated datings spanning respectively from the mid-4th century BC to the beginning of the 3rd century BC, and from the beginning of the 2nd century BC to the mid-1st century BC.

Summarizing these results, the kiln (Phase 4) was built at an age earlier than the end of the 2nd century BC, the higher time boundary for calibration of Phase 3. Since the kiln does not seem to have been used for a long time, it is likely that the construction of the kiln should be placed in the period immediately before that limit, i.e. in the 2nd century BC. The Post-Achaemenid dating of the kiln is also confirmed by the fact that two fragments of a specific variant of carinated bowl which in the sequence of Trench 6 appears only from Phase 3, were recovered in its first phase.

The filling of the kiln (Phase 3) is placed from the end of the 2nd century BC to the end of the 1st century AD, whereas the collapse of the kiln (Phase 2) has a wide time range, from the mid-1st century BC to the 6th century AD. The deposits of Phase 1, on the contrary contain materials of earlier age, probably linked to the excavation of earlier layers for the kiln, ranging from the mid-4th century BC to the mid-1st century BC, as also seen from the other artefacts recovered such as the Egyptian Blue fragments of wing.

### **Trench 6**

Phase 5 has one sample dated to  $2427 \pm 25$  B.P.: calibrated dating span the interval from the end of the 6th to the end of the 5th century BC.

Phase 4 is attributed with three samples dated to  $2372 \pm 18$  B.P.,  $2293 \pm 29$  B.P. and  $2223 \pm 25$  B.P. The calibrated dating suggests respectively the span from the end of the 5th to the beginning of the 4th century BC, the first half of the 4th century BC and the end of the 3rd to the mid-1st century BC.

Finally Phase 3 relies on one sample dated to  $2129 \pm 50$  B.P., with a calibrated dating between the end of the 3rd and the mid-1st century BC.

In terms of historical chronology, Phase 5 should fit into the 5th century, i.e. the Achaemenid period, Phase 4 should be placed between the 4th and the mid-1st century BC, i.e. the Late Achaemenid and Post-Achaemenid period, while Phase 3 should be dated to the Post-Achaemenid period.

### THE POTTERY

As a preliminary observation, we must mention the abundance of pottery, which substantiates the statistical validity of conclusions drawn from the study.

The whole of the sherds, diagnostic and non-diagnostic, has been studied according to the three categories of colour (red/orange/brown, cream, grey/black), thickness (thin, medium, thick) and quantity of temper (little, medium, much). Each of the groups stemming from the combination of the three above mentioned aspects is identified through an alphanumeric code, and has been weighed and counted in each stratigraphic unit; the processing of the data carried out by E. Iori (2010) and N. Ibnoerrida (2010) has given a comprehensive view on the ceramic of the site in the various trenches and phases.

The selected diagnostic material, besides, has been registered according to a detailed form, including information on shape, temper, production technique, firing, surface treatment, decoration and preservation; the best preserved sherds have been drawn and photographed. This material has been the object of a more detailed study carried out by M. Battisti (2010), which has also introduced a formal taxonomy worked out on the ceramics from the excavations at the Toll-e Takht of Pasargad (Galuppi 2007), allowing the definition of each single variant by an alphanumeric code.

The results concerning the two trenches Trench 4 and Trench 6 are here presented in a summarised form, in anticipation of the final publication.

The more significant information concerning all the sherds regards colour classes and thickness of the sherds.

### **Colour classes**

As regards the percentage of colour classes in the various periods in Trench 6, it is interesting to note that in the Achaemenid Phase 5, Red Ware accounts to 82%, Grey Ware to 11% and Cream Ware to only the 7%.

In the following Late Achaemenid-Post Achaemenid Phase 4, Red Ware accounts to 74%, Grey Ware to 13% and Cream Ware to 13%.

In the Post-Achaemenid Phase 3, we see an increase in the percentage of Cream Ware (19%) associated with a decrease in the percentage of Red Ware (62%), while Grey Ware is stable at 11%.

Phase 2, which stratigraphy suggests to date to the later Post-Achaemenid period, Cream Ware maintains a relevant percentage (16%), Red Ware accounts to 70% and Grey Ware to 13%.

Phase 1, represented by the disturbed surface levels, shows again Red Ware at 80%, Grey Ware at 9% and Cream Ware at 11%.

