



Archeologia  XXVIII.1
2023

del'Architettura

**ARCHEOLOGIA DEL CANTIERE EDILE:
TEMI ED ESEMPI DALL'ANTICHITÀ AL MEDIOEVO**
Atti del Convegno di Studi, 21 maggio 2021, a cura di Andrea Fiorini

ARCHEOLOGIA DELL'ARCHITETTURA

Supplemento di «Archeologia Medievale»

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redazione@insegnadelgiglio.it

Traduzione dei riassunti dall'italiano all'inglese: GAVIN WILLIAMS

Edizione e distribuzione:

ALL'INSEGNA DEL GIGLIO s.a.s.

via Arrigo Boito, 50-52; 50019 Sesto Fiorentino (FI)

tel. +39.055.6142.675

e-mail redazione@insegnadelgiglio.it

sito web www.insegnadelgiglio.it

Abbonamenti: versione carta, in Italia, € 80 (due fascicoli); tariffe per estero e versioni digitali, <https://www.aa.insegnadelgiglio.it>

Sito web della rivista: <https://www.aa.insegnadelgiglio.it>

Ebook, anche singoli capitoli: <https://www.torrossa.com/it/resources/an/2400747>

Rivista annuale, registrata presso il Tribunale di Firenze

ARCHEOLOGIA DELL'ARCHITETTURA

XXVIII.1

2023



All'Insegna del Giglio

Il volume è stato realizzato con il contributo di Alma Mater Studiorum Università di Bologna e Istituto Scuola Provinciale Edili - CPT Ravenna



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



Istituto Scuola Provinciale Edili - CPT Ravenna

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Nelle annate 2020-2022 sono stati presentati per la pubblicazione 69 contributi; non pubblicati 6.

Valutazione della ricerca

ANVUR:

fascia A: area 8, area 10

riviste scientifiche: area 8, area 10, area 11

Indexed in:

Scopus (ELSEVIER), DIALNET (Universidad de la Rioja)

Art & Architecture Source (EBSCO)

Metrics:

SJR. SCImago Journal & Country Rank

Scopus Sources

In copertina: Cantiere di una cattedrale gotica
(disegno di Giorgio Albertini).

ISSN 1126-6236

e-ISSN 2038-6567

ISBN 978-88-9285-177-1

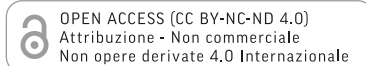
e-ISBN 978-88-9285-178-8

© 2023 All'Insegna del Giglio s.a.s.

Archeologia dell'Architettura, 28.1, 2023
dicembre 2023

All'Insegna del Giglio s.a.s.
via Arrigo Boito, 50-52
50019 Sesto Fiorentino (FI)
www.insegnadelgiglio.it

stampato a Sesto Fiorentino (FI)
dicembre 2023, BDprint



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Attribuzione - Non commerciale
Non opere derivate 4.0 Internazionale

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doi 10.36153/aa28.1.2023.13

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ARCHAEOLOGY AND THE ORGANIZATION OF CONSTRUCTION: THEMES AND EXAMPLES FROM ANTIQUITY TO THE MIDDLE AGES. CLOSING REMARKS

In his article on organizational aspects of late medieval construction projects, Andrea Fiorini briefly goes over some of the disciplines involved in the study of the organization of construction. As well as archaeology, these range from the history of architecture to written sources and epigraphy. Also included is art history, both as the specific analysis of particular architectural elements, and as the study of iconographic repertoires relating to the built heritage. For medieval Italy, summaries of these various approaches are collected in volumes or miscellaneous works (most recently, see for example COPPOLA 2015, or the less recent but still useful volume edited by CASTELNUOVO, SERGI 2001). Recent articles on the history of construction organization in the Classical period have helped to systematically address this sector of the history of the built heritage with a greater eye to the archaeological record (CAMPOREALE, DESSALES, PIZZO 2008; 2010; 2012; BUKOWIECKI, VOLPE, WULF-RHEIDT 2015).

