

# pca

european journal of  
postclassicalarchaeologies

volume 6/2016

**SAP Società Archeologica s.r.l.**

Mantova 2016



#### EDITORS

**Gian Pietro Brogiolo** (chief editor)

**Alexandra Chavarría** (executive editor)

#### ADVISORY BOARD

**Martin Carver** (University of York)

**Matthew H. Johnson** (Northwestern University of Chicago)

**Giuliano Volpe** (Università degli Studi di Foggia)

**Marco Valenti** (Università degli Studi di Siena)

#### ASSISTANT EDITOR

**Francesca Benetti**

#### LANGUAGE EDITOR

**Rebecca Devlin** (University of Florida)

#### EDITORIAL BOARD

**Gilberto Artioli** (Università degli Studi di Padova)

**Andrea Breda** (Soprintendenza BB.AA. della Lombardia)

**Margarita Diaz-Andreu** (ICREA - Universitat de Barcelona)

**José M. Martín Civantos** (Universidad de Granada)

**Girolamo Fiorentino** (Università del Salento)

**Caterina Giostra** (Università Cattolica del Sacro Cuore di Milano)

**Susanne Hakenbeck** (University of Cambridge)

**Vasco La Salvia** (Università degli Studi G. D'Annunzio di Chieti e Pescara)

**Bastien Lefebvre** (Université Toulouse - Jean Jaurès)

**Alberto León** (Universidad de Córdoba)

**Tamara Lewit** (Trinity College - University of Melbourne)

**Federico Marazzi** (Università degli Studi Suor Orsola Benincasa di Napoli)

**Dieter Quast** (Römisch-Germanisches Zentralmuseum Mainz)

**Andrew Reynolds** (University College London)

**Mauro Rottoli** (Laboratorio di archeobiologia dei Musei Civici di Como)

**Colin Rynne** (University College Cork)

**Post-Classical Archaeologies** (PCA) is an independent, international, peer-reviewed journal devoted to the communication of post-classical research. PCA publishes a variety of manuscript types, including original research, discussions and review articles. Topics of interest include all subjects that relate to the science and practice of archaeology, particularly multidisciplinary research which use specialist methodologies, such as zooarchaeology, paleobotany, archaeometallurgy, archaeometry, spatial analysis, as well as other experimental methodologies applied to the archaeology of post-classical Europe.

Submission of a manuscript implies that the work has not been published before, that it is not under consideration for publication elsewhere and that it has been approved by all co-authors. Each author must clear reproduction rights for any photos or illustration, credited to a third party that he wishes to use (including content found on the Internet). For more information about **ethics** (including plagiarism) and copyright practices and guidelines please visit the web site [www.postclassical.it](http://www.postclassical.it).

PCA is published once a year in May, starting in 2011. Manuscripts should be submitted to [editor@postclassical.it](mailto:editor@postclassical.it) in accordance to the guidelines for contributors in the webpage <http://www.postclassical.it>

*Post-Classical Archaeologies's* manuscript **review process** is rigorous and is intended to identify the strengths and weaknesses in each submitted manuscript, to determine which manuscripts are suitable for publication, and to work with the authors to improve their manuscript prior to publication.

This journal has the option to publish in **open access**. For information please visit the web site [www.postclassical.it](http://www.postclassical.it)

How to **quote**: please use "PCA" as abbreviation and "Post-Classical Archaeologies" as full title.

**Cover image**: courtesy of Schaffhausen, Stadtbibliothek (Switzerland), Gen. 8, f. 271v – Klosterneuburger Evangelienwerk, retrieved from [www.e-codices.unifr.ch/en/sbs/0008/271v/0/Sequence-1030](http://www.e-codices.unifr.ch/en/sbs/0008/271v/0/Sequence-1030)

"Post-Classical Archaeologies" was approved on 2015-05-13 according to ERIH PLUS criteria for inclusion. Classified A by ANVUR (Agenzia Nazionale di Valutazione del sistema Universitario e della Ricerca).

#### DESIGN

Paolo Vedovetto

#### PUBLISHER

SAP Società Archeologica s.r.l.  
Strada Fienili 39/a, 46020 Quingentole, Mantova  
[www.archeologica.it](http://www.archeologica.it)

#### PRINTED BY

Tecnografica Rossi, Via I maggio, Sandrigo (VI)

Authorised by Mantua court no. 4/2011 of April 8, 2011

For subscription and all other information visit the web site [www.postclassical.it](http://www.postclassical.it)

CONTENTS PAGES

EDITORIAL

5

RESEARCH - RECYCLING AND REUSE IN THE MIDDLE AGES

- R. Fleming The ritual recycling of Roman building material in late 4<sup>th</sup>- and early 5<sup>th</sup>-century Britain

7

- S. Paynter, C. Jackson Re-used Roman rubbish: a thousand years of recycling glass

31

- A. Sebastiani Glass and metal production at Alberese. The workshops at the manufacturing district of Spolverino

53

- F.-D. Deltenre, L. Orlandi «Rien ne se perd, rien ne se crée, tout se transforme». Transformation and manufacturing in the Late Roman *villa* of Aiano-Torraccia di Chiusi (5<sup>th</sup>-7<sup>th</sup> cent. AD)

71

- S. Bertoldi Santa Cristina in Caio (Buonconvento, Si): productive reuse during the Late Antiquity and the Early Middle Ages

91

- C. Fernández-Ochoa, F. Gil Sendino, J. Salido La actividad metalúrgica en el yacimiento Veranes (Gijón, España): de la villa romana al asentamiento tardoantiguo y altomedieval

109

BEYOND THE THEME

- F. Curta Postcards from Maurilia, or the historiography of the dark-age cities of Byzantium

141

- M. Asolati Trasparenze ponderali: contrappesi monetali di vetro nell'Anatolia bizantina

163

## DOSSIER - WORLD HERITAGE AND THE PUBLIC

- M. Díaz-Andreu** Introduction to the Dossier "World Heritage and the Public" 189
- M. Díaz-Andreu** Social values and the participation of local communities in World Heritage: a dream too far? 193
- Q. Gao** Social values and archaeological heritage: an ethnographic study of the Daming Palace archaeological site (China) 213
- G. Alexopoulos, K. Fouseki** Gender exclusion and local values versus universal cultural heritage significance: the Avaton debate on the monastic community of Mount Athos 235
- T.S. Guttormsen, J. Taylor, G. Swensen** Heritage values conceptualised as heritage routes. Visions and challenges towards public diversity 255
- M. Maluck** Spatial planning as a way to stakeholder involvement in cultural heritage management. Examples from Northern Europe 273
- D. Rodwell** Community values vs World Heritage values: bridging the gap 295
- G.P. Brogiolo** The UNESCO network "The Longobards in Italy. The Places of Power (568-774 A.D.)" and the Brescia case 317

