Architectural Conservation Studio

Calogero Bellanca

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Esperienze di Studio e Restauro in Europa – 1

Architectural Conservation Studio

Calogero Bellanca

with contributions by

Susana López Verdú and Alejandro Iniesta Muñoz

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Dedicated to Giuseppe Zander

Index

Foreword

This book by Calogero Bellanca, associate professor at Sapienza University of Rome and a scholar of architectural history, design and restoration for nearly 40 years, is the result of his studies on these matters in Italy and various European countries.

The publication provides a precious resource for the younger generations, who often tend to favor digital technology, as it reveals the essence of direct studies on architectural bodies and the analysis of archival and bibliographical sources before restoration work.

The methodology used in preparing this volume reflects the research and didactic activities that Prof. Bellanca carries out at Sapienza University. It expresses cultural identity as a dynamic and critical concept, a process that recreates the heritage of the past in the present and projects it into the future for the new generations to ensure both identity and progress.

Prof. Bellanca's aim coincides with Article 9 of the Italian Constitution: "*The Republic shall promote the development of culture and scientific and technical research. It shall safeguard the natural landscape and the historical and artistic heritage of the Nation*". Indeed, his book seems inspired – not only ideally but also operatively – to the words pronounced by Italian President Sergio Mattarella on incentivizing the diffusion of Italian culture as one of the country's excellences.

Thus, I believe that this book by Prof. Bellanca correctly portrays a wide range of singularities and a complex network of cultural and artistic influence, promotes ideas for future research and, above all, is excellent to educate new generations for the progress of this sector.

Eugenio Gaudio
Rector, Sapienza University of Rome

Foreword

This is the first volume of a series of three that Prof. Arch. Calogero Bellanca is preparing as part of the SURE (Sustainable Urban Rehabilitation in Europe) programme adopted by Sapienza University of Rome as part of the 2016-2019 Erasmus Plus research project.

The volume is significant in reflecting the entire academic, didactic and scientific biography of Professor Bellanca, whom I have known and esteemed from his debut, as someone open to Europe and its expressions of art and architecture, especially in Central Europe where he has spent much time ranging from Germany to Austria and Poland, but certainly not only in those countries since, as we'll see later, he embraces also Spain, and Madrid in detail.

The author's historical and critical observations (as in the cases of Zamość, the Polish founding city, and the Sternberg Palace in Vienna), are always based on direct observation, his own careful measured survey drawings, and the study of historical iconography. They then expand to include reflections and proposals on the themes of conservation and architectural restoration – disciplines of primary interest to the author – and comparisons between different approaches to the subject in a European context. Not by chance is the subtitle of his essay on the Viennese palace *A palimpsest for Europe*.

It is also not by chance that the opening contribution of the book is dedicated to drawing, that "graphic representation" that constitutes the solid foundation for the study and restoration of each monument. Here we see it applied, as in other publications, such as the one on the Church of Santa Sabina in Rome, or others on Palazzo Roverella in Ascoli Piceno, on the Wawel complex in Krakow, Poland, and on the Church of Santa Maria la Real of Sasamón in Burgos, Spain.

As a whole, the volume consists of ten substantial essays comprising more than two hundred pages, all written by Professor Bellanca with the exception of two essays entrusted to young Spanish scholars: Susana López Verdú (*Madrid. Alameda del Valle. The church of Santa Marina, Virgen y Mártir*) e Alejandro Iníesta Muñoz (*Madrid, conservation of the historical Metro*).

The essays of Prof. Bellanca summarise and update the bibliographic references for studies that he has carried out in previous years in Italy (Palermo, Sermoneta, Rome) and elsewhere in Europe, drawing upon references and comparisons throughout the continent (from England to Hungary) and systematically expanding, so to speak, from the general to the particular. These range from urban issues, as in the case of the city of Zamość, to the reading of architectural orders and their minute syntax in the case of the Palazzo dei Conservatori in Rome and the *Stadtresidenz* of Landshut in Germany, the Romanesque and then Cistercian masonry of Santa Maria Assunta in Sermoneta, and the study of construction techniques (such as the '*spinapesce*' adopted by Antonio da Sangallo il Giovane in the vaults of the Bastion of the Colonnella in Rome).

Attention to the analytical aspects is always reflected in a more general historical-territorial framework and, in some cases, in issues of politics, religion, warfare or patronage, always open to comparisons derived from reading architectural languages and exploring in depth the 'ordinary geometry' of individual buildings, in plan, elevation and section, such as to reveal previously unrecognized tangents and references. Thus there is stressed once again the fundamental importance of drawing.

In this European *excursus* that moves from the Middle Ages to the Renaissance (the Landshut and 16th-century Roman examples), to the Baroque (architectures of the 17th and 18th centuries in Poland), to modernity (Sternberg Palace, between the 19th and 20th centuries), issues of restoration recur, from the identification of forms of degradation, discussion of previous interventions, on proposals for conservation, on compatible adaptation, so as to ensure the indispensable vitality of the monument over time. Comparisons are made with the help of photos repeated at a distance of time, between the situations *ante* and *post* the most recent restorations. Also discussed are the arguments, applied to both the architecture and the city, and thus to urban themes, the colour treatment of ancient plaster and painted surfaces, and the degree of cleaning of stone surfaces to preserve that 'patina of time' masterfully treated by Cesare Brandi and so poetically recalled by Marguerite Yourcenar.

A similar method, expanded to the historical-geographical and religious context and aided by excellent interpretive drawings of historical events, is followed in the contribution of the architect López Verdú on the Church of Santa Marina. Here the contribution of a properly stratigraphic reading is stressed as fundamental for understanding the building in its multiple stages, both constructive and deconstructive.

The contribution of the architect Iníesta Muñoz is different in that it addresses the contemporary theme of the Madrid Metro (1914-1919, in its first configuration), but not different in its basic intention of proceeding as if it were an ancient monument. It reviews the history of the Metro and its four initial railway lines, the resumption of construction in 1944 and the interventions in the following sixties and seventies, up to the work currently in progress (expected to be completed in 2020).

Expansions, afterthoughts and upgrades of the Metro, Iníesta Muñoz notes, have resulted in the almost total loss of the architectural values of the first stations which at the time were studied by quality architects. This is despite the fact that they are subject to 'restrictions' as cultural heritage and urban heritage – which suddenly brings us back to contemporary Italian and European events, with the repetition of the centuries-old clash between instances of 'modernity' and others of 'conservation', as if they were irreconcilable realities and not compatible through the use of an indispensable, measured and sensitive design approach.

In conclusion, this first volume, originating within the Erasmus Plus project, has a dual value both scientific and didactic (conceived by Professor Bellanca for his students of the master's degree course in Architecture Conservation at Sapienza, but certainly not only for them). In this case it is eminently the history of architecture, yet already with significant attention paid to restoration as still conducted nowadays. In the coming volumes we will give greater attention

to the field of conservation, its theory and practice, thus emphasizing the virtuous circularity of the two disciplines, destined, in restoration, to nourish and complement each other.

Giovanni Carbonara
Emeritus, Sapienza University of Rome

Acknowledgements

I express my thanks to Eugenio Gaudio, Magnificent Rector of Sapienza University of Rome, for his constant support and interest at every stage of the European project (SURE) and during the preparation of this first volume.

I am particularly grateful to Professor Giovanni Carbonara, Emeritus of Sapienza University of Rome, for his solicitous interest at every stage of the writing of the book and for his inspiring encouragement during the many years in which I was lucky enough to study and collaborate with him.

Allow me also to give grateful recognition to the earlier professors of the School of Specialization for the study and restoration of monuments with whom I was lucky enough to train and study.

