

R (02)

Rodis

JOURNAL OF MEDIEVAL
AND POSTMEDIEVAL
ARCHAEOLOGY

Infraestructures portuàries d'època medieval i moderna a la Mediterrània occidental

Medieval and modern harbour
infrastructures in the western
Mediterranean



CR

Universitat de Girona
Càtedra Roses d'Arqueologia
i Patrimoni Arqueològic

Ajuntament de Roses
www.roses.cat

Fundació Girona
Regió de Conetxement
Universitat de Girona
Diputació de Girona
Ajuntament de Girona
Consell Social de la URG
Cambra de Comerç

Amb el suport de

Fundació
Agbar

www.documentauniversitaria.media/rodís

Rodis. Journal of Medieval and Post-Medieval Archaeology - 02

© Material editorial i organització / [Editorial material and organization](#):
Universitat de Girona, Càtedra Roses d'Arqueologia i Patrimoni Arqueològic

© Continguts i figures / [Content and figures](#): els autors / [the authors](#)

Equip editorial, objectius de la revista i instruccions per als autors i política editorial / [Editorial team, magazine objectives and instructions for authors and editorial policy](#):

www.documentauniversitaria.media/rodis

Contacte / [Contact](#):

Càtedra Roses d'Arqueologia i Patrimoni Arqueològic
cat.rosesarqueologia@udg.edu

Universitat de Girona
Plaça Ferrater Mora, 1
17071 Girona
Tel. 972 45 82 90

ISSN: 2604-6679

ÍNDEX / INDEX

Presentació

Presentation

7

Josep Burch

DOSSIER

INFRAESTRUCTURES PORTUÀRIES D'ÈPOCA MEDIEVAL I MODERNA A LA MEDITERRÀNIA OCCIDENTAL

MEDIEVAL AND MODERN HARBOUR INFRASTRUCTURES
IN THE WESTERN MEDITERRANEAN

La Torre de la Trinitat i la pesca de la tonyina (Roses, 1350-1550)

Trinity Tower and tuna fishing (Roses, 1350-1550)

11

Marcel Pujol i Hamelink

Els ports de Barcelona, Sant Feliu de Guíxols i Roses a la baixa edat mitjana: una comparativa

The harbours of Barcelona, Sant Feliu de Guíxols and Roses in the late
middle ages: a comparison

21

Marcel Pujol i Hamelink

Strutture portuali, architetture e forme urbane medievali tra XI e XIV secolo. Lo spazio tirrenico toscano, la Sardegna, le isole

Port structures, architecture and medieval urban forms between the 11th
and 14th centuries. The tyrrhenian tuscan space, Sardinia, the islands

57

Marco Cadinu

Evolució del front marítim de la zona portuària de Barcelona de la tardoantiguitat a l'edat moderna

Evolution of the seafront of the port area of Barcelona from the late
antiquity to the modern age

89

Santiago Riera Mora, Ramon Julià Brugués, Carme Miró Alaix

VARIA

Building in the city. From archaeological markers to the historical reconstruction of the worksite. Some examples from medieval Rome

La costruzione della città. Dai marcatori archeologici alla ricostruzione storica dell'opera. Alcuni esempi di Roma medievale

113

Nicoletta Giannini

VARIA

Pages	Received date	Acceptance date
113-148	2019-10-17	2019-12-02

BUILDING IN THE CITY. FROM ARCHAEOLOGICAL MARKERS TO THE HISTORICAL RECONSTRUCTION OF THE WORKSITE. SOME EXAMPLES FROM MEDIEVAL ROME

COSTRUIRE IN CITTÀ. DAGLI INDICATORI ARCHEOLOGICI
ALLA RICOSTRUZIONE DEL CANTIERE. ALCUNI ESEMPI PER
LA ROMA MEDIEVALE

DOI: https://doi.org/10.33115/a/26046679/2_5

Nicoletta Giannini

Università di Roma Tor Vergata
Codi Orcid: <https://orcid.org/0000-0003-2710-3192>

Key words

Architecture, Medieval Rome, Archaeology, Production Activities, Middle Ages

Parole chiave

Architettura, Roma medievale, Archeologia, Attività produttive, Medioevo

This work was supported by the project Petrifying Wealth: "The Southern European Shift to Masonry as Collective Investment in Identity, c.1050-1300."

This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement n° 695515").

The images without bibliographic reference or author come from the data collected for the creation of the database published in Molinari, Santangeli Valenzani, Spera 2015.

Abstract

The present paper considers the topic of building cities. This is certainly a well-studied topic, but also a complex one because different factors are involved with regard to the economic, social and political context, often characterized by the appearance of new main characters. This complexity can be analyzed in many manners, including the one of the archaeology of production and building activities.

Starting from the considerable amount of data in the database created between 2013 and 2014 for the project "archeologia della produzione a Roma" (Archaeology of production activities in Rome), the topic will be discussed from a point of view considered particularly interesting: the study of archaeological markers in building materials, and therefore, the study of all those production processes involved in construction activities.

The research will demonstrate how the analysis of physical markers of building activities can record important tracks on different aspects of building, aspects of extreme interest for understanding the city.

Sommario

Il presente contributo vuole affrontare il tema della costruzione della città. Si tratta di un tema certamente classico, ma allo stesso tempo complesso, poiché in esso entrano in gioco diversi fattori che interessano l'economia, la società, la politica, caratterizzandosi spesso per l'irrompere sulla scena di nuovi protagonisti. Tale complessità può essere affrontata e analizzata da molteplici punti di vista, tra cui anche quelli inerenti all'archeologia della produzione e dell'edilizia.

Prendendo spunto dalla mole di dati inseriti nel database realizzato tra il 2013 e il 2014, per il progetto "archeologia della produzione a Roma", si affronterà il tema da un punto di vista che si ritiene particolarmente interessante, quello degli indicatori archeologici pertinenti i materiali da costruzione e quindi dal punto di vista di tutti quei processi produttivi coinvolti nelle costruzioni*.

Si mostrerà come l'analisi degli indicatori materiali riguardanti le attività edilizie sia in grado di restituire tracce importanti su vari aspetti del costruire di estremo interesse per la comprensione del sistema città.

* Quanto si presenta prende le mosse da alcune lezioni tenute per il Corso di Archeologia Medievale dell'Università di Roma Tor Vergata, tenute nell'a.a. 2018-2019 riguardanti l'Archeologia della produzione, i materiali edilizi, le attività di cantiere e in generale tutte le attività edilizie che ruotano attorno alla costruzione di un edificio. In particolare le lezioni prendendo ad esempio Roma, volevano mostrare agli studenti come è possibile studiare una città dal punto di vista degli indicatori archeologici che riguardano il costruire e quali potevano essere gli spunti della ricerca che uno studio così impostato poteva portare. Per la preparazione delle lezioni e di questo contributo si è attinto alla banca dati del progetto "Archeologia della produzione a Roma", il cui database, progettato da scrivere, è fruibile in un CD-Rom allegato al volume "Archeologia della Produzione a Roma" a cura di A. Molinari, R. Santangeli Valenzani, L. Spera.

BUILDING IN THE CITY. FROM ARCHAEOLOGICAL MARKERS TO THE HISTORICAL RECONSTRUCTION OF THE WORKSITE. SOME EXAMPLES FROM MEDIEVAL ROME¹

FOREWORD

The construction of medieval cities is certainly a well-studied topic, but also a complex one because different factors are involved with regard to the economic, social and political context, often characterized by the appearance of new main characters. The transformations in a city are the result of complex changes, determined by focused choices made by secular and religious powers, sometimes by the euergetism of private citizens, with regard to several elements, such as the defence of the city, the addition of new political/administrative centres, and the Christianization of the city. For each one of these elements, however, an important role is played by the architecture and, therefore, the urban setting. The former constitutes an important marker of economic development, being the result of a series of production processes but also of an investment. About the latter- the urban setting- buildings often become a relevant point of urban reference- think, for instance, of churches, palaces and houses of rulers- and this urban setting is also frequently the result of projects modifying and redesigning the city. In addition, by considering the places of building activity from a topographic point of view, these show relevant patterns in the urban development and in the choices made during the growth of the city. One more extremely interesting factor consists of all the information found on buildings “in negative”, if one may say so, that is, all the organized, or not, activities of demolition and recycling of building material, characterizing several parts of the city between the fifth and fifteenth centuries, that must necessarily be connected to the systematic reuse of ancient building material and can be actually seen in all the techniques adopted in Rome in the chronological period considered² (Santangeli Valenzani 2015).

-
- 1 This study was a continuation of some of the lessons taught during the Course in Medieval Archaeology at Tor Vergata University in 2018/2019; the lessons regarded the Archaeology of production activities, building materials, construction site activities and in general all the activities related to the construction of a building. In particular, by adopting the city of Rome as an example, the teaching goal was to explain how it is possible to study a city through archaeological markers of construction activities and what kind of starting point for research this type of study approach could be. A database was used for the preparation of classes and also of this paper, created by the author of the present paper for the project “Archeologia della produzione a Roma” (archaeology of production activities in Rome) and free to consult on the CD attached to the volume “Archeologia della Produzione a Roma” edited by A. Molinari, R. Santangeli Valenzani, L. Spera. To this end I'll only take into account archaeological markers of construction activities from archaeological excavations in order to endorse this point of view.
 - 2 For Roman building techniques reusing ancient building material there is a wide bibliography available and only some major studies will be referenced: Avagnina et alii 1977; Barkley Loyd 1985; Esposito 1997; Cecchelli 2001; Meneghini Santangeli Valenzani 2004; Barelli et al. 2005.

THE PROJECT “ARCHEOLOGIA DELLA PRODUZIONE A ROMA”: A DATABASE OF PRICELESS VALUE.

The data considered in the present paper largely comes from a database created for the project “Archeologia della produzione a Roma”³ (Archaeology of Production Activities in Rome), a project started from the idea of an exhaustive analysis on production activities in Rome from the fifth to the fifteenth centuries⁴ (fig. 1). This analysis allowed, for the first time, including Rome within that complex debate on the archaeology of production activities and the different aspects of research that are connected to it. In order to obtain this goal, a thorough survey was conducted on all

old and new archaeological data, often rich in information on production activities. This type of data had never been read from the point of view of a city system. The systematic collection of all this data was therefore started through bibliographic research and the consequent classification of all data found. The information was then inserted into the database and into a GIS system of the city of Rome and its closest suburban area, containing about 600 markers of production activities. This survey allowed then, and, as will be seen through this paper, still allows analyzing phenomena of production activities with better accuracy, quantifying them in the long-term and studying them in their context. The opportunity to also look at the topographic connotation, both in the short and long term, allows for considering the complexity, distribution and quantity of the different phenomena, all within the growth and development dynamics of the city between the fifth and the fifteenth centuries⁵.