## RETROSPECT

- N.I. Platonova** Problems of early medieval Slavonic Archaeology in Russia (a view from St. Petersburg) 333

## PROJECT

- M. Valenti** "We invest in Public Archaeology". The Poggibonsi Archaeodrome project: an alliance between people, Municipality and University 417

## REVIEWS

- G. Chouquer**, *Les parcellaires médiévaux en Émilie et en Romagne. Centuriations et trames coaxiales. Morphologie et droit agraires* - by **C. Citter** 431
- A. Vigil-Escalera Guirado**, *Los primeros paisajes altomedievales en el interior de Hispania. Registros campesinos del siglo quinto d.C.* - by **T. Lewit**
- M. Díaz-Andreu, A. Pastor Pérez, A. Ruiz Martínez** (eds), *Arqueología y comunidad. El valor social del Patrimonio Arqueológico en el Siglo XXI* - by **M. del Carmen Rojo Ariza**



## EDITORIAL

*The sixth issue of PCA presents the material from two conferences held in different European countries last year.*

*The volume opens with some of the papers presented at The British School at Rome (April 2014) at a conference on The Recycling and Reuse of Materials during the Early Middle Ages. The meeting – organised by Alessandro Sebastiani (who has collaborated as guest editor for this section), Elena Chirico and Matteo Colombini – dealt mainly with productive structures related to the transformation of glass and metal in Italy (papers by Alessandro Sebastiani, Stefano Bertoldi, François-Dominique Deltenre and Lucia Orlandi). Other international experts have agreed to add their contributions to the subject: Robin Fleming on the reuse of construction material in early medieval graves, Sarah Paynter and Caroline Jackson offering a synthesis on the reuse of glass, and the team of Carmen Fernández-Ochoa in Spain presenting the early medieval productive structures at the villa of Veranes (Gijón). Two papers by Florin Curta and Michele Asolati, dealing with exchange in the Byzantine Mediterranean, have been published in the Varia section.*

*After the catastrophe of World War II, many international institutions were founded: the United Nations, UNESCO, the European Community. All these organizations are today immersed in a transitional phase in the systemic crisis which affects the entire Western world, a crisis to which the nihilist and relativist positions have contributed and which has (rightly) delegitimated the imperialism on which the West had built its dominant position. In this crisis, the recovery of shared historical memories is increasingly revealed as a central element in the defence of a rational world, which, although it may have abandoned the utopias of the 1900s, at least safeguards the principles of freedom and the pluralism of values. Today, there is wide debate, even among archaeologists, over how to present cultural heritage in a globalized society while nevertheless pre-*

*serving its multiple identities and cultures. The discussion of these matters was the purpose of the papers dedicated to the World Heritage List. This collection, guest edited by Margarita Díaz-Andreu, results from a workshop of the EU-project JPI–JHEP Heritage Values Network (H@V) held at the University of Barcelona in February 2015. The main question, summarized in the title of the paper by Díaz-Andreu, is whether the inclusion of social values and local communities in the management of cultural heritage is an impossible dream. Is it a utopian vision, typical of the historical processes which gave birth to the international organizations and their initiatives to hold back the spectre of a World War III? In many of these contributions, the watchwords still conform to this direction: the participation and involvement of stakeholders in the hope that local communities will be led to a positive valuation of assets and their public use.*

*The different directions of the debate move between the two poles of economic management and cultural enrichment of local communities. Too often, it is difficult to find a balance between touristic exploitation and a useful cultural proposal for local communities, as happened in the telling example of the Daming Palace in China, developed by Qian Gao, winner of the 2016 PCA young researcher award.*

*Direct involvement is often difficult in a globalized and multicultural society that has lost its historical roots. Most of the contributions consider that a proper balance can be found between global strategies promoted by UNESCO, based on the decalogue of general principles under which to file an application for protected sites, and the feeling and evaluation expressed by the local community (the focus of Torgrim Sneve Guttorsen, Joel Taylor, Grete Swensen on Heritage Routes and Matthias Maluck and Gian Pietro Brogiolo on organizational proposals in the interventions).*

*Also related to the subject of cultural heritage and the public is the project section of this issue, a homage the Poggibonsi Archeodromo. A project developed in recent years by the team of Marco Valenti (University of Siena), this is a unique living archaeological park recreated from archaeological evidence, presenting the life of an early medieval village, an initiative that clearly demonstrates the social and economic benefits of good practices in public archaeology in Italy.*

*Finally, the retrospect section, which addresses the history of early medieval archaeology in different European countries, is this year devoted to the fascinating recent history of early medieval Archaeology in Russia, with an extensive study by Nadezhda Platonova (St Peterburg).*

# Glass and metal production at Alberese. The workshops and the manufacturing district of Spolverino

ALESSANDRO SEBASTIANI

Department of Archaeology, University of Sheffield,  
Northgate House, West Street, Sheffield S1 4ET, UK,  
a.sebastiani@sheffield.ac.uk

This paper focuses on the discovery of a large Roman manufacturing district in the area of Alberese (Grosseto – IT). Excavations have revealed a series of metal and glass workshops, related to the recycling of older objects and to the production of metal ingots. The site was continuously in use from the late 1<sup>st</sup> c. to the late 5<sup>th</sup> c. AD before being abandoned.