I express special thanks to the Italian Ministry of Foreign Affairs and the National Research Council who have supported me over the years for research in different European countries. My gratitude also goes to the scientific institutions that have been largely involved in this research: specifically, in Poland, the Polytechnic of Warsaw, the Institute of Art History of the Polish Academy of Sciences, and restoration directorate at Wawel Castle and the Polytechnic of Krakow; and in Austria, the Technical University of Vienna, the Bundesdenkmalamt and the Max-Planck Institut.

I feel it is my duty to add to my thanks also ICCROM and ICOMOS International.

I also thank the architects Susana Lopez Verdù and Alejandro Iniesta Muñoz for providing two essays, and hope they will continue with further in-depth studies.

I would like to thank Susana Lopez Verdù for the patient and constructive editorial and graphic assistance together with architect Chiara Rullo who competently collaborated on the final drafting in English.

Finally, I express my thanks to the publisher, Sapienza University Press and specifically to Eleonora Carletti and Roberto Di Iulio who with great ability and patience made it possible to print this work.

Calogero Bellanca

Introduction

In recent years in Italy, throughout Europe and in many non-European countries, studies and publications on conservation and restoration have increased but it seems that fewer of the younger generation frequent libraries and archives because they mostly use digital technologies. This assertion is based on several years of observations made during university courses held in Italian and in English, not only at Sapienza but in various other European universities. This situation has also been evident for the last three years within the SURE Erasmus Plus project (Sustainable Urban Rehabilitation Europe). Therefore, aware of the current specious promotion of mobility at any cost, often accomplished in a superficial and banally touristic mode, we want to convey beyond the enthusiasm and passion a proper methodological rigour for the study of our preexistences.

Our aim is to provide students with tools for training in the field of restoration, along with the indispensable bibliographic and graphic aids. Together they constitute a teaching package which can be used and appreciated by other readers who are sensitive towards the restoration of our cultural heritage.

This volume is therefore based on the analysis of activities preliminary to restoration, recognizing the theoretical matrices of reference and the complexity of criteria and techniques for each intervention. It is divided into ten chapters devoted to specific topics.

Some are re-statements based on previous partially published texts which have been revised and updated in the notes and captions. The initial chapter is dedicated to the short guide of graphic representations in which the author's surveys and elaborations are presented.

The second chapter, drawing on previous work and new contributions, exhibits an architectural palimpsest of the central Mediterranean from the Middle Ages through different periods of artistic expressions up to a recent restoration project at the Church of Santa Maria dell'Ammiraglio in Palermo. The third chapter is concerned with the Church of Santa Maria Assunta in Sermoneta.

The volume continues with a chapter dedicated to cases from Rome, *The Bastion of the Colonnella, historical and conservation note* (a little-known building by Antonio da Sangallo il Giovane, discovered by the author while preparing for the conference dedicated to Sangallo in 1985); and the façade of the Palazzo dei Conservatori in Rome, when the author was invited to be part of the international group for its study and restoration during the worksites for the Jubilee in 2000. These chapters are followed by two essays dedicated to the presence and impact in Poland of Italian architectural design from the Renaissance to Baroque. These studies date from the author's study missions in Poland during a period of great political and social turmoil.

The ninth chapter, *Palazzo Sternberg, a palimpest for Europe,* presents a synthesis about a palace in Vienna, home of the Italian Institute of Culture, where the author had the opportunity to stay at different times. Finally, two young Spanish architects, Susana Lopez Verdù and Alejandro Iniesta Muñoz, present their first studies on, respectively, the Church of Santa Marina Virgen y Martir in Alameda del Valle and the Metro in the city of Madrid.

1. A brief guide to graphic representations for study and restoration

Calogero Bellanca

The study and the restoration of architectural, archaeological, environmental and landscape heritage are divided into three stages: the survey, the historical-critical analysis and the restoration project aimed at achieving concrete practical results. It is deemed essential, for didactic reasons, to make more illustrative the presentation of the sequence of graphic representations which the students will have to present in order to approach the discipline and, subsequently, sit the examinations. The question is one of continuing to verify, in the current Italian and European scene, a method for the study and the restoration of the existing through the diction proposed by Guglielmo De Angelis d'Ossat and further developed and added to by Giovanni Carbonara (survey, history, restoration), where every element of the triad justifies and completes itself by the antecedent and the consequent.
The doctrinal direction merges with the operational, meaning to contribute to the production of the study and the restoration of the existing building.

The survey

The first stage consists in the direct survey of the existing structures and is articulated with graphics and photographs. It constitutes the first step toward knowing the architectural situation to be studied in its own lexical characteristics and in the complex stratigraphy.
The graphic representations of the survey provide the most useful guide for the subsequent "methodical study" of the architectural and environmental properties, which will reveal itself to be an essential tool for their comprehension (1).

Territorial placement
A first phase of study is the placement of the property in its urban and territorial context. This consists in a series of graphic representations considering the architecture being studied in the urban-territorial context.
It will be useful to insert the property in the current cartographies (from the territorial scale 1:25.000, 1:10.000, 1:5.000, to urban maps on the scales of 1:2.000 or 1:1.000 and also the cadastral) and also make use of aerophotogrammetries of the area of study.

Photographic identification
This is an important phase preliminary to the actual survey of the edifice; in fact, it will be the task of the in situ inspection and the relative photographic campaign on the architecture examined to kindle the first understanding and stimulation through a series of photographic images of the whole and of the details. The architectural organism studied should be described, identifying, on the basis of a reference planimetry, the points of view of the photographs presented, first from the outside and then from inside, always making sure to employ the opportune optics, from wide-angle to telephoto lenses.

The geometric-dimensional survey

The geometric-dimensional survey should begin to represent the architectural situation, indicating the measurements in the plan, the elevation and the sections. The geometric-dimensional survey is generally carried out at a scale of 1:50, while the scale of 1:100 is used only to depict very large architectural complexes. The graphic representations must be the following: plans of the various levels, including any subterranean levels, the coverings and the lofts, where they are inspectable and surveyable; the elevations, with at least two sections: a longitudinal and a transversal, picked as the most significant ones; and lastly any architectural details agreed on with the supervisors.

The survey project is of fundamental importance: it will be opportune to build a virtual plane of reference to obviate height differences. It is well to remember the use of traditional instruments, such as paline, measuring rods, double metre sticks, water levels, 10 metre tapes, periscopes. In a second phase, more sophisticated instruments can be added, for example, laser pointers, theodolites, laser scanners, etc.

The aid of photographic documentation will always be decisive, both with traditional cameras and digital equipment.

Students are reminded that the system of trilateration is the one already broadly codified, in various restoration courses at Italian universities, for the precise determination of the architectural organism and its correct geometric and dimensional configuration.

The procedure is initiated through the establishment of an external poligonal and, setting fixed points, the delimitation of the object surveyed proceeds through subsequent measurements. The triangles should be equilateral or isosceles, while it is recommended not to employ scalene triangles, as the acute angle increases the risk of errors.

After having delimited the area, one then proceeds inwards, taking care to maintain the same connection in height with the external poligonal (the virtual plane); this occurs through the various apertures, doors and windows.

A third year student should possess the requisites necessary to be able to tackle, understand and solve the issues relative to the architectural survey thanks to the training of the previous years, also with the aid of courses on the history of ancient, mediaeval and modern architecture.

The architectural survey

The graphic representations of the architectural survey are usually at a scale of 1:50.