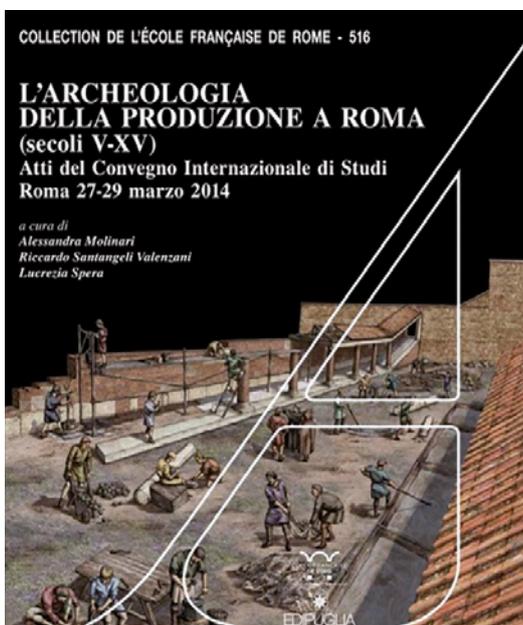


Figure 1. Cover of the volume created at the end of the project.

- 3 Exceptions are the data on building techniques, on the Fosso della Marana, and on the brick furnaces outside of the Roman area. In order to help in the comparison with the information contained in the published database, each time the database sheet number will be stated (DB).
- 4 This project was started after the collaboration between the Universities of Tor Vergata and Roma Tre, supported also by several other organizations, such as the École française de Rome, the British School at Rome, the Soprintendenza Speciale per il Colosseo, the Museo Nazionale Romano, the Area Archeologica di Roma, and the Soprintendenza Capitolina ai Beni Culturali. The project, coordinated by A. Molinari, R. Santangeli Valenzani, and L. Spera, was developed thanks to the presence of a mixed group of students and young researchers coming from the two universities and the Pontificio Istituto di Archeologia Cristiana, who contributed to the collection of data. They signed the single sheets forming the database under the coordination of C. Palombi, who then managed the implementation of the database. This database was designed by the person writing, who also developed the GIS software containing all the information collected. The results of this project were presented at the conference “L'Archeologia della Produzione a Roma” in March 2014 and published in the volume A. Molinari, R. Santangeli Valenzani, L. Spera (edited by), *L'Archeologia della Produzione a Roma (secoli V-XV)*, Atti del convegno Internazionale di Studi, in *Collection de l'école française de Rome*, 11, Roma 2015.
- 5 The choice of analyzing on the long term the economy of Rome throughout its production activities allowed for identifying better the phases of change and transition, and the importance of social and institutional transformations for the evolution of economy itself. After all, the final goal of the research was the historical long-term reconstruction of the production processes of the city and of its miles IV-V suburbs, in order to better understand the interactions between urban and suburban areas.

THE DATABASE AND GIS OF BUILDING ACTIVITIES IN ROME: A STUDY APPROACH DEVELOPMENT AMONG TRENDS AND THE STATE OF THE FIELD

In order to better understand the object of the present paper and the potential shown by this kind of research project, a short foreword is necessary on the software that was developed for the collection of data. To obtain this result the data was at first collected with the use of data sheets, which allowed quantifying the information then included in the database and the GIS (fig. 2).

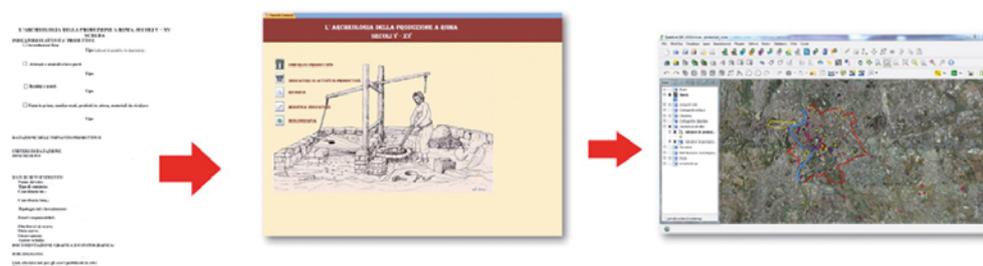


Figure 2. The elements of the system

In particular, the sheets used included different predetermined fields and were based on a breakdown of the production cycle into phases. The database was made with the software Access, while the GIS with the desktop application QGIS (Molinari Gianni 2015). The database was developed through the elaboration of relational tables and masks to help the frontend for data filing. These were then georeferenced into shapefiles with specific datasets of information.

Since, however, the transfer of data into a GIS software requires applying a specific methodology, the risk was scattering the complexity that characterizes the different production activities. Particular attention was therefore given to the transfer of data and to the critical issues brought by the published data.

The smallest recording unit adopted was the marker of production activity, which becomes valid according to the three criteria formulated by Galinié in his work in 2000: locating, chronology, definition, all elements that according to the author rightly define the life of what he refers to as historical objects and that Lefevre identifies as Constituent Element (EC) (Galinié 2000; Lefevre 2012, 65-82).

In organizing data, both according to quantity and quality, the starting point was obviously to identify these conditions, always considering that the archaeology of production activities must not be really considered, at least not only, “from the

point of view of ancient times, but by answering the rather more complex and articulated question of how the objects of the past can be studied with the aim of reconstructing histories on a larger scale” (Giannichedda 2006, 9).

The device used by the workgroup for research had to elaborate information on the organization of spaces, the kind of production contexts and, if possible, the organization and division of work (single or partner workshops, complex studios, manufactures, *etc.*), at least potentially⁶. In the light of what has been summarized⁷ here, it is evident that the analysis, once started, can move with more agility in the complexity of production activities; it also works as a valuable database for the many other researchers who may start from the information offered, as will soon be discussed here⁸.

BUILDING THE CITY: ARCHAEOLOGICAL MARKERS AND URBAN TRANSFORMATIONS.

The availability of such an amount of data on production activities for an urban context such as Rome also allows reading them in relation to the urban development. Looking at the information on building activities in the time range between the fifth and the fifteenth centuries not only gives the opportunity of studying the “geography of production”, but also the growth and development phases of the city, especially because about 50% of the information contained in the database regards markers of building activities (fig. 3). This evidence ranges from the identification of quarry sites, to spoliation pits for the recovery and reuse of building materials, to lime kilns, to heaps of materials always tied to calcination activities, to evidence on site connected to larger or smaller worksite activities of both building and dismantling; all extremely interesting data in detail, and even more so if we try to interpret them in a diachronic way, or in relation to what has survived of Roman medieval buildings. To demonstrate how these constituted focal points in the growth of the city, brief chronological summaries will be offered.

6 A possible limit of the database, of which we were aware from its beginning, is that it contains only archaeological evidence. In my opinion, tracks of production activities must be related to the different phases of a production cycle in order to not be misinterpreted, without overlooking the information coming from other kinds of sources that describe, for instance, production manners, the introduction of technological innovations, and the use of particular materials. These reflections led to associating data across topographic contexts, once the marker was identified as a minimum unit.

7 For a thorough examination of the system see Giannini 2015.

8 Following this paper is a bibliography on methodology and also regarding specific case studies. In retracing the thoughts that led to these considerations, only some of the main publications will be referenced, *fil rouge* of the system developed and of the archaeological questions that this paper tried to answer. On the study approach on production activities and on their related issues see Whisky 1962; Carandini 1979; Mannoni 1993; Giannichedda Mannoni 1996; Gould 1997; Lugli, Stoppiello, Vidale 2000, 17-19; Carver 2001, 1-22; Mannoni 2002; Vidale 2004; Mannoni 2004, 545-550; Forster, Cross 2005; Giannichedda 2005, 85-104; Giannichedda 2006; Carver 2008; Marciniak, Yalman 2013; Giannichedda 2014a e b. in particular on the relationship between medieval technology and archaeological research Giannichedda 2007, 49-61; On the study of technical and production activity markers and processes Roux Corbetta 1989; Roux 2003, 768-782; Giannichedda Ferrari 2006, 341-357; on the relationship between contexts and stratigraphic reliability and residual nature Guidobaldi, Pavolini, Pergola 1998; Giannichedda 2007b, 51-64; on the necessity to evaluate before examining Carver 2003; With regard to the GIS software, the bibliography is also rich in this case. For the study approach and the platforms that are being developed in the field of medieval Archaeology at Tor Vergata University see Molinari, Giannini in c. s. e Molinari, Giannini 2014, 334-340. For example, see also the works by Hall et al. 2002; Howell 2004; Tweddle et al. 1999; Garrioch et al. 2005, 663-676; Dean 2012.