**Keywords:** recycle, glass, metal, workshops, Roman period

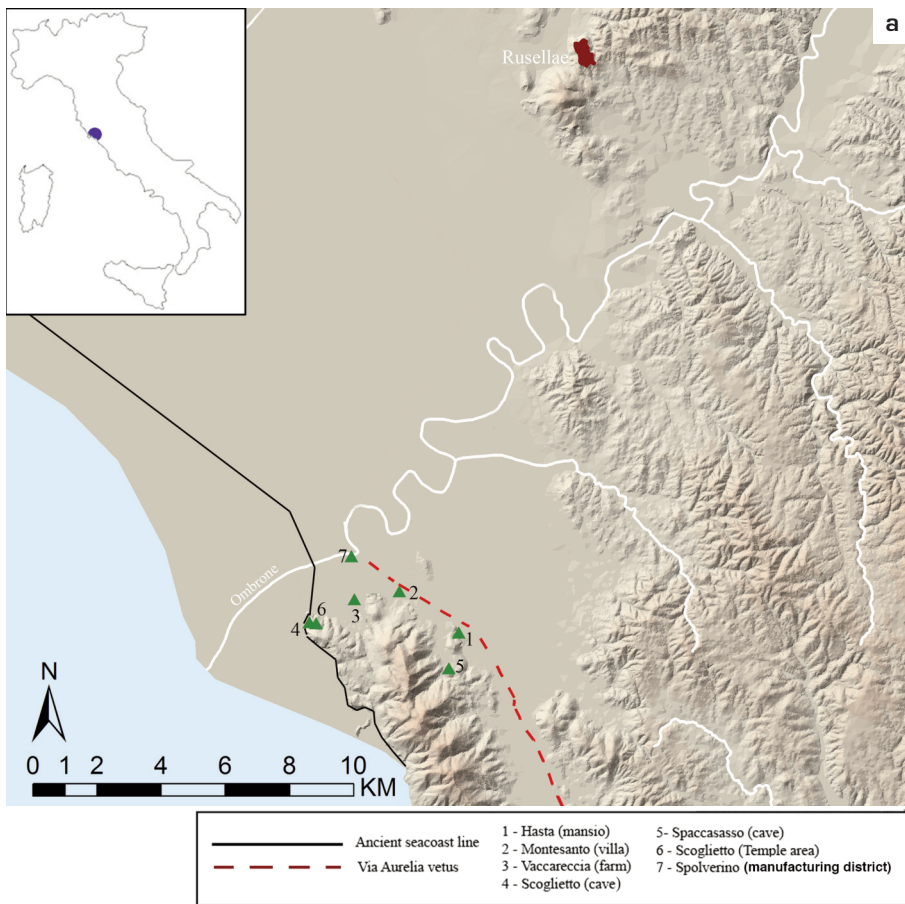
*Questo intervento descrive la scoperta di un grande quartiere manifatturiero di epoca romana nel territorio di Alberese (Grosseto – IT). Gli scavi hanno riportato alla luce una serie di officine collegate al riciclo di vecchi oggetti e alla produzione di lingotti metallici. Il sito fu utilizzato senza soluzione di continuità dall'età Domiziana al tardo V secolo d.C., prima di essere abbandonato.*

**Parole chiave:** riciclo, vetro, metallo, officine, età romana

## Introduction

Over the course of the last four years, archaeological research in the territory of Alberese (Grosseto – IT) has brought to light an important manufacturing complex located along the final stretch of the river Ombrone<sup>1</sup> (figs. 1a-c). During the Roman period, it was situated a few hundreds meters away from the mouth of the river and the main road, the *via Aurelia vetus*, as well as its side road, built along the tombolo of Lake

<sup>1</sup> For an overview of the results obtained during the last four years of excavations at the site of Spolverino, see SEBASTIANI 2014 and bibliography.



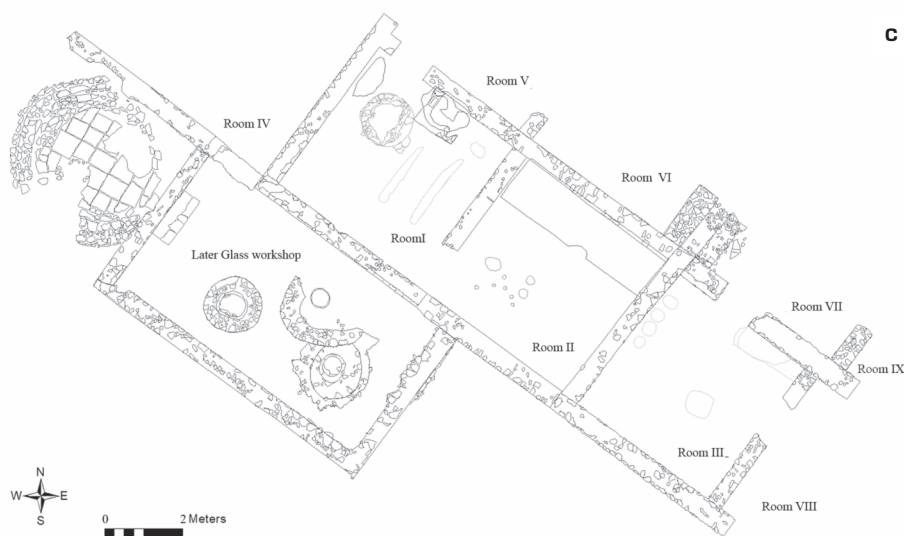


Fig 1. (a) General map of the Roman settlements in the area of Alberese (Grosseto – IT); (b) aerial picture of the manufacturing district at Spolverino (photo Paolo Nannini, SBAT); (c) plan of the manufacturing district at Spolverino, showing the location of the different rooms.

Prilus in the Domitian-Trajanic era<sup>2</sup>. Indeed, the origins of the Spolverino complex may be seen as a direct consequence of the construction of this byway, which brought about a sharp decrease in travelling times along the coast.

An accurate stratigraphic sequence dates the beginning of this complex to the Domitian period, while test pits and deep soundings preclude, for the moment, the existence of any earlier structures. From its foundation the complex was characterised by the presence of specialised, artisanal workshops dedicated to glass making. The recognition of contemporary, circular pits housing *dolia* are further indicative of storage facilities for agricultural surplus. Within the late Antonine period, and the later Severan age, a clear change in manufacturing and artisanal production is visible. This emerges from the construction of a series of specialised workshops focusing on metalworking (iron, bronze, copper and lead) as well as of a larger glass workshop, built immediately outside the original, late 1<sup>st</sup> c. AD complex. The surviving material culture allows us to argue that these activities were focused on the recycling of old (bro-

<sup>2</sup> On the geo-archaeological analysis and the study of the ancient Roman road system, see ARNOLDUS-HUYZENVELD, CITTER 2015.



ken) objects rather than on a production cycle based on the use of raw materials.

These highly specialised workshops, albeit subject to changes in their layout, were in use until the second half/end of the 5<sup>th</sup> c. AD. Subsequently, the ruins of the settlement witnessed sporadic phases of reoccupation, before a small necropolis was established atop the rubble layers in the first half of the 6<sup>th</sup> c. AD. The table below outlines the main occupation periods and phases of the site.