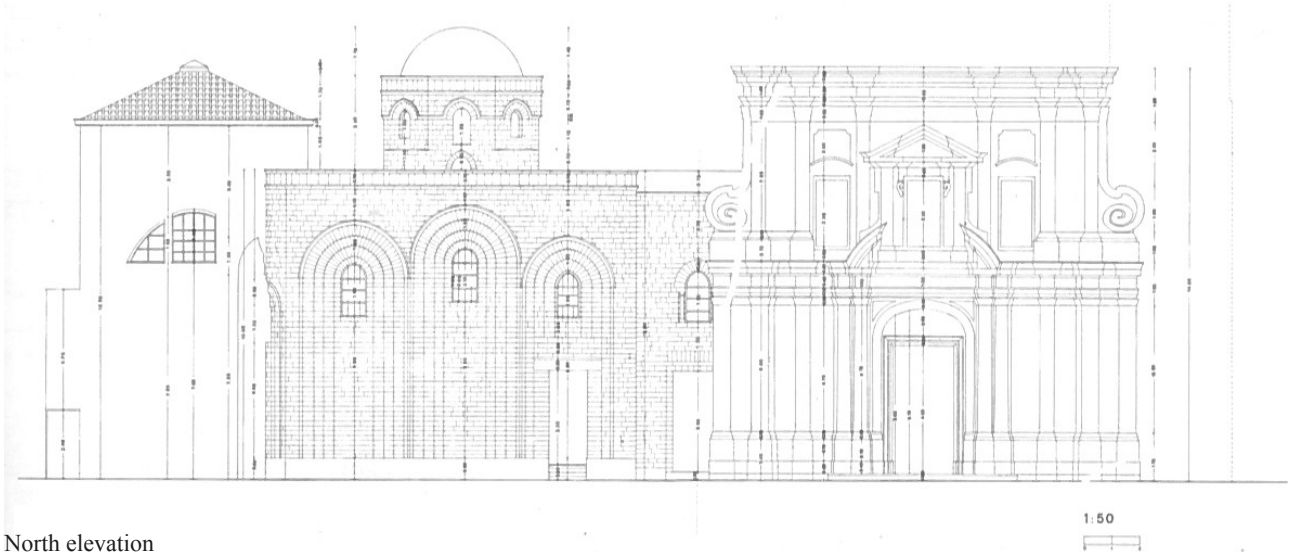
The planimetric representation and that of the elevations especially permits the analisys of masonry structures, of the architectural language, so as to allow the synoptic understanding of the edifice, without losing oneself in the details on a first look.

The graphic representations must be the following: plans at the various levels, including coverings and lofts; elevation of all the façades; sections, at least two, a longitudinal and a transversal, picked as those deemed most significant for the understanding of the architectural organism; and those architectural details agreed on with the supervisors.

These surveys may include plans, at the various heights, to better comprehend the complexities, i.e., additions and stratifications over time.

Particular care should be reserved for the graphic characterisation, if the construction is endowed with mural paintings (frescoes, etc.), sculptoreal or mosaic decorations.

This second series of graphic representations, besides supplying altimetric measurements, superpositions and and the articulations of the spatial volumes, accomplishes the task of representing the constructive-structural aspects of the organism examined.
Retracing just a few of the architectural organisms studied, first hand, in these years, a methodological constant emerges, albeit distinguishable in the various situations, this is true for the Church of the Martorana in Palermo, the Basilica of Santa Sabina, the Temple of Portuno, the Bastion of the Colonnella, Palazzo dei Conservatori in Rome, the Church of S. Maria Assunta in Sermoneta, Palazzo Roverella in Ascoli Piceno, the Landshut Residence (Germany), the monumental complex of Wawel in Krakow (Poland), and the Church of Santa Maria la Real of Sasamón in Burgos (Spain), etc.



North elevation

Fig. 1. Palermo, Church of Santa Maria dell'Ammiraglio. Geometric-dimensional survey, northern elevation (survey by the A., 1985-86).

It is deemed useful to insert into this contribution some of the graphic representations relative to these existing structures. In particular, the Martorana in Palermo may be edifying as, while being of a limited size, it manifests an uninterrupted continuity of artistic and figurative expressions. It summarises the methodological moment of the study, that is to say, of the knowledge propedeutic to restoration.

I would like to make explicit the characteristics of the medieval plan from the Norman period, delimited by the hemispheric dome supported by the system of reemployed Roman columns-ogival arches, also dwelling on the so-called Baroque "*Cappellone*", delimited by an oval simulated externally by a pitched covering. The other additions are legible from the different rhythm of the supports, constituted by spolia columns and capitals and arches always ogival. The ensemble of the choir and the underchoir, the other "new element" of the church, dating to the 1500-1700s, has low cross vaults supported by columns in the underchoir, while the area above is delimited by a vault "*a schifo"*. The complex volumetric articulation will therefore require a greater number of sections. The transversal section is situated in the area once occupied by the mediaeval quadriporticus.
The underchoir can be read as an organism generated by individual units. At the two extremities are the 18th century chapels with the two mosaics from the Norman period.

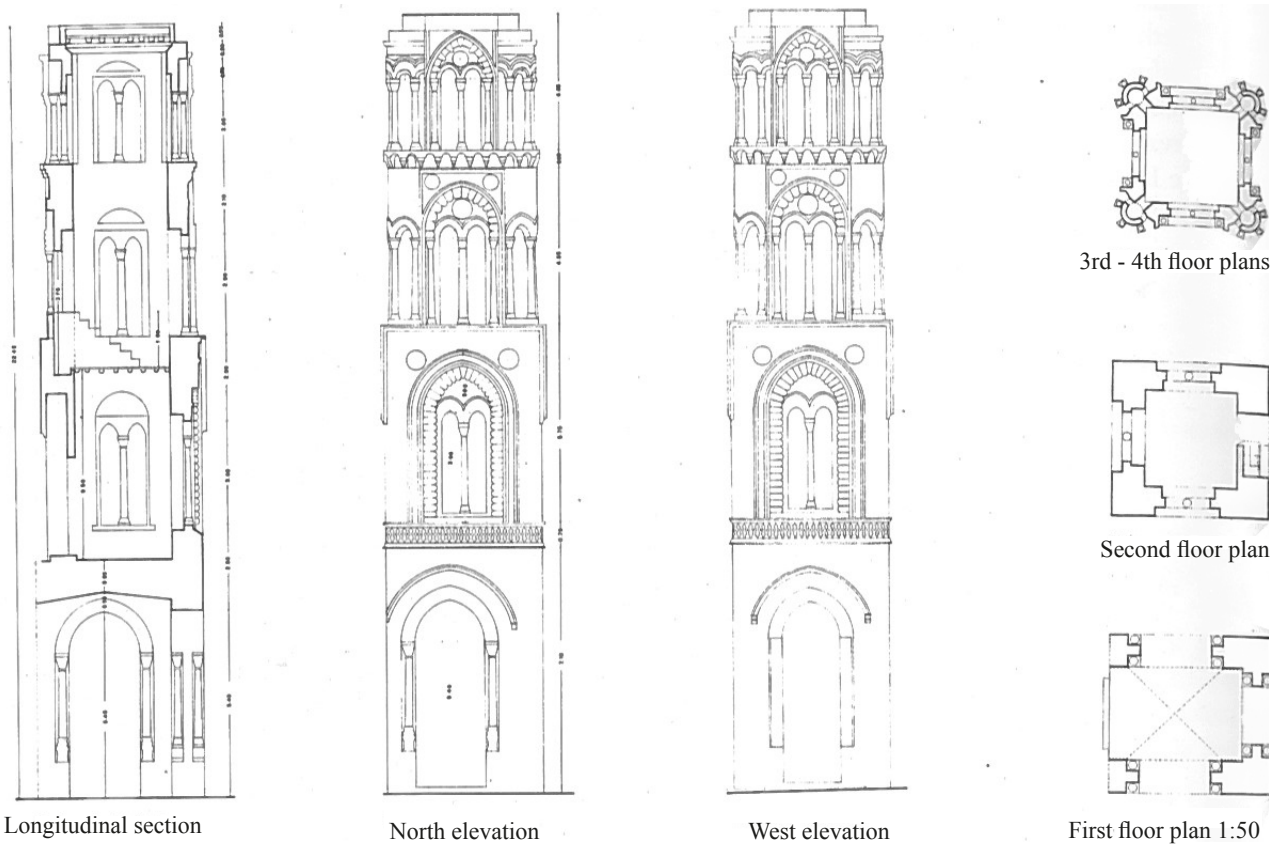


Fig. 2. Church of Santa Maria dell'Ammiraglio, architectural survey of the bell tower, plans of the various levels, longitudinal section and elevations (survey of the A., 1985-86).