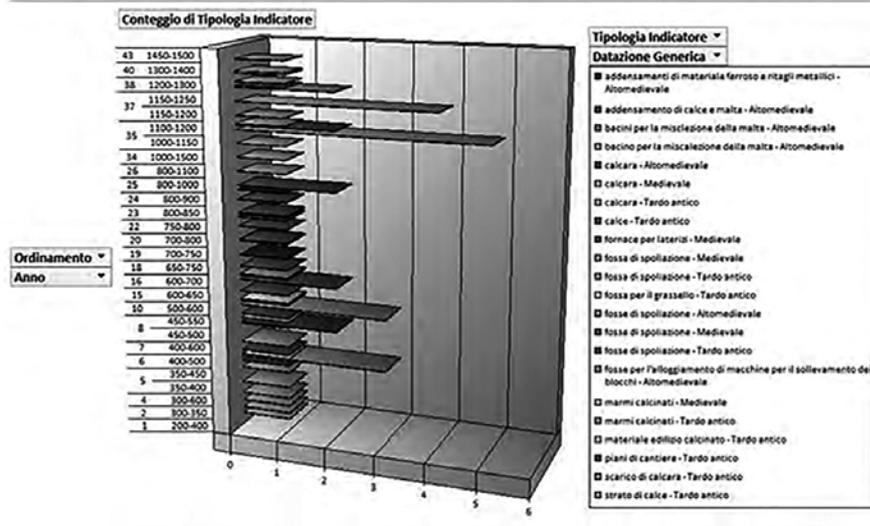
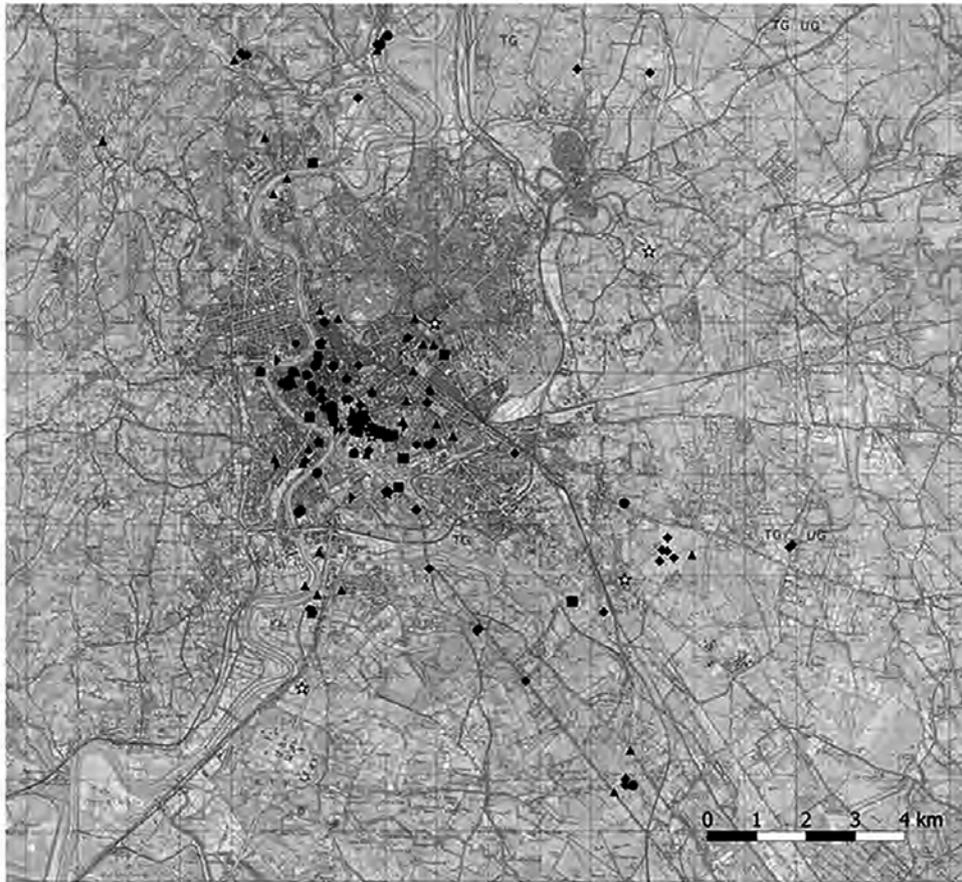


Figure 3. Building activity indicators. At the top the distribution in the GIS, at the bottom the graph concerning their chronological distribution (Graphic elaboration by N. Giannini).

Late Antiquity (5-7th centuries) (fig. 4). The analyzed data shows that the archaeological markers of the fifth century are quite weak. Few tracks related to brick production and even fewer weak tracks about quarry exploitations were found (Spera-Palombi 2015, 21). The tracks relatable to the production of lime are also few. The small amount of collected information is concentrated inside disused buildings in peripheral parts of the residential area⁹. Interesting also are the finds of



Figure 4. Distribution of production activity indicators for the V-VII centuries (graphic elaboration by N. Giannini).

⁹ This is the case of the furnace found in the domus of Caius Fulvius Plautianus on the Quirinale Hill, of the one located in the north-west section of the Circo Variano on the Esquilino Hill, of the remains of material waste from a lime kiln found in the Laterano area close to the piazzale INPS, of the tracks found in the area of Torre Spaccata and of the ones found between via dell'Acqua Bullicante and via dei Portici. Cfr. sheets DB: context 211, marker 461; context 139, marker 318; context 258, marker 534; context 259, marker 535; context 289, marker 287.

different heaps of marble material¹⁰ in the mausoleum of Augustus¹¹ and in the villa of the Quintili and in Piazza della Chiesa Nuova, where a pit for slaked lime was also found¹² (fig. 5). Just as relevant for understanding the development of building activities in this time period are the devices for manufacturing lime, functional to the construction of the church of S. Sisto Vecchio¹³, to the basilica of S. Stefano at mile III of the Via Latina¹⁴, and those found in the north-west area of the Roman Forum¹⁵. Also, a structure tied to sporadic working activity was recorded in the storage rooms built under emperor Domitian, in the block included between via di S. Paolo alla Regola, via del Conservatorio, via delle Zoccolette and via dei Pettinari. This was a pit used for extinguishing lime in the floor of one of the storage rooms, datable between the end of the fourth and beginning of the fifth century.

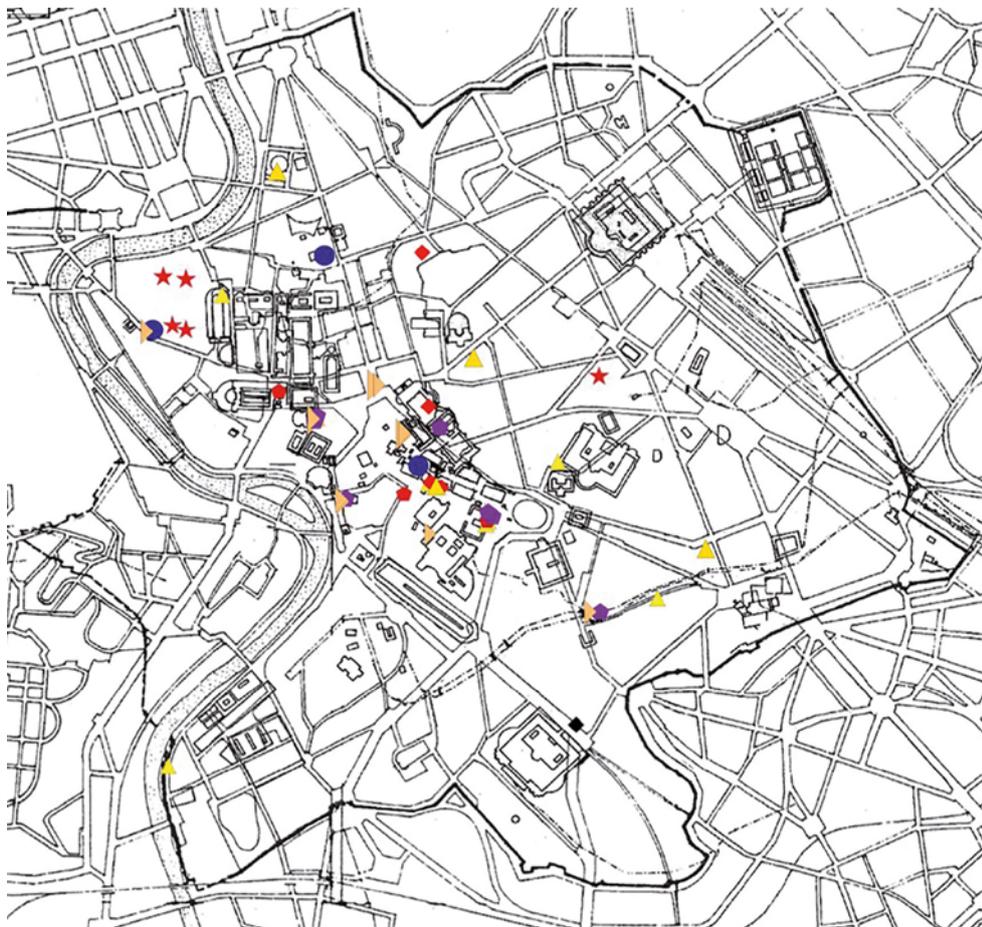


Figure 5. Distribution of production activity indicators for the V-VII centuries. Detail of the central area (graphic elaboration by N. Giannini).

10 These were also often found in association with spoliation pits for the reuse of building materials.

11 Db context 171, markers 371-372.

12 DB context 84, markers 178-179.

13 DB context 99, markers 239.

14 DB context 37, markers 316.

15 DB context 56, markers 106-107. For the *ante quem* dating of the context between the end of the sixth and the beginning of the seventh centuries, see Paganelli 2004, 180.

If the situation in the fifth century is challenging to define, the situation does not appear different for the sixth-seventh centuries. It is possible to attribute to this time period a layer of travertine chips found among the ruins of the Forum Transitorium¹⁶, two lime kilns in the Atrium Vestae associated to heaps of marble ready to be baked for the calcination process¹⁷, the sediments of stone material found in the Flavian Amphitheatre¹⁸, the heap of marbles found in the area of the Horti Luculliani¹⁹, the waste coming from a probable structure for the production of lime, found together with two spoliation pits and the remains of two calcination structures, in the domus of Palazzo Valentini²⁰ and of Palazzo delle Assicurazioni Generali²¹. These are all activities that can be related to dismantling and spoliation worksites, both in the public and private context, such as the *domus*, all additionally located in the central parts of the residential area²². In the context just described, particular importance is assumed by what was found at mile V of the Via Flaminia, close to the Tevere River²³ (Spera-Palombi 2015, 25-26; Palombi 2012, 53-61), where an actual dismantling worksite was found, opened for reusing building material (Esposito 2012, 73-75; D'Amelio Esposito 2012, 331-343) (fig. 6, 7, 8). Evidence of brick production is absent for the sixth-seventh centuries, to which only the structure found among the ruins of the *balneum* of the *Frates Arvales* can be connected, in the area between miles V and VI of the Via Campana²⁴ (Loreti, Martorelli 2000, 389).

Early Middle Ages (8th-10th centuries) (fig. 9). In this time period a noticeable increase of workshops specialized in the manufacturing of lime and marble occurs, located especially in the area between the Palatino Hill and the southern part of Campo Marzio. What appears to be interesting is that most of these activities were included into public buildings, continuing in this way to document the almost systematic process of the spoliation of the city. Among the tracks relatable to the working of marble²⁵, and therefore to the organization of the *marmorarii* workshops, the case of the Basilica Iulia is extremely interesting. Here, together with other production structures, a circular kiln was found in the central aisle and also several heaps of architectural material, and several tracks of perishable material all around the other markers mentioned²⁶.

16 DB context 196, markers 409.

17 DB context 59, markers 114-117.

18 DB context 94, marker 223-226.

19 DB context 59, marker 114-117.

20 DB context 267 e 271; markers 545 e 550.

21 DB context 82, marker 175

22 Similar evidence can be currently found in the suburbs as well. Think, for example, of the furnaces found along the Via Nomentana and Via Labicana, almost always in relation with the disused housing structures, used for calcination activities tied to the recycling of stone elements. These are the furnaces found close to the former Centocelle airport, in the so called "Villa della Piscina", in the so called "Villa delle Terme", all situated in the same district.