	Chronology	Archaeological evidence
Period 1	Domitian Era – second half of the 2 <sup>nd</sup> c. AD	Construction of the complex Glass workshop in Room I Storage facilities in Room II Dumping levels in Room VII
Period 2	End of the 2 <sup>nd</sup> c. AD – 3 <sup>rd</sup> c. AD	Glass workshop built outside the complex Bone workshop in Room I Iron and lead workshop in Room II Communal kitchen in Room III Lead workshop in Room VII
Period 3, Phase A	End of the 3 <sup>rd</sup> c. AD – first half of the 4 <sup>th</sup> c. AD	Roasting channels in Room I Metal workshop in Room II Communal kitchen in Room III Lead workshop in Room VII Glass workshop outside the complex
Period 3, Phase B	Second half of the 4 <sup>th</sup> c. AD – mid 5 <sup>th</sup> c. AD	Metal workshop in Rooms I and II Communal kitchen in Room III Lead workshop in Room VII Storage facilities in Room VIII Glass workshop outside the complex
Period 4, Phase A	Second half to the end of the 5 <sup>th</sup> c. AD	'Humble' tile floors in Rooms III, VII and VIII Limestone kiln in Room VI
Period 4, Phase B	Beginning of the 6 <sup>th</sup> c. AD	Necropolis
Period 5	6 <sup>th</sup> c. AD – Modern times	Agricultural fields and flood deposits from the river Ombrone

### Glass making workshops

During the excavations, the remains of at least two glass workshops were revealed<sup>3</sup>. An early glass workshop was recognised inside Room I,

<sup>3</sup> The glass workshops are being investigated thanks to a generous Rakow Grant for Glass Research, funded by the Corning Museum of Glass (New York). See SEBASTIANI, DERRICK forthcoming.



Fig 2. Plan and overview of the first glass workshop with a detail of the of the kiln.

which seems to have been built at the end of the 1<sup>st</sup> c. AD when the main complex was erected. It was in use for at least 70-80 years, before being decommissioned and replaced by a larger workshop constructed outside of the southern side of the complex.

The first workshop contained the remains of a circular foundation for a glass kiln, c. 1.50 m in diameter, built with stones of medium to small size bonded with white mortar in abundant quantity (fig. 2). This 'donut' shaped feature should have contained, within the empty space, the inverted rim of a *dolium* to guarantee refractoriness and ensure the least amount of heat-loss from the kiln. This solution was adopted in the other glass kilns found within the later glass workshop.

Not far from this kiln, a circular cut in the ground was identified, probably for housing a *dolium* to store the fresh water needed during the different phases of production. All around these structures, a significant quantity of fragmentary window glass, glass vessels (mainly handles and rims) and *dolia* were recovered. From the ceramic evidence, the abandonment layer has been dated to the late Antonine period, which repre-

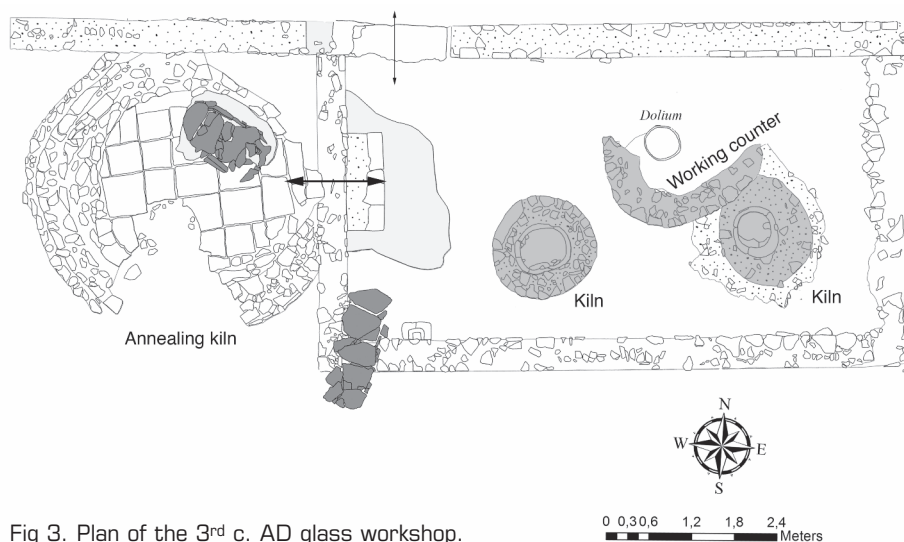


Fig 3. Plan of the 3<sup>rd</sup> c. AD glass workshop.

sents the *terminus post quem* for the end of this workshop<sup>4</sup> and its conversion to a bone workshop.

The second glass workshop was built between the end of the 2<sup>nd</sup> and the beginning of the 3<sup>rd</sup> c. AD (fig. 3). Entered on the northern side through a door communicating with Room IV<sup>5</sup>, it had a rectangular plan (18m<sup>2</sup>) with stone-based wall foundations and pisé elevations. Within, two glass kilns were discovered, surviving to c. 40 cm in elevation. These were built to a circular plan (1.40 m in diameter), mainly using tiles and small stones bonded with mortar (fig. 4). Inside of both, still preserved *in situ*, lays the inverted rim of a *dolium*. In between the two kilns was a working counter, built using medium-size stones bonded with clay, and at its foot the base of a *dolium* was preserved. As was the case in the earlier workshop in Room I, this undoubtedly served to store fresh water (fig. 5).

Completing the layout of this workshop was a large annealing kiln built outside the western side of the room. It had a circular plan of c. 4 m in diameter and was paved with *sesquipedales* (fig. 6). The opening of the furnace was set along the western wall of the workshop. On the inner side of this wall, a rectangular pit was dug into the beaten-earth floor: a piece of reused masonry, serving as a step to facilitate the correct

<sup>4</sup> The pottery recovered during the excavation is currently under investigation by Massimo Brando, who kindly shared some preliminary data.

<sup>5</sup> To date, the excavations have failed to expose the entire plan of Room IV. Consequently, we only have preliminary data from which to understand the functioning of this space during its main phases of use (SEBASTIANI 2014, p. 7).





Fig. 4. Detail of one of the two glass kilns.



Fig. 5. Working counter and *dolium* still *in situ*.