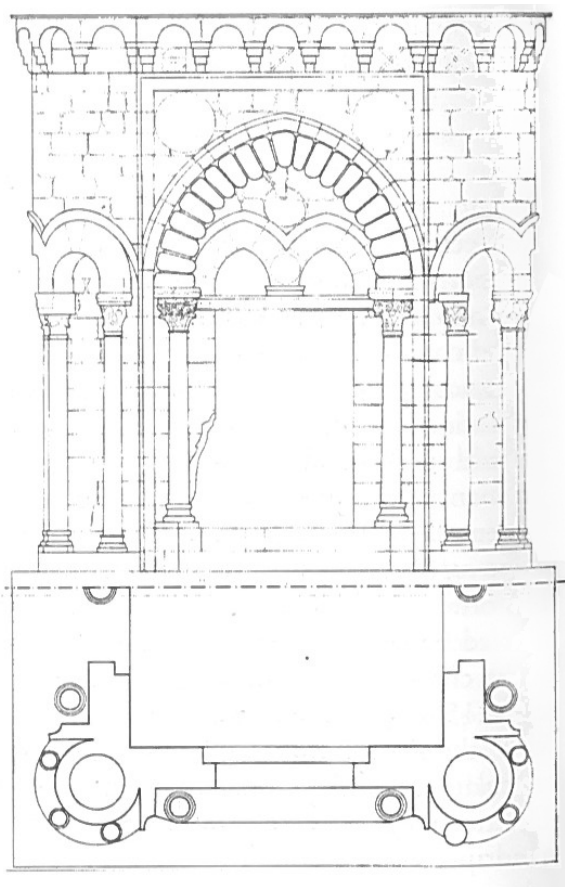


Fig. 3. Church of Santa Maria dell'Ammiraglio, architectural survey, detail of the bell tower, third level (survey by the A., 1985-86).

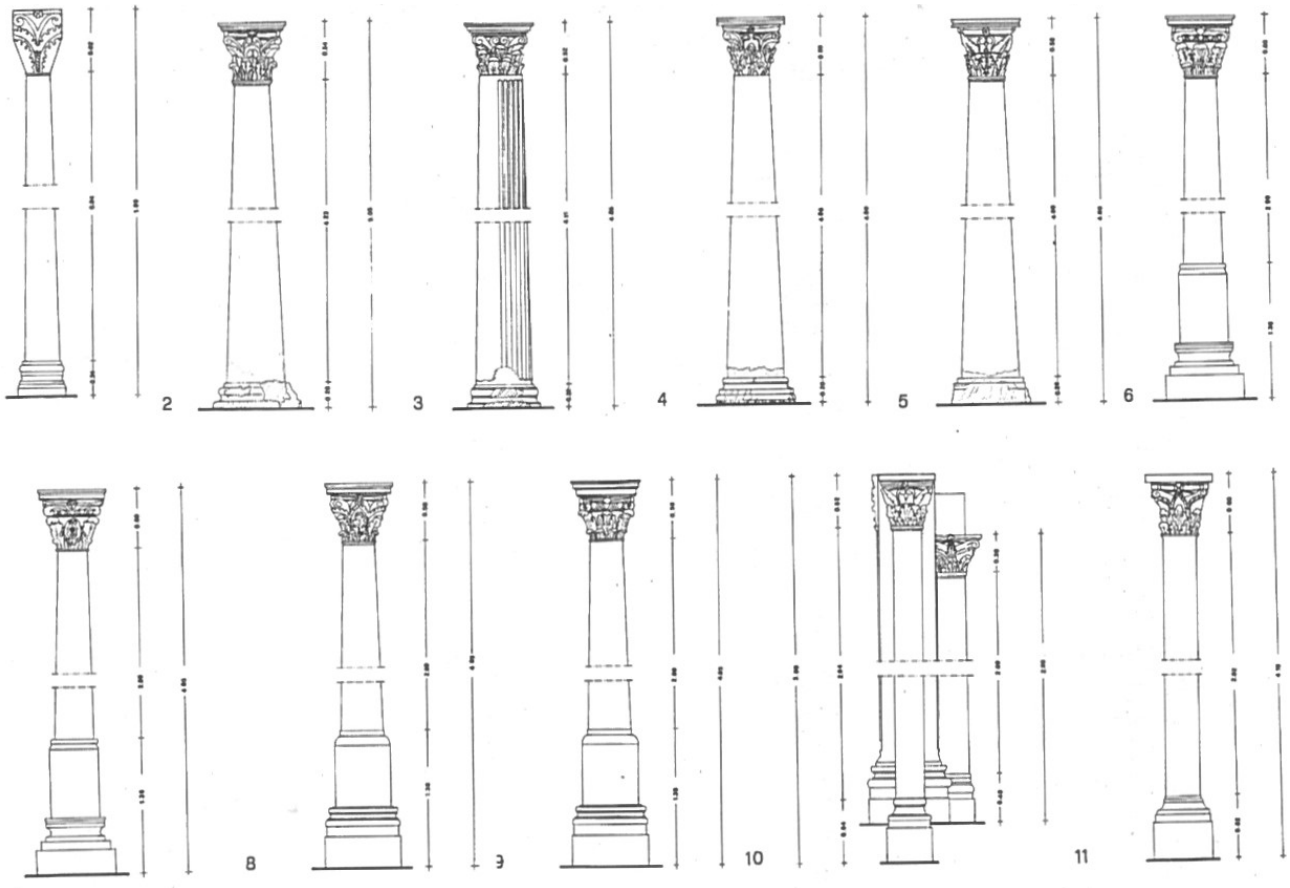


Fig. 4. Church of Santa Maria dell'Ammiraglio, analysis of constructive features. The theme of the columns with reused (reemployed) materials is presented (survey by the A., 1985-86).

In the upper part, the choir is concealed from worshippers and visitors, inasmuch as it is reserved for the cloistered monastic community, which had it realised in the 18th century.
The theme of the cube crowned by a hemispheric cap, constant in coeval architectures in the mediterranean area, highlights the initial Norman plan of the Martorana. Despite the pragmatic stereometry of the compact block, rhythmed by the triumphal arch, a campaign of surveys revealed a difference in the sizes of the capitals, supported by scavenged columns (Fig. 4).

The longitudinal section highlights the various altimetric dimensions, the super- positions and the articulations of the spatial volumes and accomplishes the task of representing the constructive-structural aspects of the church. More specifically, from the Norman plan, delimited by the hemispheric cap and the system of columns, ogival arches, one moves on to the large Baroque chapel, delimited by an oval simulated externally by a pitched covering.

The northern elevation is indubitably the most emergent, as it presents, in summary, the various constructive elements. Starting from the left, the cube of the Norman church is delimited from above by the hemispheric cap of the dome. The treatment of the stone parament is carried out with the usual system of isodomic blocks and develops the architectural theme of the wall continuum, characteristic of Romanesque architecture. This masonry structure is reproposed in the 1500s addition, while the other prevailing character is given by the three, slightly acute arches, with the subtle recessing of the archivolts. The Baroque façade, with its symmetry, and the bell tower, with its volumes of fulls and empties, conclude the section (2) (Fig. 1).