23 DB context 122, markers 473-479.

24 DB, context 141, marker 322.

25 DB context 48, markers 94-95 (*Rostra* area); context 63, marker 126 (Basilica Iulia); context 64, markers 123-129 (Palatine Hill, Stadium area); context 230, marker 498 (theatre of Marcello).

26 The group of these elements appear to be connected to what seems to be an articulated organization of spaces used for the activities of the production cycle, from the provision of materials, to the reworking, to the transformation on site of the spolia.



Figure 6. Via Vitorchiano, Spoliation activity.



Figure 7. Via Vitorchiano, Spoliation activity.



Figure 8. Via Vitorchiano, Spoliation activity.

In this period there was an increase of data regarding the manufacturing of lime, among which it is possible to find several permanent structures in use for a relatively long time. To these, many structures can be added, interpreted as temporary installations for specific restructuring needs, and some installations made for satisfying the building requirements of specific settlement centres. To the former category belong, besides the previously mentioned lime kiln in the Basilica Iulia, the furnaces found close to



Figure 9. Distribution of production activity indicators for the VIII-X centuries (graphic elaboration by N. Giannini).

Hadrian's curia²⁷; the furnace of Piazza Venezia can instead be associated to the temporary structures, together with the structure in the area of the so called Bathhouse of Elagabalo²⁸ at the north-east bottom of the Palatine Hill; these structures appear to be created to satisfy the building needs of the settlement nucleus developed around S. Maria Nova. If more is documented in the urban context, rarer are the data on the suburbs. It is in fact possible to connect only the lime kiln found in the villa of the Quintili²⁹ and the one in

27 DB, context 50, markers 97-99.

28 DB context 145, markers 328-332; Traini 2013, 51-53.

29 DB context 275, markers 557-559.

the atrium of the Sant'Elena Mausoleum along the Via Labicana³⁰; in both cases these finds, even if sporadic, bear witness to a clear change in use of the residential complexes that, entirely or in part, were converted into places for production activities.

A case of extreme interest is represented by what emerged from the excavations conducted in the area south of the basilica of S.Paolo f.l.m., which allowed identifying a very long-standing worksite activity dated between the first half of the eighth and the tenth-eleventh centuries, in relation to different building phases of the monastery³¹ (Filippi, Spera 2009, Spera 2011a, Spera 2011b; Spera, Esposito, Giorgi 2011, Appetecchia Palombi c.s.) (fig. 10, 11). Among the several tracks found, the presence of mortar mixers is of great interest. A further example of this is documented inside a large continuously inhabited architectural complex, along via Sorelle Marchisio, close to via Trionfale³² (Brucchiotti, Olmeda 2006; Santolini Giordani 2009, 621-629; Spera-Palombi 2015, 31, note 174) (fig. 12).

Middle Ages (11-15th centuries) (fig.13). The picture that can be defined for this chronological period is certainly richer in evidence. For the eleventh century several lime kilns were found, especially in the area of the Roman Forum and in some portions of the Palatine Hill³³, where spoliation pits were also



Figure 10. Construction site activities found during excavations at S. Paolo f.l.m.

30 DB context 232. markers 501-502.

31 DB context 188, markers 395-396; context 313, marker 625.

32 DB context 225, marker 493;

33 DB context 60, markers 118-20; context 146, marker 333.



Figure 11. Construction site activity in Via Trionfale, complex in via Sorelle Marchisio.



Figure 12. Excavations of S. Paolo f.l.m.: pit for mixing lime with fillers for the realization of the mortar (VIII century).



Figure 13. Distribution of production activity indicators for the xi-xv centuries) (graphic elaboration by N. Giannini).



Figure 14. Lime kilns found in S. Pasquale Baylon.

associated; tracks tied to the presence of *marmorarii* workshops, however, are recorded in the *Templum Pacis*³⁴ (Spera, Palombi 2015). Between the twelfth and the thirteenth centuries, in connection to the sudden growth of building activities recorded by written sources (Hubert 2000) and to what survived of secular buildings, one witnesses an exponential increase of markers of building activity, where the rise of permanent structures is symptomatic. The distribution analysis of markers concerning lime manufacturing highlights an almost detailed distribution in all the portions of the residential area³⁵. Among the structures of greater interest, the ones formed by multiple furnaces stand out, a sign that the area was frequented and used for long term production activities organized into a well-structured worksite. Of extreme interest appears the structure of S. Pasquale Baylon, also located in an area, Trastevere, that saw in this same period a large settlement growth and where, besides permanent production structures, notable tracks of calcination activities have also been found, as well as intentional heaps of spolia, and storage areas (Porcari 2009, 93-129)³⁶(fig. 14). From this time period numerous lime kilns are also found in the suburban area, almost always made within settlements and with the same characteristics as the urban ones. These are the cases of the Quintili villa³⁷, the villa of Lucio Vero at mile V of the Via Cassia³⁸, the so called Horti of Ovidio³⁹, the small site of Acquatraversa⁴⁰, and the *domus Marmeniae* on the Appian Way⁴¹. Besides the structures like these, occupying different residential spaces in an indistinct way, structures within funerary contexts were also found along main roads, such as in the sepulchre of the Servili, the architectural complex of S. Sebastiano, the necropolis of via Vitorchiano⁴² (fig. 15), or in religious buildings like the basilica of S. Stefano on the Via Latina, or of S. Paolo f.l.m⁴³. Many of these structures were found together with heaps of spolia, adding to the hypothesis of existing spots for the collection of materials. At the same time, data suggests an intense spoliation activity, often in relation to the major monumental complexes such as the Coliseum⁴⁴, the Baths of Caracalla⁴⁵, the temple of Bellona⁴⁶, the

34 DB, context 305, 616.

35 Lime kilns in the central area of the Roman Forum are documented in: the surroundings of the church of SS. Cosma e Damiano, Arch of Titus, the temples of the Castori, the temple of Antonino and Faustina, the temple of Venus and Rome; the area of the Coliseum, on the Celio Hill, in the Laterano area, the Palatino, Esquilino, Aventino Hills and in Campo Marzio (cfr. context 49, marker 96; context 52 marker 101; context 53, markers 102-103; context 54, marker 104; context 164, markers 360-361; context 166, marker 364; context 167, marker 365-3669; context 81, markers 172-174; context 106, markers 261-264; context 133, marker 312; context 134, marker 313; context 142, marker 323; context 146, marker 333; context 154, markers 337-338; context 161, marker 356; context 162, marker 357; context 165, markers 362-363; context 168, markers 367-368; context 169, marker 169, marker 369; context 170, marker 370; context 172, markers 373-375; context 173, markers 376-377; context 174, markers 378-380; context 175, marker 381, context 178, marker 384; context 179, marker 385; context 180, marker 386; context 181, marker 387; context 183, marker 389; context 190, markers 399-400; context 262, marker 539; context 270, markers 548-549.

36 DB context 100, markers 240-245

37 DB context 276, markers 560-564.

38 DB context 222, markers 489-491.

39 DB context 40, markers 82-85;

40 Db context 223, markers 489-491.

41 Db, context 115, marker 280.

42 Db context 184, marker 390; context 127, markers 297-301; context 220, marker 480.

43 Db, context 39, marker 81, context 315, markers 628-630.

44 Db context 93, marker 222.

45 Db context 107, marker 265.

46 Db context 177, markers 383.



Figure 15. Limestone remains in via Vitorchiano, Via Flaminia.



Campo Marzio, piazza Sforza Cesarini: resti di fornace per i laterizi



Dott.ssa Nicoletta Giannini
gnnnt01@uniroma2.it

Figure 16. The furnace of Piazza Cesarini.

Mausoleum of Augustus⁴⁷, and the *domus Tiberiana* on the Palatine Hill⁴⁸. Once more, tracks of brick production are almost completely missing, and are only ascribed to the one furnace found for this time period: the one of Piazza Cesarini (Giannini 2015, 82-89)⁴⁹ (fig. 16).

47 Db context 172, markers 372-375.

48 Db context 121, marker 288.

49 Db context 286, marker 581.

The summaries presented, even if concise, allow for underlining from the fifth-seventh centuries an ever increasing and more documented reuse of material, tied in many cases to reworking activities. This increase is obviously connected to the abandonment of many buildings and to the considerable changes of use that modified the urban setting and that often prove their conversion into small or medium-sized worksites. The changes in use often document the reuse of especially public buildings. On the one hand this highlights a certain privatization of public areas, and on the other, they recall, since Late Antiquity, the presence of a patron with a promotional function and controlling activities. One other element that emerged was the fact that sporadic structures are side by side with actual dismantling worksites, implying a considerable organization and programming of the same worksites.

A large portion of data is, in fact, related to the recycling of the main building materials, as seen from the several tracks of dismantling and recovery, both in the urban and suburban contexts. These activities are perfectly in line with what was found both in secular and religious buildings, where the systematic reuse of selected, or not, building material occurs during the entire time period considered (5-15th centuries) (Meneghini-Santangeli Valenzani 2004; Esposito 1997, Cecchelli 2001). So, if on the one hand, buildings show the presence of reused material, on the other, many archaeological markers document dismantling and demolition activities which allowed the reuse of building materials. Among these, the largest amount of information comes from all the markers tied to the production of lime. The information in the database highlights how the majority of structures is concentrated in that monumental area of ancient Rome, underlining the close relationship between their presence and the consequent presence of material to calcinate (Santangeli Valenzani 2015, 336). If the impact of these activities on the conservation of ancient monuments was certainly remarkable, impressive was also their economic cost; in addition, especially the greatest dismantling, such as the one of the pavement of the Forum of Caesar removed in a single phase halfway through the eighth century, one can suggest an intervention tied to precise and important building operations, connected to a high level patronage (papal or of the ruling classes), since they took place in areas that were, at least to that moment, public.

If the archaeological markers found do not provide detailed information on the forms of this reuse and on the person managing it, the adoption of this building material, especially in the early medieval period, still shows a clear use in religious and high-quality residential buildings. An evident example is in the *opus quadratum* technique called “Carolingian”, made with reused blocks that were reworked and often reduced in size (fig. 17, 18). This is a well-studied example, also considered by R. Santangeli Valenzani, which allows a clear reflection on the kind of access allowed to these dismantling worksites, given the kind of buildings where this technique is found; whoever had access could manage the worksite, and, most of all display of amounts of money to invest in these sites. In the light of this, the important role played by the church cannot be underestimated, which certainly acquired more managing and organizing independence between Late Antiquity and the early medieval period for the provision of building material, their



Figure 17. S. Maritno ai Monti, detail of the early medieval *opus quadratum*.