Fig. 6. The annealing kiln at the end of the excavations.

placement of the fuel and vessels inside the furnace, was then inserted into the pit. Thereafter, it was filled with layers of ash and charcoal, clearly remains from the continuous cleaning of the furnace.

This workshop remained in use until the mid 5<sup>th</sup> c. AD and, most likely, focused on the recycling of glass vessels. This hypothesis seems to be confirmed by the lack of raw materials found during the excavations and, also, by the high concentration of glass fragments, which appear to have been selected on the basis of thickness and colour<sup>6</sup>.

<sup>6</sup> More than 5kgs of Roman glass, dated to between the 2<sup>nd</sup> and the 5<sup>th</sup> c. AD, have been recovered from inside this workshop (personal communication Thomas Derrick). For a preliminary report on the material culture associated with this workshop see CHIRICO *et alii* 2011.



Fig 7. The forge of the metal workshop found in Room II.

### The metal workshops

The late Antonine period marks a notable alteration in the layout and function of the manufacturing complex at Spolverino. As was mentioned above, the earliest glass workshop was decommissioned and replaced by a bone workshop. This was followed by the construction of a much larger (and specialised) glass workshop outside the main complex.

However, the changes were not limited to this. Room I, where between the end of the 1<sup>st</sup> and the mid 2<sup>nd</sup> c. AD storage facilities were located, was converted into a metal workshop. The pits housing the *dolia* were backfilled and a new, beaten-earth floor was laid down. On top of this, a forge was constructed with reused building materials. It consisted of a platform made up of four rectangular tiles, one of which was found to bear a stamp. Unfortunately, due to its exposure to fire, the stamp is now illegible. All around this structure, numerous mixed and superimposed layers of ash and charcoal, interspersed with lumps of burnt red clay, were recorded (fig. 7). It is highly likely that these contexts were the result of the frenzied activities that were carried out around the forge.

During its excavation, a large quantity of lead and copper objects was recovered, which were clearly intended for smelting and recycling. In addition, three lead ingots were found (fig. 8). These do not bear any official stamp and, consequently, could not have belonged to any authorised Imperial mine. It is possible to argue, therefore, that lead objects were recycled in order to fashion ingots to be sold and traded through the main

maritime and terrestrial routes, taking advantage of the proximity of the *via Aurelia vetus* and the cabotage routes along the coast<sup>7</sup>.

The construction of another metal workshop in Room VII, dedicated to the recycling of lead, can be dated to the same period. Excavation revealed the presence of a series of simple ground-level kilns, common for this type of production. Due to their fragile form, these kilns needed constant replacement resulting in a series of intercutting circular and semi-circular pits spread all over the excavated area of the room. Unfortunately, this made a precise count of the kilns, or determining their respective phasing, impossible (fig. 9). Nonetheless, the high presence of lead objects along with one unstamped ingot provides further reassurance on the validity of this interpretation of the workshop. Supporting the activities carried out in this room were two further structures: firstly the foundation of a working counter, found in the SE corner of the room and secondly, found along the western wall, a *cocciopesto* basin for storing fresh water.

The final chronology for this workshop was provided by a large quantity of ceramics recovered from the rubble layers and dated to within the 5<sup>th</sup> c. AD; the initial chronology was, instead, deduced from a test trench along the southern wall. Here we excavated the levelling layer for the beaten-earth floor contemporary with the construction of the kilns, intercepting a 'dump' made up of ceramics and glass vessels belonging to the end of the 2<sup>nd</sup> c. AD.

At the end of the 3<sup>rd</sup> c. AD, the bone workshop in Room I was decommissioned<sup>8</sup>. After having laid down a new beaten-earth floor, two ore-roasting channels were installed<sup>9</sup> (fig. 10). This is the only instance



Fig. 8. Some of the lead objects and one of the lead ingots recovered in Room II.

<sup>7</sup> On the strategic importance of the maritime and terrestrial trade-routes and their role in the "... development of more robust and relevant models of interpretation beyond reciprocity, redistribution and marketing..." see FULFORD 2009.

<sup>8</sup> For a detailed description of the bone workshop see SEBASTIANI 2015b.

<sup>9</sup> These roasting channels find some parallels at the Roman site of Bardown, where similar structures have been uncovered (CLEERE 1970).





Fig. 9. Lead workshop in Room VII at the end of the excavations.

where the production cycle can be associated with raw materials rather than recycling. The excavation failed to recognise or recover any hematite ore *in situ* and the idea that this could have been traded directly from the island of Elba remains just a hypothesis. However, this workshop could only have lasted for a few decades as Room I was then converted again into a larger metal workshop by the mid 4<sup>th</sup> c. AD.

This new and larger metal workshop was created by the joining together of Rooms I and II (fig. 11) made possible by the installation of a doorway along the dividing wall of the rooms. The rooms were, however, highly differentiated in their respective functions. Room II saw the dismantling of the previous forge and a thick levelling layer was laid down across its surface. Made up of medium-size pebbles, it was then covered by a white mortar floor. In the northern part of the room, a large and solid *cocciopesto* basin was built to store fresh water, which occupied approximately a third of the surface. Just in front of it a series of small-to medium-size postholes were discovered. The lack of any identifiable alignments prevents us from making any definitive statement concerning their function, even if their slight depth may suggest that they were used to support some kind of furniture or small infrastructures.

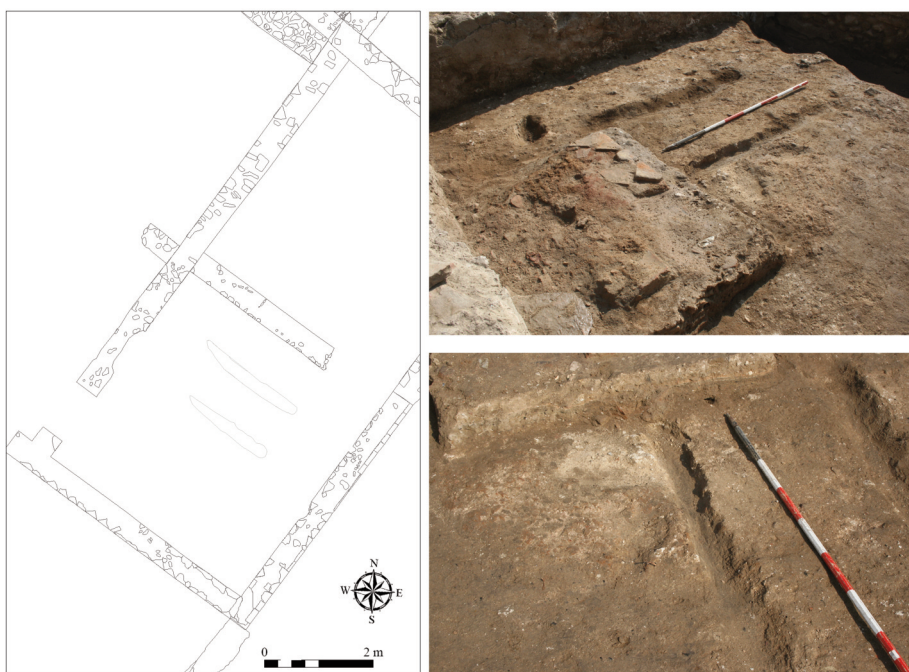


Fig. 10. The roasting channels found in Room I.