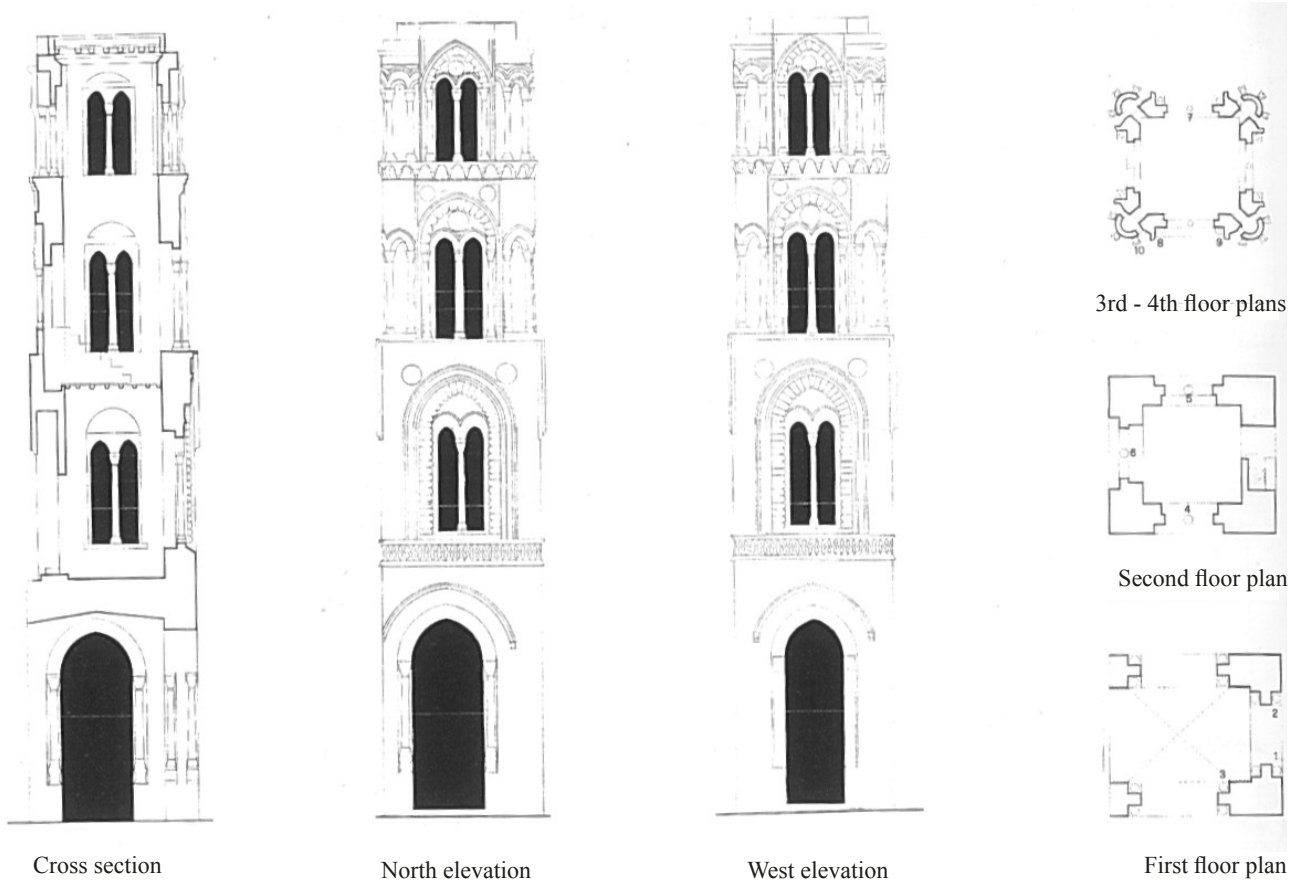


Fig. 5. Church of Santa Maria dell'Ammiraglio, analysis of constructive features, the bell tower (survey by the A., 1985-86).

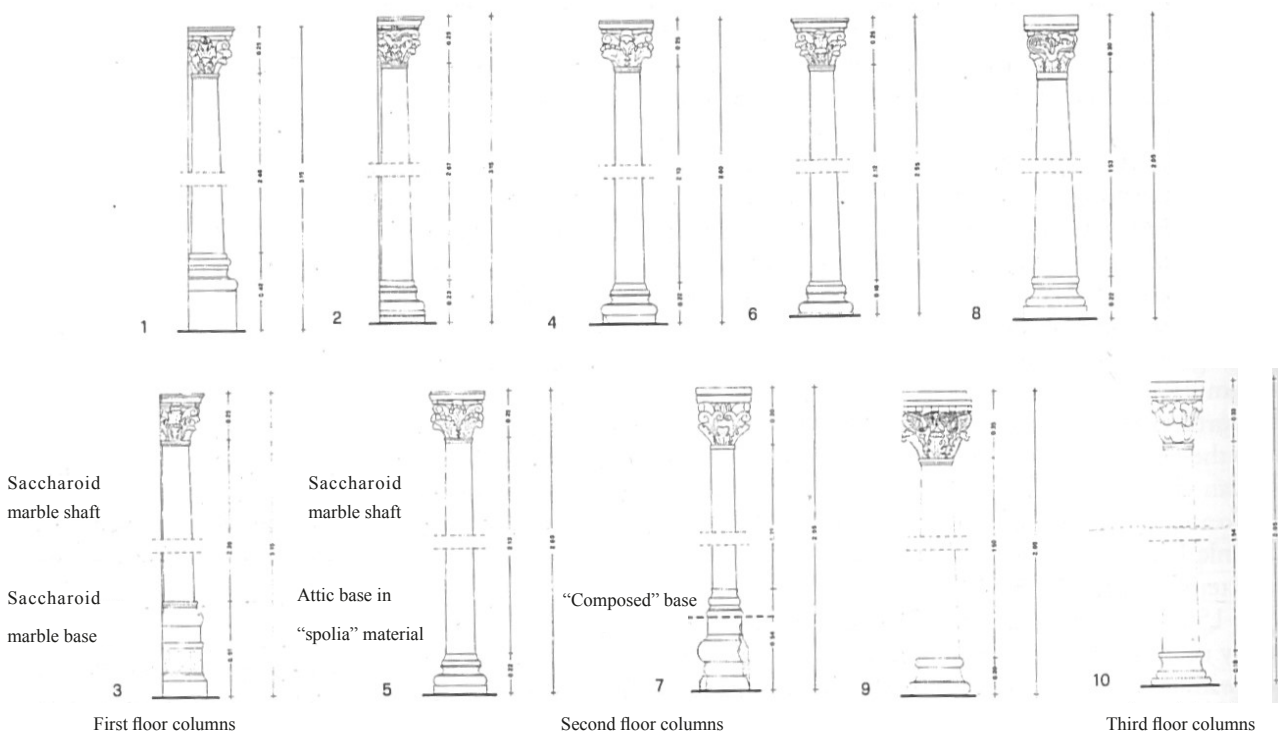


Fig. 6. Church of Santa Maria dell'Ammiraglio, analysis of constructive features, the bell tower, the theme of the columns (survey by the A., 1985-86).

With regard to the bell tower, the prismatic shape of the first two levels contrasts with the subsequent ones and this is the first characterising datum of the ensemble geometry (Fig. 2). The first two elevations show two blocks with a distended and continuous wall surface, characterised by a greater thickness and with leveled finishings (Fig. 3). The complex structure of the last two floors presents a different volumetry, especially in the corners, with the insertion of cylindrical elements, besides highlighting a reduced height in the arcades and declaring a different construction period.