The situation in the Post-Achaemenid levels of Trench 4, shows that in the earliest Phase 4, slightly later than Phase 3 in Trench 6, Cream Ware has a considerable 28%, Grey Ware 17% and Red Ware only 55%.

In Phase 3, however, it is Grey Ware to increase to 23%, Red Ware to 68% while Cream Ware shows a poor 9%.

In Phase 2, with a much larger quantity of potsherds, Red Ware maintains 68%, Grey Ware descends to 11% and Cream Ware increases up to 21%.

Phase 1, with mixed materials from lower levels, shows Cream Ware at 22%, Red Ware at 62% and Red Ware at 16%.

It seems therefore possible to infer that in the Achaemenid period Red Ware is by large the most diffused colour class, that Grey Ware is rather stable and that on the contrary Cream Ware is rather limited in the Achaemenid period but increases gradually in the Late Achaemenid Period and even more in the Post-Achaemenid period, when its percentage is around 20%.

### **Thickness**

Another important aspect is that of thickness, associated to the amount of temper: thin sherds (thickness < 0.5 cm) indicate small vessels, such as bowls, while thick sherds (thickness > 1.5 cm) belong to large containers, such as storage jars, jars and basins.

In the Achaemenid period layers of Phase 5 in Trench 6 the presence of thin sherds is significant in each of the three main colour classes: 6% in the Red Ware, 11% in the Cream Ware and 11% in the Grey Ware.

In Phase 4, dating between the Late Achaemenid and the Post-Achaemenid periods, this percentage becomes 4% in the Red Ware, 15% in the Grey Ware and 0 in the Cream Ware.

In Phase 3, of the Post-Achaemenid period, thin sherds represent only 1% on the Red Ware, 0% in the Grey Ware and 5% in the Cream Ware.

We may therefore infer that in the Achaemenid period there is a larger presence of small and fine vessels than in the following periods.

This information is associated to the other one concerning the thick sherds of large vessels. Thick sherds in Phase 5 represent 20% of the total Red Ware sherds, 7% of the Cream Ware and 0% of the Grey Ware.

In Phase 4 the percentage is 21% in the Red Ware, 34% in the Cream Ware and 23% in the Grey Ware.

In Phase 3 thick sherds account to the 51% of the Red Ware, 33% of the Cream Ware and 39% of the Grey Ware.

This figure probably means that the amount of large vessels was more significant in the Post-Achaemenid than in the Achaemenid period.

In Trench 4, the Post-Achaemenid Phases 4 and 3 are consistent with this picture. Thin sherds account respectively to 3% and 4% of the Red Ware, 2% and 2% of the Grey Ware and 14% and 10% of the Cream Ware, thick sherds account respectively to 23% and 21% of the Red Ware, 48% and 26% of the Grey Ware, and 23% and 21% of the Cream Ware.

### *Diagnostic Sherds*

The more significant information concerning the diagnostic sherds concerns production technique, firing and forms of the sherds from Trench 6.

#### **Production Technique (Fig. 8)**

Among the materials from Trench 6, the largest quantity of the pottery is wheel thrown: however the percentage of this technique decreases from

the 82% of Phase 5 to 78% of Phase 4 and 67% of Phase 3. Hand shaping is on the whole representing the 7% of the total in each phase (8% in Phase 5). The percentage of coil and slab production, typical of storage jars, is linked with the presence of these vessels in the various phases; coil production and is quite reduced in Phase 5 (4%), increasing in Phase 4 (6%) and quite significant in Phase 3 (21%); slab production accounts to 5% in Phase 5, 7% in Phase 4 and 3% in Phase 3.

### **Firing (Fig. 9)**

Good firing characterizes the 73% of the diagnostic sherds of Phase 5; this percentage decreases to 66% in Phase 4 and 64% in Phase 3. Conversely, underfiring increases from 26% (Phase 5) to 29% (Phase 4) and 32% (Phase 3). Also uneven firing increases from 1% (Phase 5) to 4% (Phase 4) and 3% (Phase 3).

### **Shapes (Figs. 10, 11)**

In the pottery from Trench 6, fragments of bowls represent by large the most common of the diagnostic sherds in Phase 5 (62%), while the percentage of bowls decreases in Phase 4 (57%) and Phase 3 (39%). Small jars are quite homogeneous in Phase 5 (13%), Phase 4 (10%) and Phase 3 (11%).