Fig 11. Plan of the 4<sup>th</sup> c. AD metal workshop Rooms I and II.



Fig 12. Piece of a bronze scale with chains still attached, recovered on the western side of the 4<sup>th</sup> c. AD metal workshop.

Room I was also significantly transformed, with a new floor of mixed clay and mortar constructed. The quality of this floor is noticeably poorer than that of Room II; a feature that may be explained by the different structures housed in the rooms. Room II was more susceptible to problems of subsidence from the underlying, backfilled storage pits and, consequently, a stronger and more reliable foundation layer was needed in order to guarantee stability.

Along the northern wall of Room I, a quadrangular forge was built. It consisted of reused triangular tiles as suggested by the stamps found on them, which belong to the *Gobat's figlina* (late 1<sup>st</sup> – beginning of the 2<sup>nd</sup> c. AD)<sup>10</sup>. The wall, itself, was cut in order to house the clay dome of the forge, while a series of postholes all around the forge possibly supported a shelter. On the eastern side, a large hole may have served to house the bellows, while on the opposite side a piece of a bronze scale with still some chains attached has been recovered (fig. 12). Along the western wall, a medium-sized pit, covered with a marble slab, was found to contain a hoard of bronze and iron objects. These were, most likely, intended for recycling in the nearby forge. The workshop itself was in use until the mid/late 5<sup>th</sup> c. AD, when the first rubble layers appear sealing its surface.

<sup>10</sup> For tile stamps in the area of Alberese, see CYGIELMAN 2015.

During the excavations of the metal workshops at Spolverino a number of markers of the production cycle has been recovered, apart from the main structures just described. Mainly, they consist of hundreds of old metal objects ready to be recycled in the various forges and kilns discovered in the rooms of the settlement. Moreover, a series of metal slags were documented in all the different workshops and, at this stage of the research, they are under analysis to better understand the production cycle. Nonetheless, a small number of tools are attested. Unfortunately, the highly degraded state of preservation of this kind of objects, due to the soil condition, avoids a full recognition their primary shapes, although a possible hammerhead and pliers can be recognized.

## Discussion<sup>11</sup>

The Antonine crisis resulted in the abandonment of a large number of settlements, with the economy re-orientated to concentrate large estates in the hands of a few owners. Settlements that didn't survive this land reorganization were not only abandoned but also used as sources of building materials and metal/glass supply. The settlement at Spolverino seems to reflect this picture of crisis and economic restructuring. From its foundation at the end of the 1<sup>st</sup> c. AD, its economy was equally divided between glass production and the storage and sale of agricultural surplus, but during the middle of the 2<sup>nd</sup> c. AD we can discern a radical change. Economic concerns with agricultural surpluses were replaced (together with the associated infrastructures) by an economy that was wholly reliant upon glass and metal production. The archaeological evidence for this is provided by the removal of the storage facilities in Room II and the subsequent conversion of the area into a metal workshop.

By Late Antiquity, the practice of recycling becomes more widespread within this area of Tuscany. Parallel situations can be found in the *ager Rusellanus* where, besides the site at Spolverino, we can cite the refurbishment of the abandoned bathhouse complex of the so-called *Domus of the Mosaics* in the Etruscan-Roman city of *Rusellae* (Michelucci 1985; Sebastiani 2011), or the nearby settlement of Poggio Rotigli (Celuzza 2012).

<sup>11</sup> In this section I analyse issues related to metallurgy and metal recycling only at the site of Spolverino during the Roman period. I, intentionally, do not discuss any aspect related to glass production, as this is the subject of a forthcoming publication in the next issue of the *Journal of Glass Studies*.



At *Rusellae*, in the area of the bathhouse of the *Domus of the Mosaics*, a metal workshop was built between the end of the 4<sup>th</sup> and the first half of the 5<sup>th</sup> c. AD. Here, activities relied on the continuous recycling of copper and iron materials coming from the systematic spoliations of the nearby Etruscan necropolis (set along the slopes of the hills) and from the architectural furnishings of disused public buildings. Metal pins from statues, door fittings as well as objects recovered within the rubble layers of the city were systematically recycled in the newly born metal workshop of the *Domus*<sup>12</sup>. Similarly, the site of Poggio Rotigli (Commune of Campagnatico, GR) provides evidence for the existence of a metal workshop focused on recycling, in the form of a large quantity of hoarded copper material (Celuzza 2012).

These two cases suggest that the practice of recycling was widespread in Late Antiquity, particularly as archaeological research has failed to identify any trace of raw materials at these locations. It is possible, perhaps, to hypothesise that this practice was fed by a dramatic reduction in mining activities, principally in the nearby Colline Metallifere and the island of Elba. Spolverino has produced new data in support of this hypothesis. The discovery of at least two lead workshops producing ingots for trade seems to underline the gradual decline in mining activities from the late Antonine period as well as the progressive take over of new, private economic agents in the administration of metal supply along the Tyrrhenian coast.

Finally, it is worth noting the recent archaeological excavations at the site of Santa Cristina in Caio (Buonconvento – SI) that have brought to light a series of manufacturing facilities, built on top of the abandonment levels (Valenti 2012). From the end of the 4<sup>th</sup> c. AD, small- to medium-size workshops were constructed dedicated to the working of lead, iron and glass. Taking advantage of the still visible ruins and wall-tops, ground level kilns were built for which traces of bellows can still be detected (Valenti 2012, p. 7).