The historical-critical analysis

The second methodological stage, the historical-critical analysis, central nucleus of the study of architectures, consists in specific in-depth thematic sections. In university courses today, this section will be initiated in the course on restoration elements or in courses on constructive features and principles of restoration in the third year. In the subsequent Restoration laboratory of the fourth year, all the in-depth examinations demanded by the monument itself will be carried out.

The historical iconography
The investigation beings with the historical iconography, through the study of the genesis and the initial process of the production up to the most recent interventions, through drawings, prints, engravings, water-colours, restoration interventions and, sometimes, reconstruction hypotheses of the past, according to the manner of the period. Old black and white and colour photographs will be representing the buildings to be studied and their context.

The analysis of the constructive features
The process continues with the architectural description of the ensemble of the construction and with the direct analysis, at the appropriate metric scales, of the constructive features. This also takes place through the opportune references to previous and coeval episodes in the history of the architecture and of the artistic expressions.
These in-depth examinations will be represented on an appropriate scale (1:20 or 1:10) and will always be furnished with a reference to identify the part analysed in detail with respect to the ensemble, for example, of an elevation or from photographs, if necessary. Of fundamental importance is familiarity with the history of the architecture and a knowledgeable capacity for the bibliographic and archival research to be carried out in libraries or in the relevant archives (3).
A particular reading can be provided by the understanding of the architectural orders (Figs. 5, 6, 9, 10).
A few years ago, it has been demonstrated how a precise survey, carried out during the course of the restoration of the façade of Palazzo dei Conservatori in Rome, allowed the identification of the differences in the details of the architectural components attributable to Michelangelo and his successors (see chapter 5).

The logical-constructive model
Certain architectural structures, for example, are based on the column-arch constructive model, as in the cases of lowered cross vaults which sometimes support choirs above them. The vaults are constituted in their upper part by a structure of wooden beams, suitably modelled, to which are nailed panels that support the layer made of eads plaster, the layer of plaster and the final fresco.

Above, the covering system is usually composed of a sloped roof made using the traditional method of trusses, secondary beams, boards and tiles (Fig. 7).

The theme of the volumetric layout

If, as an example, we consider once again the Church of the Martorana, this case presents an architecture constituted by the joining of simple volumes, with large linear extensions, rhythmed by small blocks and marked by slight recessing which delimit the apertures.

The most characteristic accent is given by the spherical protuberance of the dome with the polished surface and of a shape extraneous to the repertoire of Byzantine caps.

The dome, both in Byzantine and in Arabic architecture, collects and ends, with its push, an architectural volume. While the dome of Byzantine religious edifices in Greece expressively centralises its function of dilating the internal space and is englobed by a polygonal tambour and a roof covering, in Arabic architecture, it expresses itself with a different accent: it has a compact volume and decisive momentum. Spherical domes show themselves to be the ideal quintessence of Islamic architecture. All these domes in the south of the mediterranean, be they brick, stone or concrete, present a constant particularity in their transitions from square base to round dome. The principle on which they are founded is that of the "pendentives" plumes jutting from interior walls.

This norm admits minimal variations in the executive details and a principle identical to the one which characterises the proportions of Sicilian domes, also made of stone or bricks, like those of the same period constructed in Campania and Calabria (4).

From this, we can infer that the dome-tambour system is statically autonomous, with a concatenation which, without pretences, brandishes the technical principle of the transmission of forces in a direct, vertical line.

Metrological and proportional analysis

Among monographic sections, the metrological and proportional analysis is favoured, so as to identify geometric lines of modularity or of proportioning and recognise constructive reprisals which could otherwise be incomprehensible. Also to be observed is the presence of any corrections of optics or perspective.

I will stress the extreme importance of the capacity to read and understand the articulation of the architectural organism, also through the differing thicknesses of walls built from Antiquity to the Middle Ages, with different units of measurement for individual territorial settings (5) (Figs. 8, 11, 12).

The theme of the logical-figurative model

In the framework of historical-critical analysis, in the presence of particular architectural expressions, the study can highlight the figure of the equilateral triangle determining the length and the height of the main scansions of the edifices; once again, the "symbol of the divine law regulating the universe" is present.

Invention, fancy and creativity are put to one side to make room for such a respect for geometry and literature that they can be found in the symmetry of a Renaissance and/or Baroque façade and in the possibility of inscribing it in a square, a figure which is also rich in meaning, as it expresses the form of stability, certainty, the symbol of security and truth.

The logical-constructive model (*Il modello logico costruttivo*)

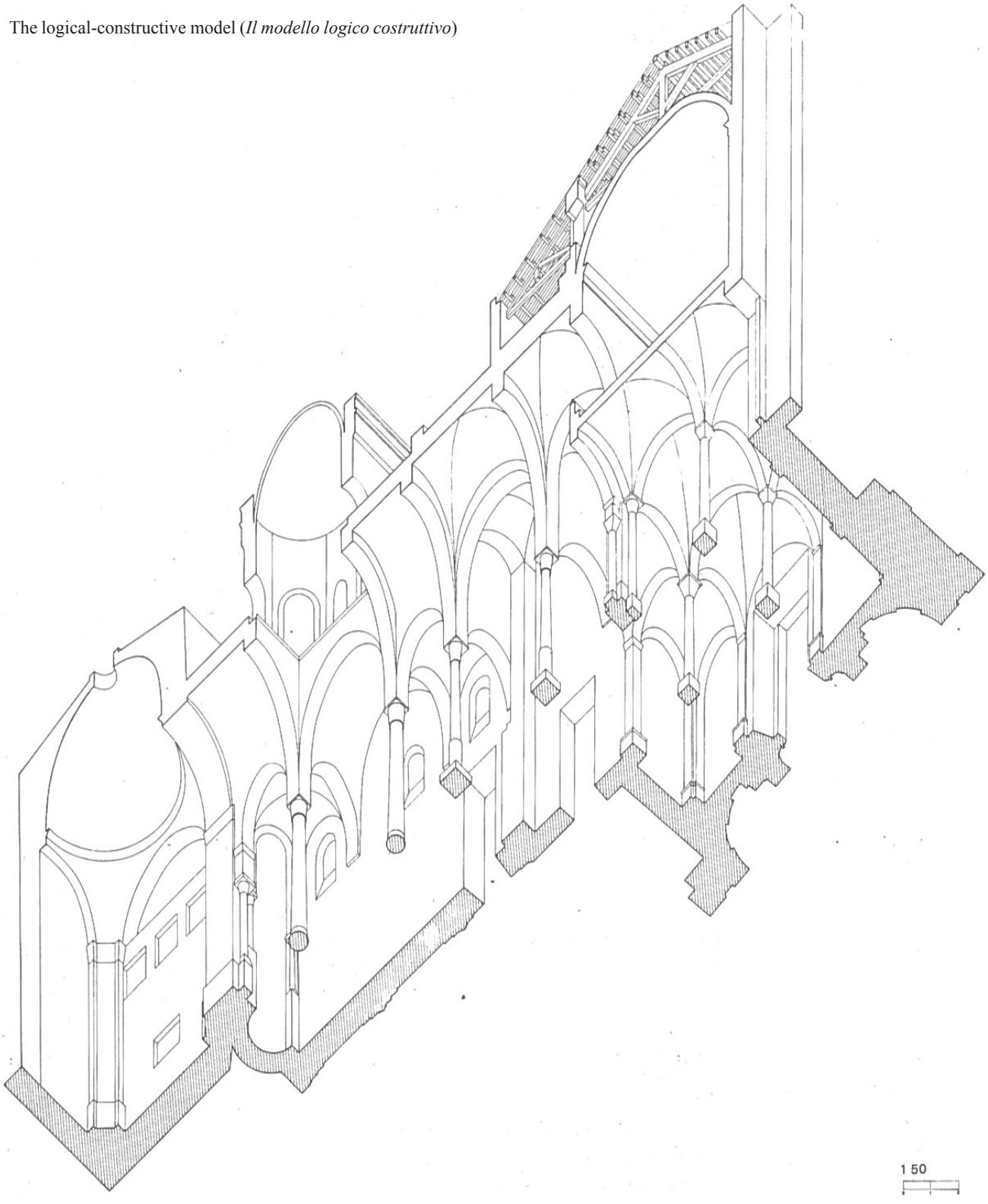


Fig. 7. Church of Santa Maria dell'Ammiraglio, the logical-constructive model (cutaway drawing by the A., 1987).