The presence of vessels of larger dimensions, conversely, increases with the passing of time. Basins represent 5% of the diagnostic sherds in Phase 5, 9% in Phase 4 and 16% in Phase 3; jars account to 1% only in Phase 5, and increase to 3% in Phase 4 and to 11% in Phase 3; storage jars, on the contrary, represent 4% in Phase 5, 2% in Phase 4 and 4% in Phase 3.

Among shapes with a lesser frequency, jugs account to 4% in Phase 5, 3% in Phase 4 and 1% in Phase 3; pans account to 4% in Phase 5, 2% in Phase 4 and 3% in Phase 3; beakers are present only in Phase 4 (1% of the Phase), while pilgrim flasks are present only in Phase 3 (1% of the Phase).

To these general consideration regarding basic shapes, we will be able to add more interesting information regarding the evolution of specific groups and variants for each of the shapes.

As we mentioned above, a formal taxonomy allowing the definition of each single variant by an alphanumeric code has been established; this taxonomy follows a hierarchy organised in category, group, subgroup, series and variant. While the group and subgroup are defined by the form of the body, the series is defined by the form of the rim and each variant is defined on the basis of the different form of the lip.

That of the bowls is undoubtedly the category for which there is the more abundant evidence. Thanks to the stratigraphic information, it is possible to trace a reliable picture of the chronological attribution some of the most significant groups, at least as far as presence of the shapes is concerned.

Group o.210 of the taxonomy of bowls with rounded sides (Fig. 12) thus results concentrated in the Post-Achaemenid period only. Group o.220 of deep bowls with thickened rims (Fig. 13) spans the Achaemenid through Post-Achaemenid periods, while the presence of subgroup o.225 (Fig. 14) is evidenced only from the Late Achaemenid period onwards. Group o.230 of bowls with straight sides (Fig. 15) appears from the Achaemenid through the Post-Achaemenid periods. The group of the carinated bowls, traditionally considered as a shape typical of the Achaemenid period (Boucharlat & Haerinck 1991: 302), corresponding to group o.260 in our taxonomy (Figs. 16, 17), is on the contrary found from the Achaemenid through the Post-Achaemenid periods. Finally group o.270 of shallow bowls with corrugated short carination (Fig. 18) spans the Late Achaemenid through Post-Achaemenid periods.

### **Decoration**

The study of pottery from Trench 6 gave also interesting information on the different techniques of decoration which characterize the large jars of the Achaemenid and Post-Achaemenid periods: this feature until now had never been more specifically studied despite the fact that it has a great importance in the study of sherds from surface collections, being the jars fragments easily identified.

The two main decoration techniques are the applied ribs and the modelled ridges. The study of the stratigraphic distribution of the two techniques has shown that the applied ribs (Figs. 19-21) are present from the Achaemenid through the Post-Achaemenid periods, while the modelled ridges (Fig. 22) are present so far only in layers of Post-Achaemenid period.