Figure 18. Houses of the Forum of Nerva. Detail of the early medieval *opus quadratum*.

manufacturing, the management of worksites, and the summoning of specialized workforces⁵⁰. It is possible to also add to these activities the management of monuments in the city, which determined in a certain way the consolidation of the pope's political authority (Santangeli Valenzani 2015, 341).

The situation in the following centuries appears different, because some data suggests a change in the managing of monuments, since the spoliation practice, still documented, seems to be more tied to private patrons than in the past, partly in connection to the privatization of public areas in many sections of the city since the ninth century⁵¹. Moving ahead in time, we cannot avoid associating the archaeological record to what is known about the development of the city.

From the end of the eleventh century the city saw an economic and demographic recovery, intertwined with the birth of the commune- with its significantly complex history- and with the transformations of papacy in this same period. These events put an end to that system of *Adelpapsttum* or *Familiennpapsttum*, that brought to the end within the city the identification of the papacy with the Roman aristocracy: the former became a distinct entity from the city and separated, at least in part, from the influence of the important aristocratic families. Therefore, from the second half of the eleventh century, a new urban aristocracy was born, with the establishment of new family groups that were untied from the papacy but also related to it differently (in economic or political ways or through patronage), in line with the economic development of the time; between the twelfth and thirteenth centuries the establishment of the senatorial aristocracy will follow and also a further growth that will turn Rome into a mercantile city.

In conjunction with the events summarized, Rome also saw its most intense urbanization, as documented by the many buildings from this period in several areas of the city. An interesting example in this context is the making of the Marana stream, completed by Pope Callixtus II in the first half of the twelfth century⁵² (fig. 19). This canal has already been described in other studies, consultable by the reader, but the present paper will focus only on the structures

50 Think, for instance, of the mortar mixers in S. Paolo f.l.m. or of the one found close to Via Trionfale, elements that suggest the use of specialized building workforces showing the same knowledge of techniques.

51 As shown by the surveys in the area of the Imperial Forums, in many nearby public spaces, orchards, vines and houses were installed. Cfr. Meneghini Santangeli Valenzani 2004. As already underlined by R. Santangeli Valenzani, the houses made in these sections were completely built in reused material and it is hard to hypothesize if they were granted to each owner to obtain the demolition of a monument, or part of it, to recover building material out of it. It is instead more plausible that these demolitions would happen because of the simple property right on the monuments or part of them, because they were inside the owned piece of land. Cfr. Santangeli Valenzani 2015, 341.

52 The "fosso dell'acqua Mariana" or "Marana" is certainly one of the most interesting canals of the Roman Campagna. Already mentioned in sources of the eleventh century as *Acqua Crabra* (Tab. Santa Maria Nova doc. VIII), it started from the springs in the Latin Valley between Colle Tuscolo and Colle Molaro, continued north-west towards the Tuscolano-Artemisio enclosure, crossing the residential area of Grottaferrata and collecting also the springs from the "Acqua Julia". From here it continued towards Valle Marciana under the abbey of S. Nilo and, across an itinerary now matching the stream of Tor Sapienza, joined the Aniene river in the area of Ponte Mammolo. The deviation, attributed to Pope Callixtus II, modified its itinerary in the area of the "villa dei Centroni" on the Via Anagnina, where, through the creating of a sluice, the waters of this river were channeled into the "fosso dell'acqua Mariana" and then towards the Laterano area. The stream, by reusing parts of an underground pipe of the Claudian aqueduct, reemerged on the surface in the area of Casalotto to cross the farms of Casale della Marana, Buon Ricovero, and Roma Vecchia. From here it proceeded to the current via del Mandrione and, siding the aqueduct, reached the Aurelian Walls in the surroundings of Porta Asinaria, where it touched both areas of Laterano and Celio, to then enter the city from Porta Metronia. Finally, in its last portion, it sided the area of S. Sisto Vecchio and of di S. Maria in Tempulo, crossed the Circus Maximus and ended in the river Tevere.



Figure 21. Detail of the brickwork found in the Circus Maximus (from Giannini 2015 B).

Together with these transformations, an open area canalization, paved with architectural reused elements, was also made. This canalization determined the complete defunctionalization of the previous aqueduct and was characterized by a greater water capacity. After this, stratigraphy allows dating to the beginning of the twelfth century the creation of a bank with ceramic material, followed by the making of a sluice and a wall below the bank. The works were part of a real urban plan concerning the entire city and aimed at creating this canal to entirely bypass the city; it is possible, as a matter of fact, to consider the Marana stream as an essential part of what very much resembles a large-scale “urban project” launched between the end of the eleventh century and at least the first three decades of the twelfth century, based on a different way of perceiving spaces and urban elements, where the canalization of water also played an important role. Without considering this project in detail, on this occasion it is particularly interesting to consider the economic connotations of this operation (Guidobaldi 2014; Giannini 2015). The deviation of a river is not a small thing; even more so if planned during the wide range of transformations already described, which certainly implied an important financial commitment. We are not currently able to quantify the cost of a similar operation, nor to suggest any interpretation through the use of the given data on the provenance of the money required for it. However, once again, data proves to be of large importance. The modification of the Circus Maximus area for the flowing of more water implied a peculiar building technique that used marble chips. This technique is not found in religious buildings between the papacies of Paschal II and Honorius II, and rather refers to masonry characterized by the presence of irregular flint and marble chips, mainly found in private and defensive structures of the Roman Campagna. The substructure masonry of the found side was made in irregular marble pieces of different dimensions, organized in undulating rows, both convergent and split, and can be compared, for example, to textures ascribable to the first half of the twelfth century⁵³. This technique also corresponds, in a certain way, to some restoration of the Aurelian Walls, especially along the southern section between Porta Appia and Porta Ostiense; a portion of the walls closely tied to our stream and also characterized by Porta Metronia, through which the Marana entered the city and where the well-known inscription is on the restoration of the walls by the senate in 1157. If the commune was only formed in 1143, it is, however, true that several documents highlighted, for example, the role of the *sexaginta senatores* even before this institution officially existed. The transfer of water from the Aniene to the Tevere Valley appears, in addition, to support the commercial connotation of the city, by preserving -as previously explained- the city harbours such as the Magnus harbour, but also by enhancing the area of the Ripa Romea and the section between the Almone and the city. One should also consider that the Via Latina was an important node of the road network towards the south, a factor tied to the distribution of products. After all, if we look at the territory, the area between the Via Latina and the Appian Way is certainly the most productive in the Roman Campagna and, as a consequence, the object of greatest attention for political powers. Think, for instance, of the area surrounding the abbey of S. Nilo,

53 Think, for example, of Torre Selce, already existing in 1131.

and particularly of the water network of the Valle Marciana, where metal, paper and textile manufacturing is documented in the medieval period, or the mill of Mola Cavona, the Mola de Supra, the Mola Vexalla, or the four mills in the area of Porta Asinaria recalled in the document by Alexander III, and also the millstone of the Porta, mentioned in a document of 1397, or the Molella S. Johannis, property of the Laterano chapter, mentioned in a document of 1426. Finally, one other element inviting to extend the research in this direction is the actual interest of Roman citizens, who will manage many forges in the Valle Marciana during the centuries following this intervention. This interest is confirmed by the fact that between the end of the twelfth century and the beginning of the thirteenth century *senatores e mercatores* are mentioned in documents, building some houses exactly here, after supporting the destruction of Tuscolo.

These considerations recall a secular connotation and suggest hypotheses, all to be verified, on a possible “secular” participation in the works, in terms still to define.

Later in time, the restart of spoliation activities on a large scale between the thirteenth and fifteenth centuries, -think of the dismantling of part of the cavea of the Flavian amphitheatre, or of the dismantling of almost all of the border walls of the imperial forums, -underlines how, in this case, we can also see vast operations, requiring a large technical commitment, specialized skills, a complex worksite organization, but also important investments -an aspect that once again recalls aristocratic or religious patronage (fig. 22, 23).



Figure 22.



Figure 23.

The last considerations regard the production of brick. As a matter of fact, the data presented show how tracks of this production are basically missing for the wide time range considered in the present paper. This is not surprising if we think of the reuse of building materials, as seen during the entire chronological period considered.

However, the analysis of the only find of a brick furnace -the one in Piazza Cesarini- invites some interesting considerations (Filippi, 2010, 54) (fig. 16). Despite the little published information on the location of the artefact and on the human activity in the stratigraphic layers associated to it, the furnace appears interesting if included in the panorama of brick production in Rome in the Middle Ages⁵⁴.

The structure was found during the surveys along corso Vittorio Emanuele, for the construction of the Metro C (Egidi, Filippi, Martone 2010). We are in an important area of the city, that is, the western section of the *Campus Martius*, an

54 The record related to this production in Rome is still incomplete, despite some existing studies, both for the physical and written sources. For understanding the modes of pre-industrial production in Rome, the treatise by Giuseppe Valadier « L'architettura Pratica» published in 1828 remains fundamental and is rich in information on the description of artefacts, often accompanied by illustrations of furnaces, tools and phases of the production cycle. A first synthesis on brick production in the Lazio region between the sixth and the twelfth centuries was produced in the important work published by Arthur and Whitehouse in 1983 on the brick production of central and south Italy (Arthur Whitehouse 1983, 525-537). At the time, studies on the production in the Roman area were still poor but, in time, archaeological surveys included important acquisitions, many of which were published almost twenty years after the work by Arthur Whitehouse in the Rome conference of 1998, published in 2001 (De Minicis 2001). For certain aspects of brick production in Rome and for the case studies here described see Giustini 2001, 9-21, Giustini, 1997, Montelli 2001, 63-68. For a methodological approach see Steinby, 1993, 139-143, Campagnoli 1993, Mannoni 2000, Ratilainen, Bernotas, Herrmann 2014. For a study especially on written sources see Cortonesi, 1986, Pineiro Vaquero 2002. Finally, among the wide bibliography see Peacock 1979, Norton 1990, Parenti 1994, Pittalunga Quiros Castillo 1997, Parenti Quiros Castillo 2000, Quiros Castillo 2001, Id. 2005, Baldassari, Ciampoltrini 2006, Mellor 2014.

area continuously built since the late republican period. The surveys brought to light a sequence of settlements from the Augustan Age to the present, yet showing, in many cases, the lack of fully medieval layers, because they were removed due to the architectural changes in this part of the city, between the sixteenth and seventeenth centuries. However, this same survey brought to light the remaining evidence of the medieval levels dating to the thirteenth-fourteenth centuries, relatable, together with the structure, to the building activities of that period.