The logical-figurative model (Il modello logico figurativo)

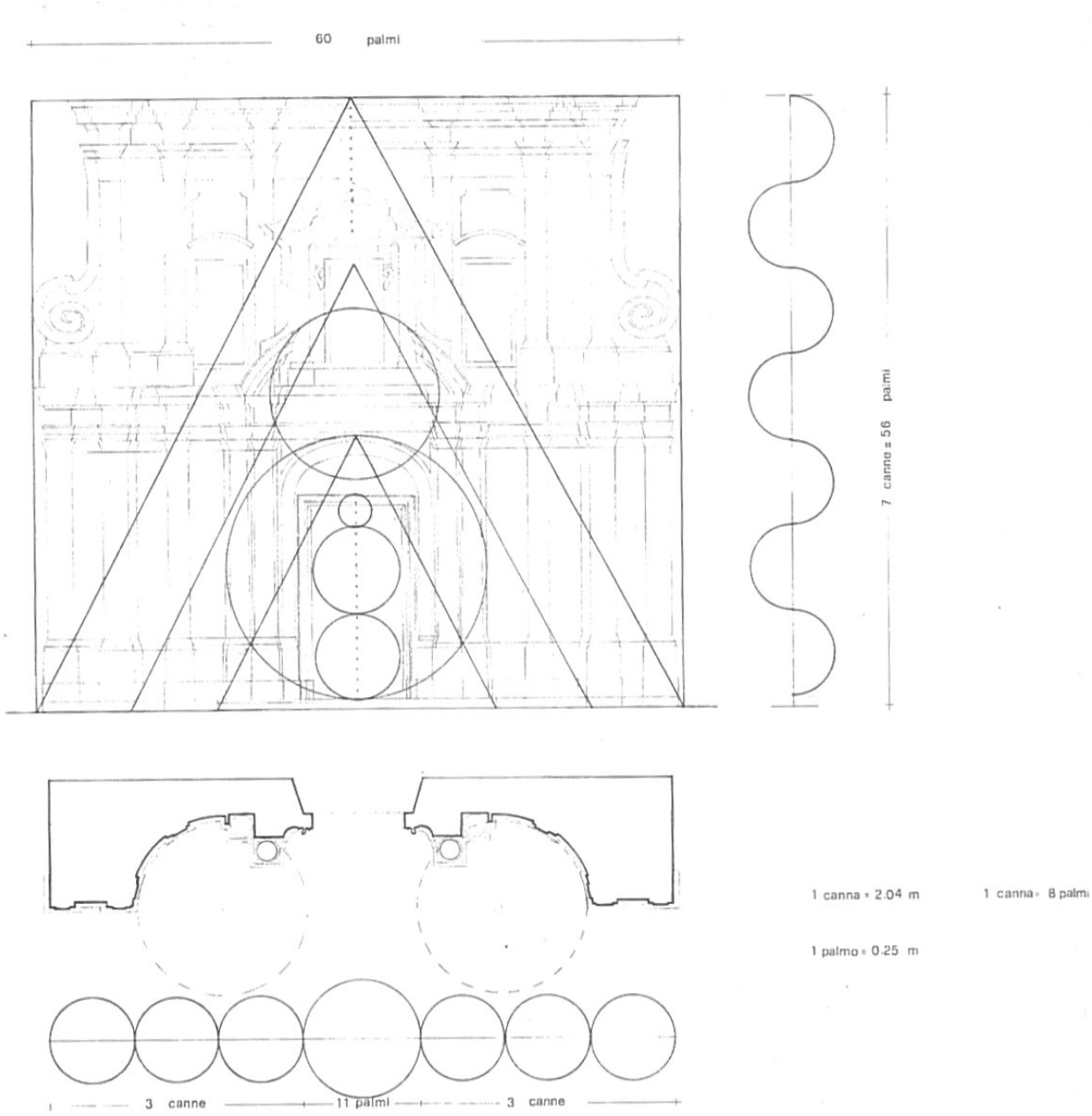


Fig. 8. Church of Santa Maria dell'Ammiraglio, metrological - proportional analysis (diagram by the A., 1987).

Analysis of masonry

Another aspect to be examined in depth in order to understand the architectures is the study and the analysis of the masonries, classifying in tables the complex stratifications so as to obtain a chronology of it.

Particular attention is paid to the studying, the surveying and analysing of the various masonries constituting the existence being examined. The analysis begins with the identification of the materials constituting the masonries constructed in the different historical periods the architectural complex being examined was constructed in.

On the basis of the architectural survey of the whole of the edifice, the different masonries present are analysed and individual portions of it are recorded (areas of 1.00 m x 1.00 m on a scale of 1:10). Specific tables are drawn up to summarise the main features: the composition, the constituent materials, the type of masonry the size of the stones, the size and characteristics of the mortar joints, etc.