## REFERENCES

- Alden, J.R. (1978) Excavations at Tal-i Malyan, Part I: A Sassanian Kiln. *Iran* 16: 79-86.
- Battisti, M. (2010) *La ceramica dello scavo della Missione archeologica congiunta Irano-Italiana (Unibo, IsIAO, ICAR) a Persepolis West (Fars, Iran, Trincee Tr. 4 e Tr. 6, ca. V-I sec. a.C.: ricerche archeologiche*. Tesi di laurea specialistica, Università degli studi di Roma "Sapienza". Roma.
- Boucharlat, R. (2003) The Persepolis Area in the Achaemenid Period. Some Reconsiderations. In: N.F. Miller & K. Abdi eds., *Yeki bud, Yeki nabud. Essays on the archaeology of Iran in honor of William M. Sumner* (Monograph Series, 48, Cotsen Institute of Archaeology, University of California). Los Angeles: 261-265.
- Boucharlat, R. & E. Haerinck (1991) Ceramics, xi. The Achaemenid period. In: *Encyclopaedia Iranica*, V/3: 302-304.
- Galuppi, M. (2007) *La ceramica dello scavo della Missione Archeologica dell'Università di Bologna sul Toll-e Takht di Pasargadae (Fars, Iran), c. V-I sec. a.C.: ricerche archeologiche*. Tesi di laurea, Università degli studi di Bologna. Bologna.
- Gondet, S. (2011) *Occupation de la plaine de Persépolis au Ier millénaire av. J.-C. (Fars central, Iran)*. Thèse de doctorat, Université Lumière Lyon 2, Lyon.
- Herzfeld, E. (1929-30) Rapport sur l'état actuel des ruines de Persépolis et propositions pour leur conservation. *Archäologische Mitteilungen aus Iran* 1: 17-40 and 1-24 (Persian).
- Ibnoerrida, N. (2010) *La ceramica delle fasi achemenidi dagli scavi della Missione congiunta ICAR-Unibo-IsIAO a Persepolis West (Iran), Trincee 7-11*. Tesi di laurea, Università degli studi di Bologna. Bologna.
- Iori, E. (2010) *La ceramica dello scavo della Missione archeologica congiunta Irano-Italiana (Unibo, IsIAO, ICAR) a Persepolis West (Fars, Iran), stagione 2008: Analisi Quantitativa*. Tesi di laurea, Università degli studi di Roma "Sapienza". Roma.
- Mercuriali, A. (2009) *La trincea PW 4 della campagna di scavi 2008 dell'Università di Bologna a Persepolis West (Iran): la fornace*. Tesi di laurea, Università degli studi di Bologna. Bologna.



Sumner, W.M. (1972) *Cultural Development in the Kur River Basin, Iran. An archaeological analysis of settlement patterns*. PhD dissertation, University of Pennsylvania. Ann Arbor, UMI.

Sumner, W.M. (1986) Achaemenid Settlement in the Persepolis Plain. *American Journal of Archaeology* 90: 3-31.

#### FIGURES (PLATES XXIX-XXXVIII)

Fig. 1. Persepolis West, general map with indication of the areas, with geophysical surveys and excavated trenches (drawing Iranian-Italian Joint Archaeological Mission).

Fig. 2. The wall in Trench 3 (photo Iranian-Italian Joint Archaeological Mission).

Fig. 3. The kiln in Trench 4, from N (photo Iranian-Italian Joint Archaeological Mission).

Fig. 4. The kiln in Trench 4, E-W cross-section (drawing A. Mercuriali, Iranian-Italian Joint Archaeological Mission).

Fig. 5. Trench 6, general view (photo Iranian-Italian Joint Archaeological Mission).

Fig. 6. Trench 7, cross-section of the ditch (drawing L. Colliva, Iranian-Italian Joint Archaeological Mission).

Fig. 7. Trench 8, general view from W (photo Iranian-Italian Joint Archaeological Mission).

Fig. 8. Percentage of manufacturing techniques in diagnostic sherds from Trench 6.

Fig. 9. Percentage of firing qualities in diagnostic sherds from Trench 6.

Fig. 10. Absolute frequency of ceramic shapes in diagnostic sherds from Trench 6.

Fig. 11. Percentage of ceramic shapes in diagnostic sherds from Trench 6.

Fig. 12. Group o.210, Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

Fig. 13. Group o.220, Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

Fig. 14. Subgroup o.225, Late Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

- Fig. 15. Group o.230, Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).
- Fig. 16. Group o.260, Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).
- Fig. 17. Group o.260, Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).
- Fig. 18. Group o.270, Late Achaemenid to Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).
- Fig. 19. Storage jars, applied ribs: sherd P00724, Trench 6, Ph. 5, Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).
- Fig. 20. Storage jars, applied ribs: sherd P00542, Trench 6, Ph. 4, Late to Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).
- Fig. 21. Storage jars, applied ribs: sherds P00595, Trench 6, Ph. 3, Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).
- Fig. 22. Storage jars, modelled ridges: sherd P00561, Trench 6, Ph. 3, Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