These cases, although others could be cited, concern metal workshops built in both rural and urban sites, which during Late Antiquity witnessed a change in their economic role, shifting their focus onto production activities related to glass and metalworking. The site at Spolverino is, however, another case entirely. It was built and developed primarily as a manufacturing centre. The settlement did not change its basic nature or function; it only increased (instead of decreasing!) its production from the mid 2<sup>nd</sup> c. AD<sup>13</sup>. From that moment onwards, it focused its

<sup>12</sup> For a detailed analysis of this workshop, see at last SEBASTIANI 2011.

<sup>13</sup> This is somehow going against a general accepted economical trend of decline from the 3<sup>rd</sup> c. AD onwards (WARD PERKINS 2005, pp. 102-120).



economy on the recycling of metal and glass vessels, abandoning the idea of a mixed economy incorporating agriculture. There is no doubt that Spolverino was mainly supplied through the terrestrial and maritime trading routes, taking advantage of its strategic setting, but also through the systematic spoliation of nearby, abandoned settlements<sup>14</sup>. From the late 3<sup>rd</sup> to the 5<sup>th</sup> c. AD this plundering of materials is especially evident at the nearby villa of Montesanto and at a newly discovered maritime site, located just 700 m west of Spolverino<sup>15</sup>.

### Final remarks

Few final thoughts emerge from the excavations of the workshops at Spolverino. Nearby abandoned settlements were often visited by those looking for materials that could be recycled. This phenomenon is also well known in urban contexts, especially for collecting broken glass vessels (see Biundo, Brando 2008, p. 94, footnote 4). Trading in scraps or reusable materials was a profitable commercial venture and source of income that could have easily co-existed at Spolverino together with the 'professional' activities of the craftsmen.

Future research will hopefully clarify the reasoning behind the choice to focus exclusively on recycling rather than direct production from raw materials. Undoubtedly, the activities surrounding recycling required less specialised skills, particularly in relation to the initial stages of the production cycle. Moreover, the choice at Spolverino and, potentially, across a wider area, of melting down old metal objects to create ingots, facilitated the subsequent trade and commerce of the final products. These ingots, passing along the maritime or terrestrial routes, would have fed the requirements of much more specialized workshops where everyday goods or luxury objects were produced. Taking a much wider perspective of the production chain, workshops such as the ones discovered at Spolverino can be considered as holding an intermediate position.

The choice to concentrate manufacturing activities on the recycling of objects clearly prompts questions concerning the availability of raw materials from the mines. At this moment, it is difficult to provide any definitive answers on this subject. On the one hand, the closure of the

<sup>14</sup> The only nearby settlement that didn't undergo a systematic spoliation seems to be the sanctuary area dedicated to *Diana Umbronensis* at Scoglietto. Here, after a methodical dismantlement of the religious structure, all the luxury and exotic materials were left abandoned *in situ* (SEBASTIANI 2015a).

<sup>15</sup> This settlement, awaiting preliminary publication, presents late antique phases of reoccupation relating to systematic spoliations occurring between the late 3<sup>rd</sup> c. and the 5<sup>th</sup> c. AD.

mines on the island of Elba at the beginning of the 5<sup>th</sup> c. AD (McCormick 2001, p. 44, Map 2.1) may help us to understand this choice but, on the other, the question must remain open for the earlier centuries when they were fully operational. After all, the manufacturing district at Spolverino concentrated its efforts in metalworking from, at least, the second half of the 2<sup>nd</sup> c. AD, when the Imperial mines were in use and the production of ingots was delegated to them. Nevertheless, it would appear that the social and economic picture is beginning to look somewhat different from what has been traditionally thought<sup>16</sup>. It is possible that the answer needs to be sought in the birth of new economic elites that arose from the late Antonine period and replaced the earlier landowners whose economy was based on agriculture and the production of oil and wine<sup>17</sup>. Therefore, it seems plausible to suppose that the reaction to the crisis of the Antonine period was economic reinvention; developing a new economy based on artisanal productions and around new socio-economic agents that reached a climax in the Late Antique period.

In the area of Alberese, these new economic agents replaced the old 'agrarian elite' and, through a series of sustainable redevelopments and settlement reorganisation they succeeded in reversing the fate of an otherwise declining landscape<sup>18</sup>. They may well, also, have been responsible for the refurbishments that occurred in the temple area of *Diana Umbronensis* at Scoglietto exactly at the time between the end of the 2<sup>nd</sup> and the beginning of the 3<sup>rd</sup> c. AD (see Sebastiani, Celuzza 2015). Even if it was reduced in size, the religious settlement continued to act as a territorial marker and play a role in the visual connectivity between the maritime cabotage routes along the Tyrrhenian coast and the *via Aurelia vetus*. In this way it enhanced the location and prominence of the manufacturing district of Spolverino and its related harbour. At the same time as this economic investment in the temple area of Scoglietto, Spolverino saw a reorganization of its working spaces, possibly renting them to specialised craftsmen supplying the income required to undertake these conversions.

<sup>16</sup> For a general overview see at last BOWMAN, WILSON 2009.

<sup>17</sup> This may be an early attestation of the "*wealthy aristocrats*", mentioned by WARD PERKINS (2001), who took advantage of a land reorganisation in the territory of Alberese following the crisis at the end of the 2<sup>nd</sup> c. AD. Their economy was no longer based on agricultural production, which was superseded by the Hispanic and North African provinces, but on manufacturing activities.

<sup>18</sup> Interestingly, the situation appears to be diametrically opposed in the *ager Cosanus*, immediately south of the territory of Alberese. In that case, the territory and the economical agents didn't have the possibility of reversing the situation after the crisis of the agricultural economy. Villas were abandoned soon after the end of the 2<sup>nd</sup> – beginning of the 3<sup>rd</sup> c. AD (with Settefinestre representing the main case, CELUZZA, REGOLI 1985, pp. 53-56) as well as villages and a general decline in the occupation of the territory is registered (CAMBI, FENTRESS 1989; FENTRESS 2003, pp. 68-69).

If this hypothesis can be confirmed in its entirety, future research in this part of Tuscany should then focus on the socio-economic relationships that developed soon after the 3<sup>rd</sup> c. AD, especially in terms of their impact upon the nearby urban centre of *Rusellae*. However, even at this stage, it is possible to perceive a radical change in the economic patterns of the 3<sup>rd</sup> c. AD, a century usually seen as a moment of economic decline, rather than of growth.