By contrast, all the papers at the conference held remotely in 2021, and their respective written articles published here, focus attention solely on the contribution of archaeology to this research theme, often summing up decades of research, or else proposing detailed interpretations, although these are anchored to broader fields of knowledge.

Naturally, seven articles are not enough for a complete overview, given that all the articles substantially focus on monumental buildings of a public and civic nature, or else religious buildings, or buildings linked to high-status private patrons. Thus minor constructions are excluded from the analysis, especially ordinary domestic buildings belonging to members of the middle and lower social classes, which were often made of perishable materials. This is despite the fact that important articles have been devoted to these, both in the past and more recently, especially for the medieval period (first and foremost SANTANGELI VALENZANI 2011; GALETTI 1998; 2004a; 2004b; and, lastly, DE MINICIS, PASTURA, ROMAGNOLI 2022).

However, it is easy to understand the reason behind this choice. Addressing a long tradition of research into the history of construction processes, which evolved between the 4th century BC and the Late Middle Ages, and in an attempt to identify transitional moments that herald substantial changes of various kinds, a more immediate response is certainly to see these changes in the choices made by members of the section of society who were the instigators of new buildings. In addition, it is precisely in this kind of construction that we can find a reflection of the characteristics of the skills of the builders, and the desires

of the people who commissioned the work, in relation to what was to be 'read' by their contemporaries, namely the people who were the end users of these buildings, especially in the case of buildings designed for public use. In any event, taken together, these articles, mostly written by researchers who have been working and publishing on these themes, can prompt a series of considerations.

First and foremost, what can the archaeology of architecture tell us, and what are the prime physical indicators for this discipline.

In almost all the papers, techniques used for the construction of outer walls are the main source of knowledge. This is true owing to the numerous articles on this subject published also in other places, and in previous years (see, by way of example, BROGIOLO, GENTILINI 2012; BROGIOLO 2013). The break-up of the production cycle makes it possible to focus on specific parameters that can be analyzed in detail: the type of building material, its supply or manufacture (in the case of bricks and tiles), and the ways in which these materials are worked and finished, and set in place, are undoubtedly the main indicators used today to analyze technical knowhow, the organization of work, and the criteria of representation. They also constitute the common thread linking almost all the articles in this monographic work. Also, the preliminary and vital stratigraphical interpretation makes it possible, in some of these articles, to estimate the ways in which the construction progressed, by identifying horizontal or vertical interruptions.

Only in Marsili's article does attention shift to the decorative elements, especially column capitals. These are analyzed mainly thanks to masons' marks. These are useful for reconstructing working processes in Late Antiquity in different workshops that were geographically far apart, but all part of a complex system of contacts, especially between Constantinople and Ravenna. This is a unique field of research, connected to a tradition that is now fairly well consolidated in Italy, involving quarry marks, markers indicating how elements were to be located in situ, or identity markers, and it is also found in other articles referring to construction processes in the Republican era (Bernard), and including those in late medieval Puglia (Giuliani, Mangilardi).

Another important line of research involves estimating the time and costs involved in construction, using an approach based on an analysis of the energy expended on buildings. Such an approach appears above all in the works of our colleagues who specialize in ancient history, drawing on a research tradition inaugurated at the end

of the millennium by Janet DeLaine, for her analysis of the Baths of Caracalla (DELAINE 1997). In recent years it has also been undertaken in several works by medieval historians (see the various contributions in BROGIOLO, CAMPOREALE, CHAVARRIA ARNAU 2017). In the texts in the present monographic work, there are fewer examples of traces of construction phase organization revealed during excavation, ranging from the (negative trace) remains of scaffolding to traces of lifting machinery, and including places for mixing lime mortar, although we can find these in previous works focusing on specific production cycles.

Sciences applied to the archaeology of architecture (from archaeometric analyses to geomorphological analyses etc) are a further step forward in research in the last 10 years, and this is also reflected in the papers in this monographic work (mortar analysis, thermoluminescence dating etc).