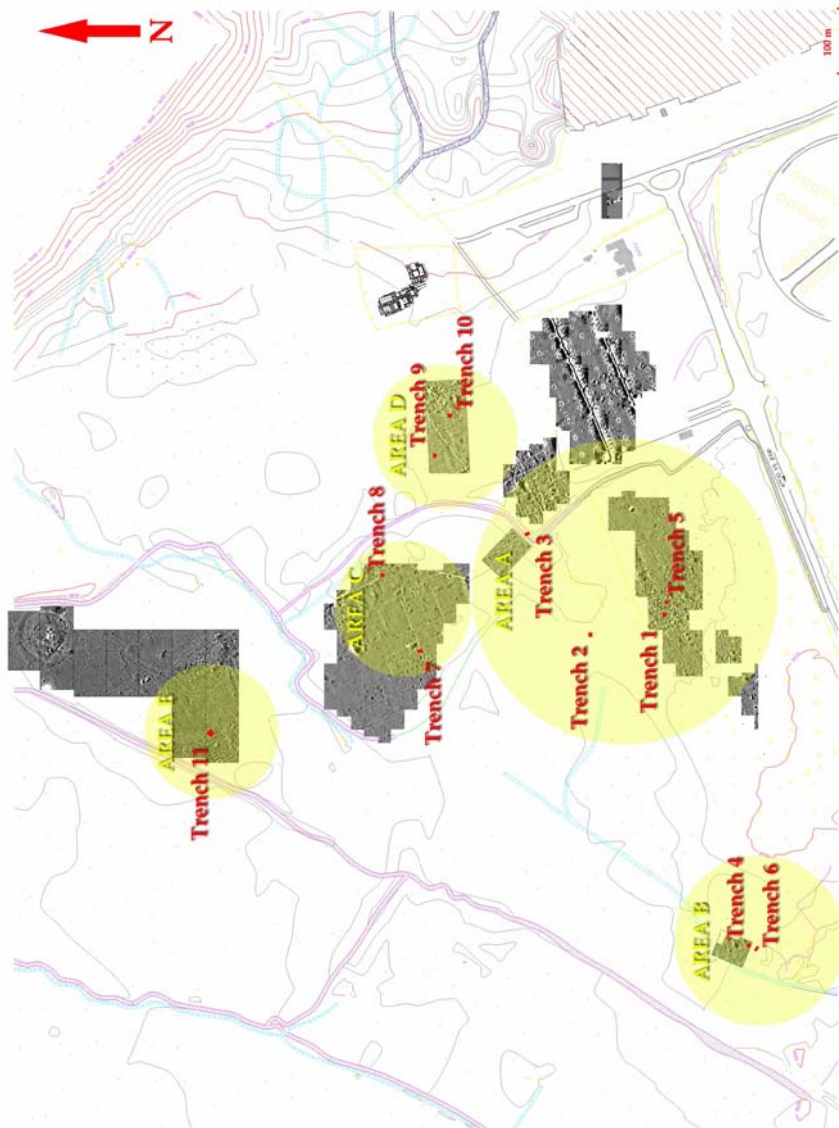


Fig. 1. Persepolis West, general map with indication of the areas, with geophysical surveys and excavated trenches (drawing Iranian-Italian Joint Archaeological Mission).



Fig. 2. The wall in Trench 3  
(photo Iranian-Italian Joint Archaeological Mission).



Fig. 3. The kiln in Trench 4, from N (photo Iranian-Italian Joint Archaeological Mission).