Undoubtedly, brick production is one of the most important building activities for the city since the Roman period, and certainly highlights an entire set of problems connected to the study of production activities in the medieval period in a city such as Rome (Panella 2015; Coarelli 2015).

The brick industry in Rome, widely documented up to the third century, is first interrupted towards the middle of the fourth century, and then undergoes a new beginning in the Theodorian period (490-526), but never recovering completely to the level of activity documented in the imperial period. Even if the data derived from archaeological surveys signal the presence of manufacturing, especially for roof pieces, it is only towards the end of the Middle Ages that these activities flourish again as a leading economic activity organized serially. Between these two chronological periods, the sixth and fifteenth centuries, there was also a very small recovery supported by the Carolingian popes, while the production patterns between the eighth-ninth and fourteenth-fifteenth centuries still have to be examined thoroughly. If reuse activities are well-known and documented, it is, however, also true that we have knowledge of some production activities, definitely limited and for a short time, during both the early medieval and full medieval period.

Think, for instance, of the brick with stamp *Iohannes* in a tabula ansata, coming from the temple of Vesta, or of the tiles with the stamp of pope Hadrian I from the roof of S. Maria Maggiore, and also of the tiles with stamp of Innocent II, found on the Via Nomentana (Crostarosa 1896, 63; Steinby 1973-1974, 117-118; Id. 1986, 146-148, 158-159; Gatti 1909, 107-112; Marini 1884, 5.). These are limited cases that could, indeed, recall the euergetic value of the brick stamp, but could also be framed within the scene of tile production. As already highlighted by E. Hubert, roof bricks seem to turn from a luxury good reserved for few people, between the tenth and eleventh centuries, to a building product newly spread from the twelfth century⁵⁵, so much as to become almost primary in the fourteenth century⁵⁶. In all the cases described, the connection between brick production and papal or ecclesiastic patronage is apparent, also well documented in excavations

55 A definite proof of this economic value is the fact that the cardinal of S. Maria in Trastevere in 1075 exchanges a one-story house with a land and one hundred tiles. (Tab. Vicar. Urbis, Archivio del Capitolo di Santa Maria in Trastevere, perg. 6). According to Hubert, the lack of mention of the topic in written records from the twelfth century is determined by the large distribution, which brought notaries to stop recording the presence of tiles because their use had become common (Hubert 1990, 220-222 e 228-229). The presence of tiles, despite their wider spread, certainly kept on having some importance for calculating the value of houses, if, in a selling contract of 1456, we can read that «casarenum seu domum discopertam cum orto post se, cum duobus trabibus et certis tegulis in eo existentibus, cum omnibus et singulis introytibus ... positum in regione Campi M(artis)»

56 The first sign of an actual brick production is instead in 1368-69, and it regards the material used in the Vatican palaces, while some years later, in 1372, the request recorded in documents by the notary Lorenzo Staglia is recorded: *Fornaciarius dudum de Peruscio et nunc de regione Ponti set contrate Sancti Petri*, requested by the vicar of the monastery of S. Paolo.

of furnaces in Rome, in its territory and in other areas of the Lazio region, such as Montecassino (Pantoni, 1953, 258). Here, research on the technology of production underlined the presence of specific production activities, which seem to correspond with practices typical of the Lombardian area (Giustini 2001,11). Another interesting example is the furnace found in archaeological excavations conducted in the *domuscultae* of Santa Cornelia, where its products and waste materials could be dated between the eleventh and thirteenth centuries. The structure was put in relation to the production of roof materials for the church⁵⁷. The exclusive presence in the walls of the ecclesiastic complex of reused “tuffelli” and bricks support this interpretation, even if perhaps with the newly acquired information on the stratigraphy of the Roman brick buildings, an updated reading of data would be appropriate. The structure invites reflection on the relationship between places of production activities, patrons (ecclesiastic) and materials used. This connection between the production cycle and the ecclesiastic worksite, always in the surroundings of Rome, emerges also in the case of the brick furnace found in the square facing the castle of Julius II, referable to the creation of the episcopate wanted by Pius II, inside the town of Ostia Antica, even if dated to the beginning of the fifteenth century (Broccoli 1983, 170-175; Giustini 2001, 13). Production activity is also documented here, comparable to the case mentioned, but also to other structures in the Lazio area. Let’s consider, for example, the furnace found in the area of La Fontanaccia- Allumiere, also in close connection with a religious patron and in the proximity of an area characterized by the presence of *figlinae* in the ancient Roman period⁵⁸. It is definitely still a small number of known structures. However, these show an interesting situation for the chronological period between the eleventh and fourteenth centuries, when, in the light of archaeological evidence, brick production appears to always be tied to ecclesiastic worksites of a certain relevance⁵⁹; these also show how, next to a wide use of *spolia* material in the construction of religious buildings, rare examples of new production existed and started growing until they proliferated in the following centuries⁶⁰ (Giannini 2015).

57 The furnace can be compared to the structure found in the church of SS. Giovanni e Reparata in Lucca and dated to the end of the twelfth century. *Cfr.* Quiros Castillo 2001, 35. It is interesting to remember that, in the light of what is presented in this paper, what the author says about its characteristics: Quiros Castillo underlines how the furnace was made of bricks of a particular module (26x 13x 5 m) and that these can be compared to the bricks used for the church aisles, confirming their creation for the construction of the building.

58 I also consider it appropriate to remind that the data on the section of the Appian Way including the *domusculta Sulpicianae* is still scarcely studied under this particular research field; for several production features this territory keeps on having a determining role in the evolution patterns of the city. In particular, regarding brick production, the find of a brick stamp of the *figlinae Sulpicianae* should be remembered, in the area of the Colle Savelli, a focal point of this territory for a long time. On other aspects of production in this zone where the relationship with Rome can be seen Giannini 2006 e ead 2013. For the Roman *figlinae* and the interest of Roman aristocracy in the economic management of these activities see Coarelli 2015.

59 The relationship between new brick production and worksites of religious patrons is also tied to the presence of a series of technological innovations compared to the Roman tradition, marking in a significant way the study approaches, not only in the archaeology of production activities, but also in the construction of the city.

60 In the light of the context described, it appears suitable to also remind about the structure excavated in 1996 in the site of Rossilli along the Via Latina. The structure found dates back to the 13-14th centuries, and stratigraphic data highlighted an abandonment of the structure already at the end of the fourteenth century. See on this Giustini 2001, 13.

BIBLIOGRAPHY

- APPETECCHIA, A., PALOMBI, C., Le apparecchiature murarie: classificazione tipologica e modalità costruttiva, SPERA, L., FILIPPI, F. (a cura di), *Il complesso di San Paolo fuori le mura. Profilo dell'insediamento attraverso le indagini 2007-2008 nell'orto dell'abbazia in c.s.*
- ARTHUR, P., WHITEHOUSE, D. 1983, Appunti sulla produzione laterizia nell'Italia centro-meridionale Tra VI e XII secolo, *Archeologia Medievale*, X, 525-537.
- AVAGNINA, M.E., GARIBALDI, V., SALTERINI, C. 1976, Le strutture murarie degli edifici religiosi di Roma nel XII secolo, *Rivista dell'Istituto Nazionale d'Archeologia e Storia dell'arte*, vol. 23/24, 173-255.
- BALDASSARI, M., CIAMPOLTRINI, G. 2006, *I maestri dell'argilla. L'edilizia in cotto, la produzione di laterizi e di vasellame nel Valdarno inferiore tra Medioevo ed età Moderna*, Pisa: Felici.
- BARELLI, L. et al. 2005, Lettura storico-critica di una muratura altomedievale: l'opus quadratum a Roma nei secoli VIII e IX, FIORANI, D. ESPOSITO, D. (a cura di), *Tecniche costruttive e dell'edilizia storica. Conoscere per conservare*, Roma: Viella, 59-77.
- BARCLAY LLOYD, J.E. 1985, Masonry Techniques in Medieval Rome, c.1080-c.1300, *Papers of the British School at Rome*, LIII, 225-277.
- BRANDIZZI VITTUCCI, P. 1991, L'emiciclo Del Circo Massimo Nell'utilizzazione Post Classica, *Mélanges Del l'ecole Francaise De Rome. Moyen-Age*, Tome 103, 7-40.
- BRANDIZZI VITTUCCI, P., 1990, Circo Massimo: Materiali E Strutture Presso La Torre Frangipane, *Quadaei*, 14, 57-71.
- BRANDIZZI VITTUCCI, P., Circo Massimo: Contributi Di Scavo Per La Topografia Medievale, *Quadaei*, 16, 415, n.5.
- BROCCOLI, U. 1983, Ricerche su Gregoriopoli: materiali e nuove acquisizioni per la storia del borgo di Ostia antica nel medioevo, *Archeologia Laziale V, Quaderni del Centro Studi Etrusco Italico*, VII, 170-175.
- BRUCCHIETTI, M., Olmeda, E. 2006, Via della Pineta Sacchetti, via Sorelle Marchisio. Note Preliminari, *bcom*, CVII, 293- 301.
- CAMPAGNOLI, P. 1993, Proposta di una scheda per la catalogazione e lo studio dei prodotti laterizi dell'antichità. Dall'età preromana al Medioevo, *Quaderni della Bassa Modenese*, 23, 17-34.
- CARANDINI, A. 1979, *Archeologia e cultura materiale. Lavori senza gloria nell'antichità classica*, Bari: Laterza.
- CARVER, M. 2001, Why that? Why there? Why then? The politics of early Medieval monumentality, HAMEROW, H.F., MACGREGOR, A. (edd.),