Thus there is a large amount of data, and the overall impression given by these papers is that we have now reached a point in which we can put forward tentative overviews to describe the history of construction processes in Italy in the various different historical periods in which archaeological data are at the centre of the narration, as the main source (starting with stratigraphical analysis) to which can be anchored the further history inferred from other types of sources.

The other consideration that emerges from all these papers is the high level of detail of some research studies, especially as regards drawing up a more precise chronology for the adoption of particular techniques, and as a result for developing specific technical trends, or trends in the formation of local technical circles, including as a consequence of an active osmosis between the knowhow of local master-builders and those coming in from outside. This is an important step forwards especially for pre-medieval periods, for which a more detailed chronotypology of building techniques is taking shape (see the case of *opus cementicium* discussed by Mogetta). A new typology of these is also starting to appear, on the basis of characteristics that were to some extent overlooked (as in the case of the use of small tiles, presented by Camporeale), as is a detailed analysis of technical expedients adopted by the builders of Late Antique buildings in a major city, namely Milan (Greppi).

Useful points for discussion also come from the macro-periodization of medieval techniques, now consolidated in previous studies (a summary appears in BIANCHI, CAGNANA 2016). This is referred to in many articles devoted to this historical period, especially by Bernardi. Regarding this latter subject, the main points underlined are: a clear interruption in technical skill as of the 7th century, with the widespread absence of quarried, dressed stones; a decline in the presence of reused stones, which seem to reappear as of the 9th-10th centuries; fragmentation in the production of bricks and tiles; the widespread occurrence of a wall building technique in which regular horizontal courses were fairly absent; the widespread use of plaster to cover whole wall surfaces, or partial plaster facing as a result of flattening out excess mortar; and the consistent use of lime mortar, often of good quality.

These characteristics have been highlighted by a considerable number of studies, and already in the past it has been noted that these decisions, viewed in their overall historical and architectural context, and in specific technical circles, were largely due not so much to a loss of knowhow as to a deliberate decision, dictated mainly by the need to reduce costs in the construction of walled features, while maintaining a constant investment in a building's overall planning and design (especially in religious buildings, the surviving evidence for which is greater), and in its decoration (BIANCHI 2010).

Reading the articles in this volume devoted to construction in the Republican period, and especially to the Imperial period, when there were more and more investments in public and private construction projects, also due to a rise in the economic resources available to all the figures who initiated the construction of buildings, we can see further, indirect confirmation of this hypothesis. In the examples cited by several authors, we often see, in construction processes, an overriding need to save on certain items of expenditure in the overall budget: the use of different techniques depending on how prominent their position was in the building, and in relation to its various structural elements; the use of certain materials (eg. as with the small tiles) combining criteria of economizing and structural strength; and the use of certain surface applications to cover architectural features only on front-facing parts (as in the case of 2nd century AD red ochre). All this occurred in a context not only of economic development but also at a time of clear growth in construction knowhow, thanks to which it was possible to make the right decisions to achieve the excellent execution of the construction project, one way or another. Thus, these decisions are not indicative of a decline in skills, but of a strategy that is clearly evidenced by the archaeological record. Of course, in the Early Middle Ages we are looking at a profoundly different world of construction in terms of patrons and investments, as well as the political and social significance of buildings compared to the Roman world. Decisions were certainly more drastic, in a context such as the one in central and northern Italy, especially, which was distinguished by patrons with a lesser ability to invest. However, this does not mean that these decisions were dictated by a decline in skills and knowhow.

By contrast, less attention is paid, at least in the articles presented in this volume, to the transitional centuries between early medieval construction processes and the situation in the Late Middle Ages. Even in important urban contexts such as Milan and Pavia, the 10th and 11th centuries still seem represented only scantily in material terms.

The observations that can be made today in the case of Tuscany, for example, which is one of the most well studied cases at least in central and northern Italy, show that these are, by contrast, crucial periods for getting a better understanding of the marked change associated with the Late Middle Ages. Indeed, from a more detailed analysis of the physical evidence, one deduces that stone became prevalent in civil constructions gradually, and only in given site contexts, often linked to the public powers.