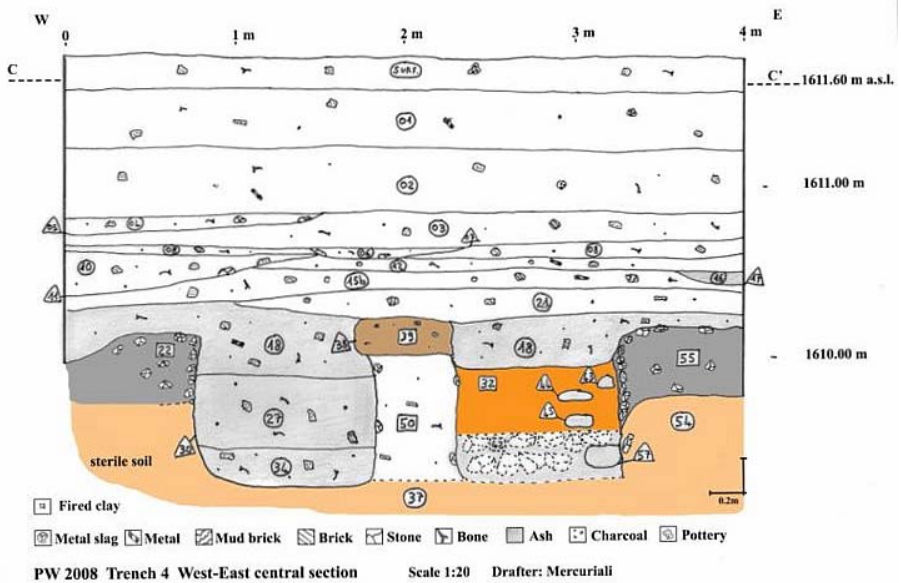


Fig. 4. The kiln in Trench 4, E-W cross-section (drawing A. Mercuriali, Iranian-Italian Joint Archaeological Mission).





Fig. 5. Trench 6, general view  
(photo Iranian-Italian Joint Archaeological Mission).

PW 2009 Trench 7 Section of Canal: A-A'

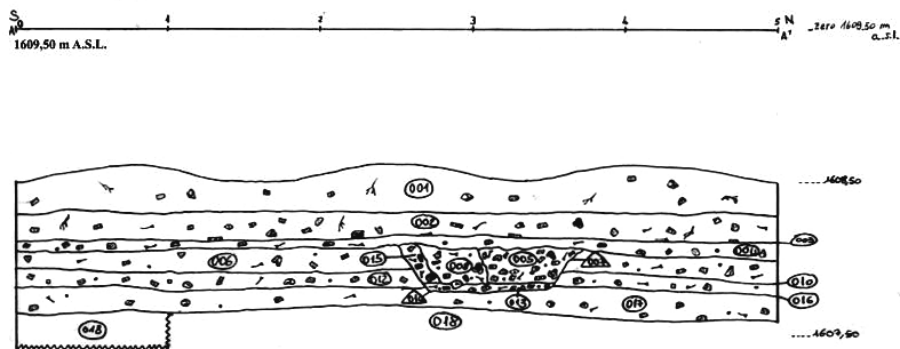


Fig. 6. Trench 7, cross-section of the ditch  
(drawing L. Colliva, Iranian-Italian Joint Archaeological Mission).



Fig. 7. Trench 8, general view from W  
(photo Iranian-Italian Joint Archaeological Mission).

**Tr. 6**

	Topsoil	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
<b>Coils</b>	14%	7%	17%	21%	6%	4%
<b>Hand</b>	17%	7%	7%	7%	7%	8%
<b>Mould</b>	0%	0%	0%	0%	0%	0%
<b>Slab</b>	14%	7%	15%	3%	7%	5%
<b>Wheel</b>	56%	78%	61%	67%	78%	82%
<b>Hand+Wheel</b>	0%	0%	0%	2%	1%	1%
<b>Coils+Wheel</b>	0%	0%	0%	1%	0%	0%
<b>Undefined</b>	0%	0%	0%	0%	1%	0%
	100%	100%	100%	100%	100%	100%

**Percentage of manufacturing techniques**

Fig. 8. Percentage of manufacturing techniques in diagnostic sherds from Trench 6.

**Tr. 6**

	Topsoil	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
<b>Good firing</b>	40%	59%	64%	65%	66%	73%
<b>Underfiring</b>	43%	41%	36%	32%	29%	26%
<b>Low firing</b>	3%	0%	0%	0%	0%	0%
<b>Overfiring</b>	9%	0%	0%	0%	1%	0%
<b>Uneven firing</b>	6%	0%	0%	3%	4%	1%
	100%	100%	100%	100%	100%	100%

**Percentage of firing qualities**

Fig. 9. Percentage of firing qualities in diagnostic sherds from Trench 6.

**Tr. 6**

	Topsoil	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	
Dishes	0	0	0	0	5	0	5
Bowls	9	17	15	44	94	48	227
Basins	5	3	9	18	15	4	54
Pans	3	3	3	3	4	3	19
Beakers	0	0	0	0	2	0	2
Storage jars	3	2	3	5	3	3	19
Jars	4	1	5	12	5	1	28
Small jars	9	5	2	12	16	10	54
Flasks	0	0	1	0	0	0	1
Pilgrim's flasks	0	1	0	1	0	0	2
Jugs	1	1	2	1	5	3	13
Small jugs	0	0	0	1	1	0	2
Unguentaria	0	0	0	0	1	0	1
Undefined	2	8	6	17	14	6	53
	<b>36</b>	<b>41</b>	<b>46</b>	<b>114</b>	<b>165</b>	<b>78</b>	<b>480</b>

**Absolute frequency of ceramic shapes**

Fig. 10. Absolute frequency of ceramic shapes in diagnostic sherds from Trench 6.