### **Acknowledgements**

This paper summarises part of the results of my research, undertaken at the Department of Archaeology of the University of Sheffield in the years 2012-2014 (Marie Curie IEF Project ALBTUSMED II). I'd like to thank John Moreland, Inge Lyse Hansen and Richard Hodges for the stimulating discussions on the site of Spolverino, as well as Massimo Brando and Thomas J. Derrick for sharing their preliminary data on pottery and glass materials. I'd like to thank also Mark Peters for editing the text and the useful suggestions.

## References

- A. ARNOLDUS-HUYZENVELD, C. CITTER 2015, *Lo Scoglietto nel paleo-paesaggio della piana di Grosseto*, in SEBASTIANI *et al.* 2015, pp. 1-11.
- R. BIUNDO, M. BRANDO 2008, *Caratteristiche della discarica e meccanica della stratificazione. L'approccio allo scavo*, in F. FILIPPI (ed), *Horti et Sordes. Uno scavo alle falde del Gianicolo*, Roma, pp. 93-96.
- A. BOWMAN, A. WILSON 2009, *Quantifying the Roman economy: integration, growth, decline?*, in A. BOWMAN, A. WILSON (eds), *Quantifying the Roman Economy. Methods and Problems*, Oxford, pp. 3-86.
- F. CAMBI, E. FENTRESS 1989, *Villas to castles: first millennium A.D. Demography on the Albegna valley*, in K. RANDSBORG (ed), *The Birth of Europe*, Roma, pp. 74-87.
- M. CAVALIERI *et alii* 2009, *San Gimignano (SI). La villa di Torracchia di Chiusi, località Aiano: dati della IV campagna di scavo, 2008 e dalle analisi archeometallurgiche*, "Notiziario per i Beni Archeologici della Toscana", 4 (2008), pp. 492-517.
- M.G. CELUZZA 2012, 4.3. *Loc. Granaione, Poggio Rotigli, Insediamento romano con sepolcra*, in M.A. TURCHETTI, M.G. CELUZZA (eds), *Nazione Italus. Valerio Clemente e il territorio di Campagnatico dalle origini al Medioevo*, Grosseto, pp. 44-45.
- M.G. CELUZZA, E. REGOLI 1985, *Gli insediamenti nella Valle d'Oro e il fondo di Settefinestre*, in A. CARANDINI (ed), *Settefinestre. Una villa schiavistica nell'Etruria romana*, I, Modena, pp. 48-61.
- E. CHIRICO, M. COLOMBINI, E. RUBEGNI, A. SEBASTIANI 2011, *Relazione preliminare alla I° campagna di scavi archeologici a Spolverino (Alberese - GR). Prime valutazioni e ipotesi sul porto romano di cabotaggio di Rusellae*. Online in: [www.fastionline.org/docs/FOLDER-it-2011-232.pdf](http://www.fastionline.org/docs/FOLDER-it-2011-232.pdf).
- H. CLEERE 1970, *The Romano-British Industrial Site at Bardown, Wadhurst*, "Sussex Archaeological Society Occasional Paper", I.
- M. CYGIELMAN 2015, *I bolli laterizi*, in SEBASTIANI *et al.* 2015, pp. 338-339.
- M. McCORMICK 2011, *Origins of the European Economy. Communications and Commerce AD 300-900*, Cambridge.
- E. FENTRESS 2003, *Settlement between the 3<sup>rd</sup> and the 5<sup>th</sup> centuries AD*, in E. FENTRESS (eds), *Cosa V: an Intermittent Town. Excavations 1991-1997*, Ann Arbor, pp. 63-71.
- M. FULFORD 2009, *Approaches to quantifying Roman trade: response*, in A. BOWMAN, A. WILSON (eds), *Quantifying the Roman Economy. Methods and Problems*, Oxford, pp. 250-258.
- M. MICHELUCCI 1985, *Roselle. La Domus dei Mosaici*, Montepulciano.
- A. SEBASTIANI 2011, *Nota su due strutture produttive tardo romane nell'ager Rusellanus: la bottega di un mastro vetraio a Spolverino (Alberese - GR) e l'officina metallurgica a Rusellae (Grosseto)*. Online in: [www.fastionline.org/docs/FOLDER-it-2011-221.pdf](http://www.fastionline.org/docs/FOLDER-it-2011-221.pdf)
- A. SEBASTIANI 2014, *Spolverino (Alberese - GR), The 4<sup>th</sup> Archaeological Season at the Manufacturing District and revision of the previous archaeological data*. Online in: [www.fastionline.org/docs/FOLDER-it-2014-320.pdf](http://www.fastionline.org/docs/FOLDER-it-2014-320.pdf)
- A. SEBASTIANI 2015a, *La piena età tardoantica (Fine del IV secolo d.C. - Metà del VI secolo d.C.)*, in SEBASTIANI *et al.* 2015, pp. 60-67.
- A. SEBASTIANI 2015b, *Workshops and craftsmen in Roman south coastal Tuscany: new evidence from the River port of Rusellae*, in J.M. ÁLVAREZ, T. NOGALES, I. RODÀ (eds), *Proceedings of the XVIII Congreso Internacional Arqueología Clásica*, pp. 1385-1388.
- A. SEBASTIANI, M.G. CELUZZA 2015, *L'ager Rusellanus e la città di Rusellae nel periodo tardoantico*, in SEBASTIANI *et al.* 2015, pp. 358-366.
- A. SEBASTIANI, E. CHIRICO, M. COLOMBINI, M. CYGIELMAN (eds) 2015, *Diana Umbronensis a Scoglietto. Santuario, Territorio e Cultura Materiale (200 a.C.-550 d.C.)*, Oxford.
- A. SEBASTIANI, T.J. DERRICK forthcoming, *The Glass Workshop and Glass Assemblage from Spolverino (Alberese - GR)*, "Journal of Glass Studies", 58.
- M. VALENTI 2012, *Santa Crisitina (Buonconvento - SI): le campagne di scavo del 2009 al 2012*. Online in: [www.fastionline.org/docs/FOLDER-it-2012-266.pdf](http://www.fastionline.org/docs/FOLDER-it-2012-266.pdf)
- B. WARD-PERKINS 2001, *Specialized production and exchange*, in A. CAMERON, B. WARD-PERKINS, M. WHITBY (eds), *The Cambridge Ancient History*, vol. XIV, pp. 346-391.
- B. WARD-PERKINS 2005, *The Fall of Rome and the End of Civilization*. Oxford.