It also becomes clear that methods of dressing and working this building material were borrowed from religious constructions. They therefore acquired a pronounced symbolic association in political and economic terms for the rural aristocracies that were engaged in consolidating their powers over the territories over which they had authority (BIANCHI 2021). Accordingly, it would be interesting to have more comparative data in contexts that have been well studied, also as regards the people who commissioned buildings.

Meanwhile, the articles in this volume do not fail to underline the major change in construction processes in the course of the 12th century, in terms of the skilled workers who were employed, the number and type of patrons, and the technical solutions adopted, with special reference, for walled constructions, to the exponential increase in stone-built constructions, and the systematic adoption of the practice of stone-dressing, with stones being laid in increasingly regular courses.

It is now an established fact that this series of decisions are a reliable indicator of what was now full-blown economic growth, which is well recognized thanks to the material evidence (WICKHAM 2010; WICKHAM 2023, pp. 612-620). This has recently been examined also in the form of an important project devoted, appropriately enough, to the study of diachronic aspects of petrification in several European contexts¹.

¹ This is the ERC Advanced project entitled *Petrifying Wealth. The Southern European Shift to Masonry as Collective Investment in Identity, c. 1050-1300* directed by Ana Rodríguez and Sandro Carocci. See the project website for the relevant bibliography: www.petrifyingwealth.eu.

However, what has not been properly explored, at least for central and northern Italy, is a micro-chronology for the 12th century that makes it possible, context by context, to establish whether dates for the buildings in question, in which there is a clear choice in favour of stone, often along with stone-dressing, are to be placed in the early or later 12th century. Indeed, the question is quite an important one, given that other production cycles also seem aligned with a change that took place more towards the end of the century, rather than in the previous decades. This fact can be indirectly seen in Fiorini's article on medieval construction processes, which states that a real change in the world of construction actually becomes evident above all during the 13th century.

Thus it will be important, in the near future, to concentrate more attention on this aspect of the built heritage, with a wide-ranging gaze that also takes in urban and rural settings, so as to highlight differences, or similarities, in relation to the political and economic chronological history of the various people who were commissioning new buildings.

Economic trends did not always go hand-in-hand with political events, and the rise of certain social classes, attested to in written documents, may not, in some cases, have gone hand-in-hand with the investments associated with these changes.

Buildings, of whatever sort, and the organizational aspects surrounding their construction, are perhaps the best 'manifesto' of these transformations, and the timescale in which they took place. It is therefore worth continuing to study them in more detail, as far as possible by means of a diachronic perspective, such as the one adopted in this monographic work.

€ 50,00

ISSN 1126-6236
e-ISSN 2038-6567
ISBN 978-88-9285-177-1
e-ISSN 978-88-9285-178-8

L'Archeologia del cantiere edile prende in esame le tracce lasciate dai costruttori durante il loro operato e i caratteri dei manufatti prodotti, concentrandosi principalmente sulle murature, al fine di comprendere il funzionamento di un cantiere in azione, in particolare l'organizzazione tecnico-logistica, le operazioni eseguite per il suo impianto, la programmazione del processo edilizio (filiera), le opere provvisorie, le macchine, i ruoli e le responsabilità delle persone coinvolte. Inoltre, indaga il mutamento di questi aspetti sul lungo periodo e cerca di spiegarne i motivi. Il convegno dal titolo "Archeologia del cantiere edile: temi ed esempi dall'Antichità al Medioevo", tenutosi il 21 maggio 2021 su piattaforma Microsoft Teams, è stato organizzato dal Dipartimento di Storia Culture Civiltà (DiSCi - Università di Bologna), nell'ambito delle attività didattiche e di ricerca promosse dall'insegnamento di Archeologia dell'architettura (Scuola di Specializzazione in Beni archeologici) e dal Laboratorio di Archeologia dell'architettura. Ogni relatore si è occupato di questo tema in relazione a uno specifico contesto territoriale e limitatamente a una determinata fascia cronologica. Inoltre, Giovanna Bianchi ed Andrea Augenti hanno discusso i risultati più importanti, offrendo spunti di riflessione e stimolando ulteriori ricerche.

AA-28-1



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