**Tr. 6**

	Topsoil	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Dishes	0%	0%	0%	0%	3%	0%
Bowls	25%	41%	33%	39%	57%	62%
Basins	14%	7%	20%	16%	9%	5%
Pans	8%	7%	7%	3%	2%	4%
Beakers	0%	0%	0%	0%	1%	0%
Storage jars	8%	5%	7%	4%	2%	4%
Jars	11%	2%	11%	11%	3%	1%
Small jars	25%	12%	4%	11%	10%	13%
Flasks	0%	0%	2%	0%	0%	0%
Pilgrim's flasks	0%	2%	0%	1%	0%	0%
Jugs	3%	2%	4%	1%	3%	4%
Small jugs	0%	0%	0%	1%	1%	0%
Unguentaria	0%	0%	0%	0%	1%	0%
Undefined	6%	20%	13%	15%	8%	8%
	100%	100%	100%	100%	100%	100%

**Percentage of ceramic shapes**

Fig. 11. Percentage of ceramic shapes in diagnostic sherds from Trench 6.



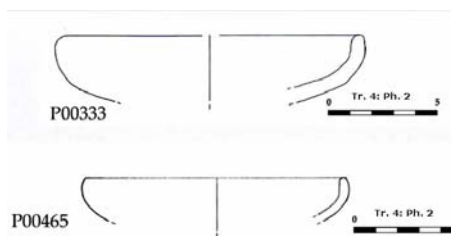


Fig. 12. Group o.210, Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

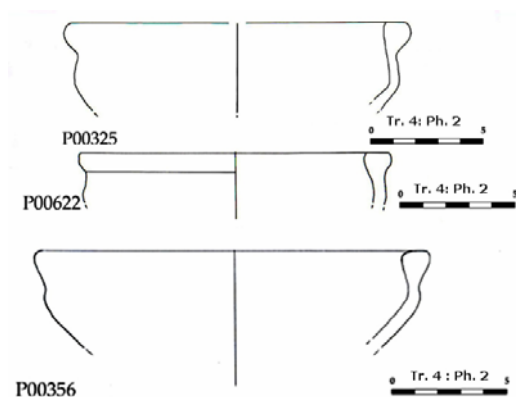


Fig. 13. Group o.220, Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

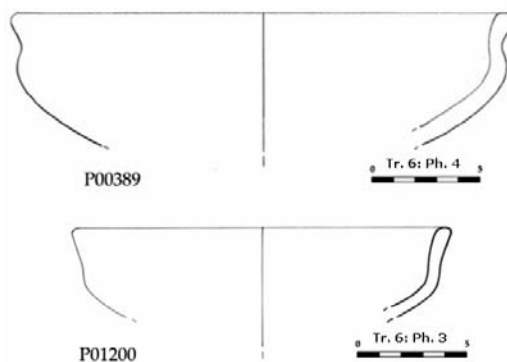


Fig. 14. Subgroup o.225, Late Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