- Image and power in the archaeology of early medieval Britain: essays in honour of Rosemary Cramp*, Oxford: Oxbow Books, 1-22.
- CARVER, M. 2003, *Archaeological Value and Evaluation*, Mantova: Società Archeologica.
- CARVER, M. 2008, *Thinking Allowed Current Archaeology*, London.
- CECCHELLI, M.M. 2001, *Materiali e tecniche dell'edilizia paleocristiana a Roma*, Roma: De Luca Editore d'Arte.
- COARELLI, F. 2015, Le attività artigianali nella Roma di età Imperiale: fonti letterarie e fonti epigrafiche, MOLINARI A., SANTANGELI VALENZANI R., SPERA L. *L'archeologia della produzione a Roma*. (secoli V-XV), Atti del Convegno Internazionale di Studi . Roma 27-29 Marzo 2014, Roma: Edipuglia.
- CORTONESI, A. 1986, Fornaci e calcare a Roma e nel Lazio nel Basso Medioevo, GIAMMARIA, G. (a cura di), *Scritti in onore di Filippo Caraffa*, Anagni: ISALM, 277-307 (*Biblioteca Latium 2*).
- CROSTAROSA, P. 1896, Inventario dei sigilli impressi sulle tegole del tetto di Santa Maria Maggiore, *Nuovo Bollettino di Archeologia Cristiana*, II,63-70.
- D'AMELIO, M.G., Esposito D. 2012, Il cantiere di smontaggio: la pietraia lungo la via Flaminia. Osservazioni sul recupero di materiali da costruzione, ROSSI D. (a cura di), *Sulla via Flaminia. Il manuale di Marco Nonio Macrino*, Roma.
- DE MINICIS, E. 2001, *I laterizi in età medievale. Dalla produzione al cantiere. Atti del Convegno Nazionale di Studi* (Roma, 4-5 giugno 1998), Roma: Kappa.
- DEAN, G. 2012, GIS, archaeology and neighbourhood assemblages in Medieval York, *Postclassical Archaeologies*, 2, 7-30.
- EGIDI, R., FILIPPI, F., MARTONE, S. 2010, *Archeologia e infrastrutture. Il tracciato fondamentale della linea C della metropolitana di Roma: prime indagini archeologiche*, Roma: Casa Editrice Leo S. Olschki, 39-92, (*bda*, volume speciale).
- ESPOSITO, D. 1997, *Tecniche costruttive murarie medievali. Murature a Tufelli in area romana*, Roma: L'Erma di Bretschneider.
- ESPOSITO, D. 2012, Pietraie e Calcarari a Roma : recupero dei materiali da costruzione fra medioevo ed età moderna, MELO A.S., RIBEIRO (a cura di), *Historia da Construcao Os Materials*, Braga: CITCEM-LAMOP, 59-76.
- FILIPPI, F. 2010. Le indagini in Campo Marzio Occidentale. Nuovi dati sulla topografia antica: il ginnasio di Nerone(?) E l'“Euripus”, EGIDI, R., FILIPPI, F., MARTONE, S., 39-92.
- FILIPPI, F., SPERA, L. 2009, Il monastero altomedievale di S. Paolo. Recenti indagini archeologiche nell'orto dell'abbazia, UTRO, U. (a cura di), *San Paolo in Vaticano. La figura e la parola dell'apostolo delle Genti nelle raccolte pontificie*, Todi: Editrice, 140-142.

- FORSTER, M., CROSS, S. 2005, *Able minds and practised hands Scotland's early medieval Sculpture in the 21st Century*, Leeds: Society for Medieval Archaeology (The Society for Medieval Archaeology 23).
- GALINIÈ, H. 2000, *Ville, espace urbain et archéologie*, Tours: Maison des Sciences de la Ville, de l'Urbanisme et des Paysages, Université François Rabelais (Sciences de la Ville, 16).
- GARRIOCH, D. et al. 2005, The social history of urban neighbourhoods. Introduction, *Journal of Urban History*, 32, 663-676.
- GATTI, G. 1909, Tegole fittili col bollo di Innocenzo II, *bcom*, XXXVII, 107-112.
- GIANNICCHEDDA, E. 2005, Archeologia e cultura dei manufatti, LAGUZZI, A., RICCARDINI, E. (a cura di), *Studi di Storia Ovadese. Atti del Convegno in occasione del 45° di fondazione dell'accademia Urbense e dedicati alla memoria di A. Bausola* (Ovada, 7-8 dicembre 2002), Ovada, 85-104.
- GIANNICCHEDDA, E. 2006, *Uomini e Cose. Appunti di Archeologia*, Bari: Edipuglia.
- GIANNICCHEDDA, E. 2007, Tecnologie medievali e ricerca archeologica, Patitucci uggeri S. *Archeologia del Paesaggio Medievale. Studi in memoria di Riccardo Francovich*, Firenze, 49-61 (Quaderni di Archeologia Medievale, IX).
- GIANNICCHEDDA, E. 2007b, Lo scavo i residui, l'affidabilità stratigrafica, *Facta. A Journal of Roman Material Culture Studies*, 1, 51-64.
- GIANNICCHEDDA, E. 2014a, Chi ha paura dei manufatti? Gli archeologi hanno paura dei manufatti?, *Archeologia medievale*, XLI, 79-93.
- GIANNICCHEDDA, E. 2014b, Archeologia della produzione, GELICHI S. (a cura di), *Quarant'anni di Archeologia Medievale in Italia. La rivista, i temi, la teoria e i metodi, amediev*, numero speciale, 2014, 75-94.
- GIANNICCHEDDA, E., FERRARI, L. 2006, Studio degli indicatori del processo produttivo: il contributo dell'etnoarcheologia, LUSUARDI SIENA, S., NERI E. (a cura di), *Del fondere campane. Dall'archeologia Alla produzione. Atti del Convegno* (Milano, 23-25 febbraio 2006), Milano: All'Insegna del Giglio, 341-357.
- GIANNICCHEDDA, E. MANNONI, T. 1996, *Archeologia della produzione*, Torino: Einaudi.
- GIANNINI, N. 2006, Canalizzazioni sotterranee e mulini in un'area campione dei Colli Albani tra il Nemus Dianae e l'Albanum, LOMBARDI, L., LENA, G., PAZZAGLI, G. (a cura di), *Tecniche di Idraulica Antica. Le opere di captazione: dighe, cunicoli, esautori, ieri e oggi. Atti del Convegno* (Roma, 7 settembre 2006), 121-145 (Geologia dell'ambiente, supplemento al numero 4).
- GIANNINI, N. 2013, L'organizzazione delle acque e dei mulini nei catasti urbani e rurali: il caso dei Colli Albani orientali (Provincia di Roma), CADINU,

- M. (a cura di), *I Catasti e la storia dei luoghi. Metodi per la ricostruzione storica di contesti urbani e paesaggistici finalizzati alla tutela e al progetto. Atti del Convegno Internazionale* (Cagliari, 12-13 ottobre 2012), Cagliari: Edizioni Kappa, 621-634 (Storia dell'urbanistica, 4).
- GIANNINI, N. 2015, Il Gis e le Attività produttive a Roma in età medievale. Una questione di metodo tra tendenze e fatti, MOLINARI. A., SANTANGELI VALENZANI. R., SPERA. L., *L'archeologia della produzione a Roma. (secoli V-XV)*, Atti del Convegno Internazionale di Studi. Roma 27-29 Marzo 2014, Edipuglia, 73-93 (Collection de l'École Française de Rome 516).
- GIANNINI, N. 2015b, Leggere la città attraverso i dati materiali. L'esempio del fosso della marana e le Trasformazioni urbanistiche di Roma tra XI e XIII secolo, BONARDI. C. (a cura di), *Fare Urbanistica tra XI e XIV secolo, Storia dell'Urbanistica* 7, 31-50.
- GIUSTINI, M. 2001, La produzione laterizia nel Lazio tra VII e XIV secolo: 'status quaestionis', de minicis, 9-21.
- GIUSTINI, L. 1997, *Fornaci e laterizi a Roma dal XV al XIX secolo*, Roma: Kappa (*Museo della città e del Territorio*, IX).
- GOULD, S.J. 1997, *Quando i cavalli avevano le dita: misteri e stranezze della natura*, Milano: Feltrinelli editoriale.
- GUIDOBALDI, F. 2014, Un estesissimo intervento urbanistico nella Roma dell'inizio del XII secolo e la parziale perdita della « memoria topografica » della città antica, *Mélanges de l'École Française de Rome - Moyen Âge [En ligne]*, 126-2 | 2014, mis en ligne le 28 août 2014, consulté le 08 janvier 2016. URL: <http://mefrm.revues.org/2223>.
- GUIDOBALDI, F., PAVOLINI, C., PERGOLA, P. 1998, *I materiali residui nello scavo archeologico*, Roma: École Française de Rome (Collection de l'École Française de Rome 249).
- HALL, R.A. et al. 2002, *Medieval Urbanism in Coppergate: Refining a Townscape*, York: Council for British Archaeology.
- HOWELL, M. 2004, The Spaces of Late Medieval Urbanity, BOONE, M., STABEL, P. (edd.), *Shaping Urban Identity in Late Medieval Europe*, Leuven/ Apeldoorn: Garant Uitgevers.
- HUBERT, É. 1990, *Espace urbain et habitat à Rome: du X siècle à la fin du XIII siècle*, Roma: École Française de Rome (Collection de l'École Française de Rome 135).
- LEFEVRE, B. 2012, The study of urban fabric dynamics in long time spans. Modelling, analysis and representation of spatio-temporal transformations, *Post Classical Archaeology*, II, 65-83.
- LORETI, E. M., MARTORELLI, R. 2000, La via Portuense dall'epoca tardo antica all'età di Gregorio Magno. Continuità e trasformazioni, PERGOLA, PH., SANTANGELI VALENZANI, R., VOLPE, R. (a cura di), *Suburbium. Il suburbio di Roma dalla crisi del sistema delle ville a Gregorio Magno. Atti delle giornate di studio sul suburbio romano*. (Roma 16-18 Marzo

- 2000), Roma. École Française de Rome 367-397 (Collection de l'École Française de Rome 311).
- LUGLI, F., STOPPIELLO, A., VIDALE, M. 2000, Etnoarcheologia: un processo di messa a fuoco, *Archeologia Postmedievale*, 4, 17-19.
- MALATESTA S. 1885, *Statuti delle Gabelle di Roma*, Roma 1885 (*Accademia delle Conferenze Storico- Giuridiche*, V).
- MANNONI, T. 1993, Modi di fare la storia con l'archeologia. Variazioni su un tema di Andrea Carandini, *Archeologia medievale*, XX, 561-568.
- MANNONI, T. 2000, I problemi dei laterizi altomedievali. Considerazioni conclusive generali sulla giornata di studio, GELICHI, S., NOVARA, P. (a cura di), *I laterizi nell'alto Medioevo italiano*, Ravenna: Società di studi ravennati 213-220 (Biblioteca di "Ravenna studi e ricerche" 3).
- MANNONI, T. 2002, Modi di conoscere la storia con l'archeologia. Variazioni sul tema dei rapporti tra cultura Materiale e cultura esistenziale, *Archeologia medievale*, XXIX, 415-420.
- MANNONI, T. 2004, Modi di conoscere la storia con l'archeologia 3. Variazioni sul tema dell'intuizione Nei processi conoscitivi, *Archeologia medievale*, XXXI, 545-550.
- MARCINIAK, A., YALMAN, N. 2013, *Contesting Ethnoarchaeologies: Traditions, Theories, Prospects*, New York: Springer.
- MARINI, G. 1884, *Iscrizioni antiche doliarie pubblicato dal comm. G.B. de Rossi, con annotazioni del dott. E. Dressel*, Roma (*Accademia delle conferenze Storico Giuridiche*, III).
- MELLOR, M. 2014, *Pots and tiles of the Middle Ages*, London: Sam Fogg.
- MENEGHINI, R., SANTANGELI VALENZANI, R. 2004, *Roma nell'alto medioevo. Topografia e urbanistica della città dal V al X secolo*, Roma: Ist poligrafico e Zecca dello Stato.
- MOLINARI, A., GIANNINI, N. 2014, Un archivio digitale dell'edilizia civile medievale di Roma, DE MINICIS, E. (a cura di), *Case e torri medievali IV. Indagini sui centri dell'Italia meridionale ed insulare (sec. XI- XV), Campania, Basilicata, Puglia, Calabria, Sicilia e Sardegna. Atti del V Convegno Nazionale di Studi* (Orte, 15-16 marzo 2013), Roma: Edizioni Kappa 334-340 (Museo della città e del territorio, nuova serie 3).
- MOLINARI, A., GIANNINI, N. 2015, La costruzione della forma *urbis digitale* di Roma medievale: Il progetto dell'università di Roma Tor Vergata, *Archeologia e Calcolatori*, supplemento 7, 213-225.
- MOLINARI, A., SANTANGELI VALENZANI, R., SPERA L., 2015, *L'archeologia della produzione a Roma. (secoli V-XV)*, Atti del Convegno Internazionale di Studi . Roma 27-29 Marzo 2014, Roma: École Française de Rome (Collection de l'École Française de Rome 516).

- MONTELLI, E. 2001, *Tecniche costruttive murarie medievali. Mattoni e laterizi in Roma e nel Lazio fra X e XV sec.*, Roma: L'Erma di Bretschneider.
- NORTON, C. 1990, The production and distribution of medieval floor tiles in France and England, BARRAL I ALTET, X. (ed), *Artistes, Artisans et Production Artistique au Moyen Age*, Paris: Picard, 101-131.
- PALOMBI, C. 2012, La basilica di S. Valentino sulla via Flaminia. Nuove ricerche sull'assetto della zona presbiteriale, BRANDENBURG, H., GUIDOBALDI, F. *Scavi e scoperte recenti nelle chiese di Roma*, Roma: Pontificio Istituto di Archeologia Cristiana, 153-188 (Sussidi allo Studi delle antichità cristiane 24).
- PANELLA, C. 2015, Roma imperiale come centro produttivo: Le evidenze archeologiche, MOLINARI, A., SANTANGELI VALENZANI, R., SPERA, L., *l'archeologia della produzione a Roma. (secoli V-XV)*, Atti del Convegno Internazionale di Studi . Roma 27-29 Marzo 2014, Roma: École Française de Rome, 97-118 (Collection de l'École Française de Rome 516).
- PANTONI, A., 1953, Su un cimitero altomedievale a Montecassino e sul sepolcro di Paolo Diacono, *Atti del II Congresso Internazionale di Studi sull'alto Medioevo*(Grado-Aquileia-Gorizia-Cividale-Udine, 7-11 settembre 1952), Spoleto: Fondazione Centro italiano di studi sull'alto medioevo, 255-261.
- PARENTI, R. 1994, Le tecniche costruttive fra VI e X secolo: le evidenze materiali, FRANCOVICH, R., NOYÉ, G. (a cura di), *La storia dell'alto medioevo italiano (VI-X secolo) alla luce dell'archeologia. Atti del Convegno Internazionale* (Siena 1992), Firenze: All'Insegna del Giglio, 479-496 (Biblioteca di Archeologia Medievale)
- PARENTI, R., QUIROS castilloj., A. 2000, La produzione di mattoni della Toscana medievale (XII-XVI secolo). Un tentativo di sintesi, BOUCHERON, P., BROISE, H., THÈBERT, Y. (edd.), *La brique antique et médiévale: production et commercialisation d'un matériau. Actes du colloque international* (Saint-Cloud, 16- 18 novembre 1995), Roma: École Française de Rome, 219-235 (Collection de École Française de Rome, 272).
- PEACOCK, D.P.S. 1979, An ethoarchaeological approach to the study of Roman Bricks and Tiles, MCWHIRR, A. (ed.), *Roman Brick and Tile. Studies in Manufacture, distribution and use in the Western Empire*, Oxford: British Archaeological Reports, 5-10 (Bar International Series 68).
- PITTALUGA, D., QUIROS CASTILLO, J. A. 1997, *Mensiocronologia dei laterizi della Liguria e della Toscana: due esperienze a confronto*, Atti del I Congresso Nazionale di Archeologia Medievale, Firenze: All'Insegna del Giglio, 460-463.
- PORCARI, B. 2009, Dai Monumenti funerari alle calcare. Storia di un contesto di materiali lapidei dal Trastevere (Roma), *Mitteilungen des Deutschen Archäologischen Instituts Römische Abteilung*, 115, 93-129.
- QUIROS CASTILLO, J. A. 2001, Mensiocronologia e produzione di laterizi in Toscana, DE MINICIS E., *I laterizi in età medievale. Dalla produzione*

- al cantiere. Atti del Convegno Nazionale di Studi* (Roma, 4-5 giugno 1998), Roma: Kappa, 31-44.
- QUIROS CASTILLO J. A. 2005, Building archaeology and social change: Medieval tiles and bricks in Spain, CRAMER, J., SACK, D. (edd.), *Technik des Backsteinbaus im Europa des Mittelalters*, Berlin: Imhof Verlag, 39-49.
- RATILAINEN, T., BERNOTAS, R., HERRMANN, C. 2014, *Fresh Approaches to Brick Production and Use in the Middle Ages. Proceedings of the session 'Utilization of Brick in the Medieval Period-Production, Construction, Destruction'* (Helsinki, 29 august- 1 september 2012), Oxford: British Archaeological Reports (*Bar International Series*, 2611).
- ROUX, V. 2003, Ceramics standardization and intensity of production: quantifying degrees of specialization, *American Antiquity*, 68, 768-782.
- ROUX, V., CORBETTA, D. 1989, Wheel throwing technique and craft specialization, V. ROUX, *The potter's wheel: craft specialization and technical competence*, Oxford & IBH Publishing Company, 10-92.
- SANTANGELI VALENZANI, R. 2015, Calcare ed Altre Tracce di Cantiere, cave e smontaggi sistematici degli Edifici Antichi, MOLINARI A., SANTANGELI VALENZANI R., SPERA L., *L'archeologia della produzione a Roma. (secoli V-XV)*, Atti del Convegno Internazionale di Studi . Roma: 27-29 Marzo 2014, Roma: École Française de Rome, 335-344 (Collection de l'École Française de Rome 516).
- SANTOLINI GIORDANI, R. 2009, «Nel segno dell'acqua». Impianti e manufatti rurali presso via della Pineta Sacchetti, JOVILET, V., PAVOLINI, C., TOMEI, M.A., VOLPE, R. (a cura di), *Suburbium II. Il suburbio di Roma dalla fine dell'età monarchica alla nascita del sistema ville (V-II secolo a.c.)*, Roma: École Française de Rome, 621-627 (Collection de l'École Française de Rome 419).
- SPERA, L. 2011a, Dalla Tomba alla città di Paolo: profilo topografico della Giovannopoli, BUCARELLI, O., MORALES, M.M. (a cura di), *Paolo apostolo martyri. L'apostolo San Paolo nella storia, nell'arte e nell'archeologia*. Atti della giornata di studi (Università gregoriana, 19 maggio 2009), Roma: Pontificio Istituto Biblico, 119-161 (*Miscellanea Historae Pontificae* 69)
- SPERA, L. 2011b, Osservazioni sulla Porticus dei santuari martiriali a Roma. Assetti architettonico-urbanistici e questioni cronologiche, Brandt, O., Pergola, Ph., *Marmoribus vestita. Miscellanea in onore di Federico Guidobaldi*, Città del Vaticano: Pontificio Istituto di Archeologia Cristiana, 1039-1070.
- SPERA, L., ESPOSITO, D., GIORGI, E. 2011, Costruire a Roma nel Medioevo: evidenze di cantiere a S. Paolo f.i.m., *Archeologia dell'architettura*, XVI, 19-33.
- SPERA, L., PALOMBI, C. 2015, La banca dati e il Gis degli indicatori di produzione. Note topografiche e prime riflessioni di sintesi, MOLINARI A., SANTANGELI VALENZANI R. SPERA L., *L'Archeologia della produzione a Roma (secoli V-XV)*, Atti del Convegno Internazionale di Studi, Roma 27-

- 29 Marzo 2014, Roma: École Française de Rome, 9-72 (Collection de l'École Française de Rome 516).
- STEINBY, E. M. 1973-1974, Le tegole antiche di Santa Maria Maggiore, *Rendiconti della Pontifica Accademia Romana di archeologia*, XLVI, 117-118.
- STEINBY, M. 1986, L'industria laterizia di Roma nel Tardo Impero, GIARDINA, A. (a cura di), *Società Romana e Impero Tardoantico. II. Roma, politica, economia, paesaggio urbano*, Bari: Laterza, 99-159.
- STEINBY, M., 1993, L'organizzazione produttiva dei laterizi: un modello interpretativo per l'instrumentum in genere? HARRIS; W.H. (ed.), *The inscribed economy. Production and distribution in the Roman empire in the light of instrumentum domesticum*, Ann Arbor: University of Michigan, 139-143 (Journal of Roman Archeology, supplementary Series, 6).
- TWEDDLE, D., MOOULDEN, J., LOGAN, E., 1999, *Anglian York: A Survey of the Evidence*, York: Council for British Archaeology.
- VAQUERO PINEIRO, M. 2002, La gabella dei calcarari. Note sulla produzione di calce e laterizi a Roma nel Quattrocento, LACONELLI, A., AIT, I, *Maestranze e cantieri edili a Roma e nel Lazio. Lavoro, tecniche, materiali nei secoli XIII-XV*, Roma: Vecchiarelli, 137-154 (Itinera. Profili di Storia rur. e urbana).
- VIDALE, M. 2004, *Che cos'è l'etnoarcheologia*, Roma: Carocci (Le bussole).
- WHISKY L.J. 1962, *Medieval technology and Social Change*, Oxford: Oxford University Press.