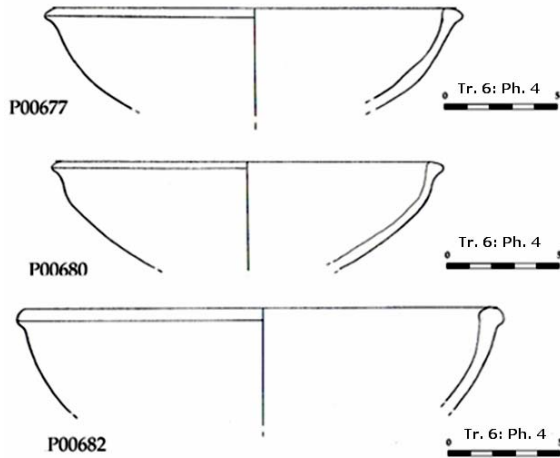


Fig. 15. Group o.230, Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

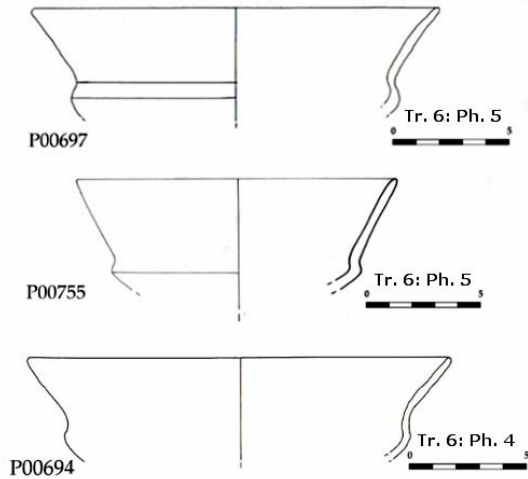


Fig. 16. Group o.260, Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

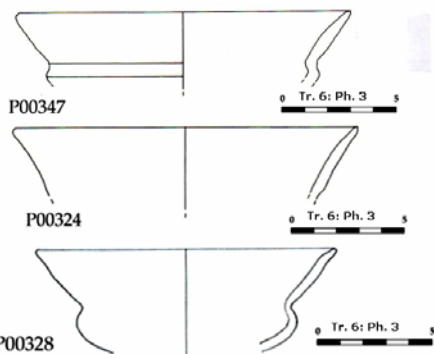


Fig. 17. Group o.260, Achaemenid through Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

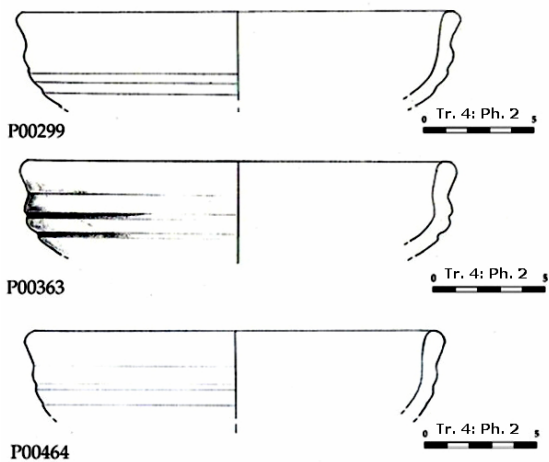


Fig. 18. Group o.270, Late Achaemenid to Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

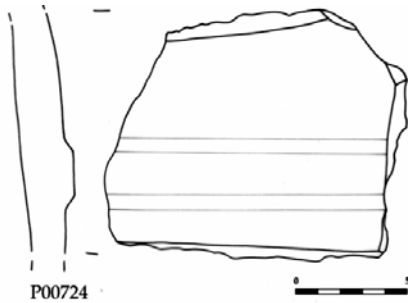


Fig. 19. Storage jars, applied ribs: sherd P00724, Trench 6, Ph. 5, Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

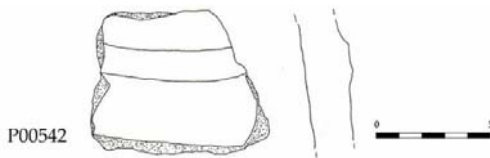


Fig. 20. Storage jars, applied ribs: sherd P00542, Trench 6, Ph. 4, Late to Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

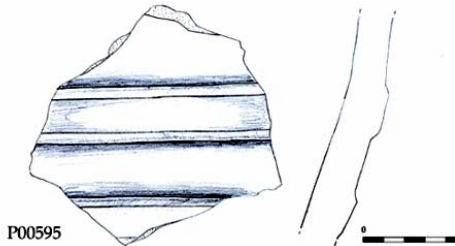


Fig. 21. Storage jars, applied ribs: sherds P00595, Trench 6, Ph. 3, Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).

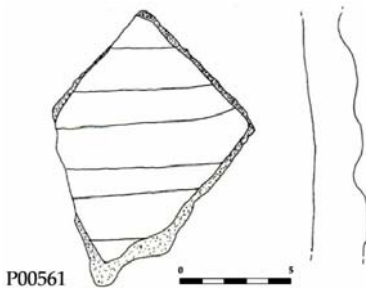


Fig. 22. Storage jars, modelled ridges: sherd P00561, Trench 6, Ph. 3, Post-Achaemenid (drawing Iranian-Italian Joint Archaeological Mission).