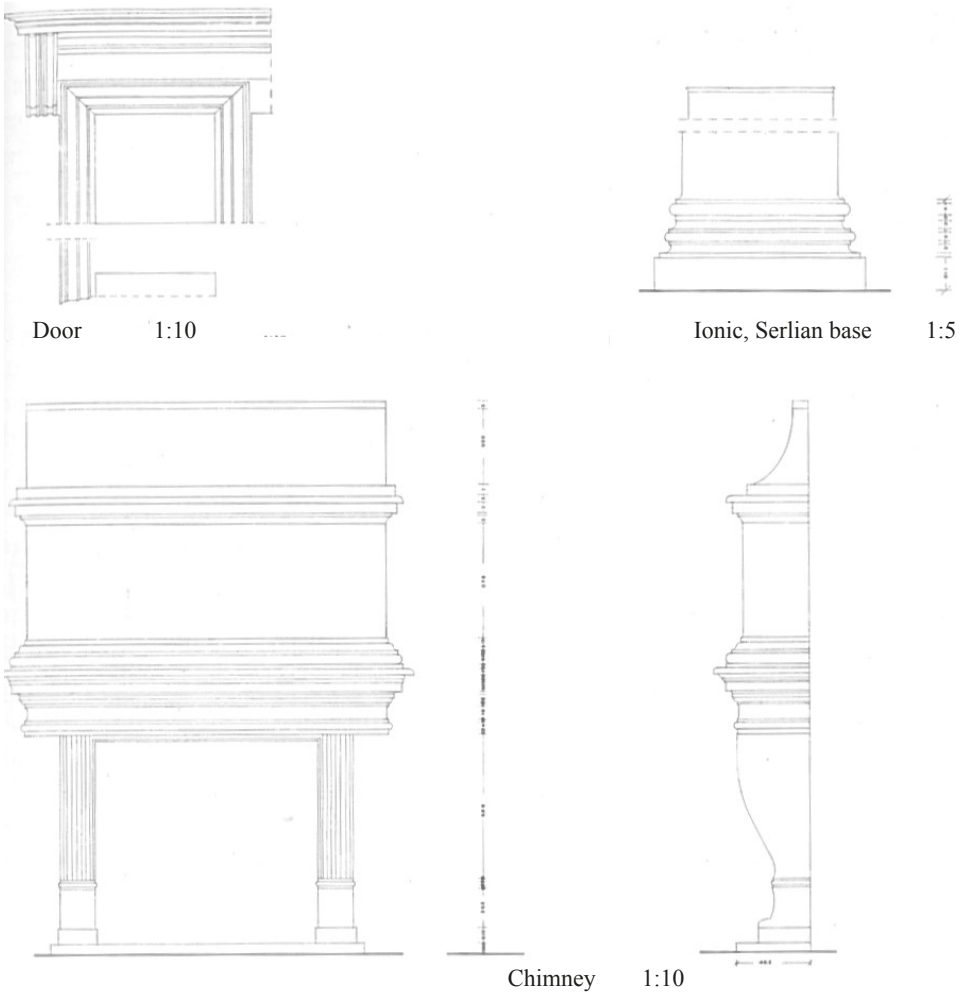


Fig. 9. Landshut (München), Stadtresidenz, Sala italiana, *piano nobile*, the fireplace and details of a door and of a Ionic base (survey by the A., 1986 and 1989).

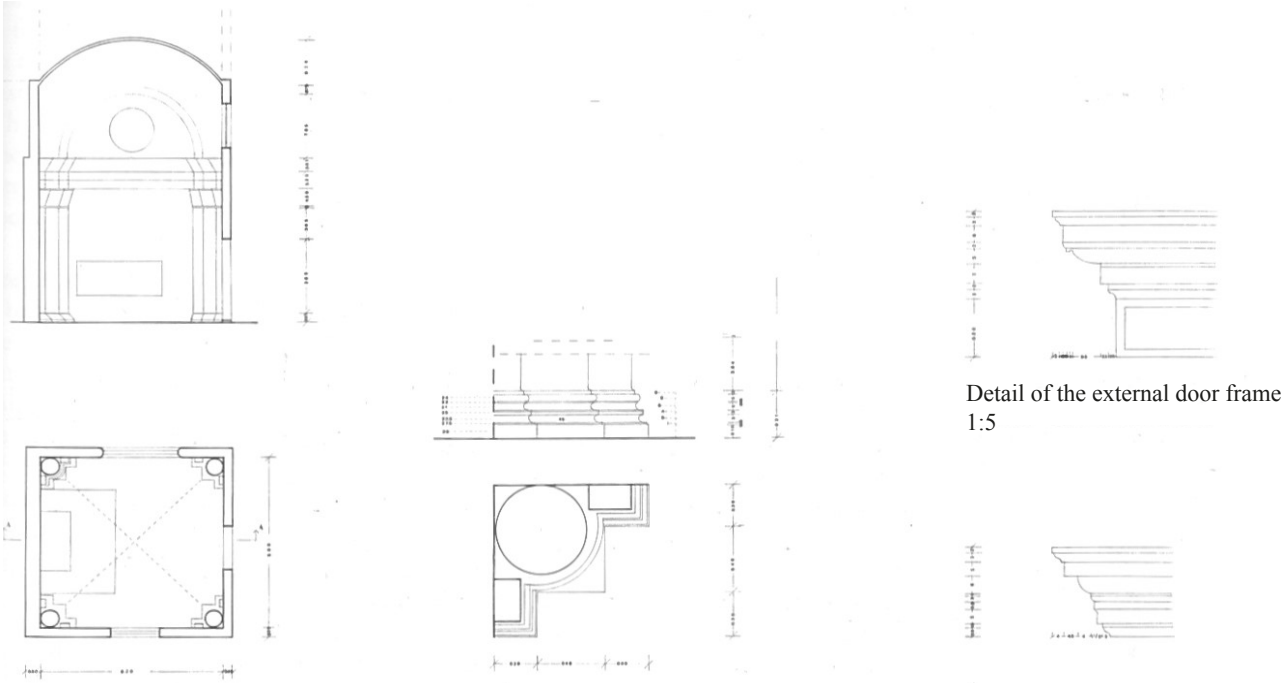


Fig. 10. Landshut, Stadtresidenz, the chapel, architectural surveys (survey by the A., 1986 and 1989).

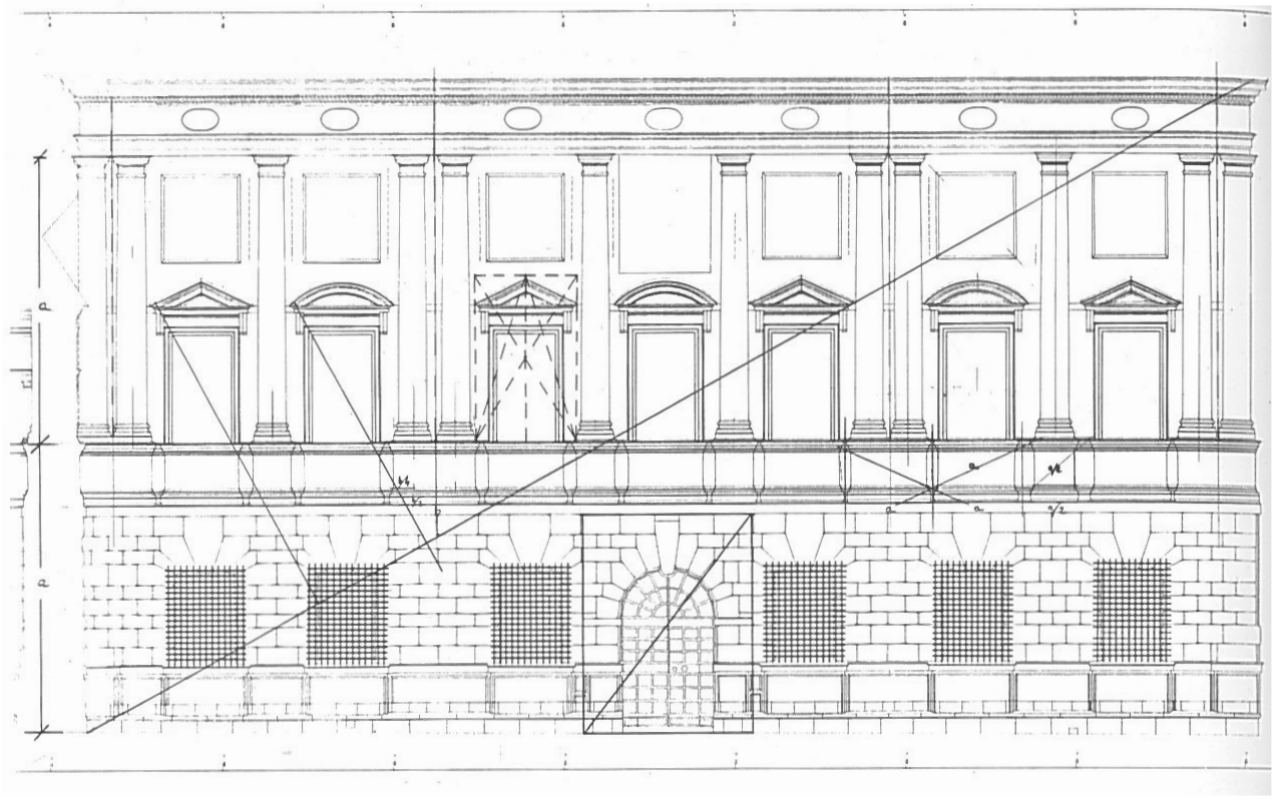


Fig. 11. Landshut, Stadtresidenz, façade on Landgasse, proportional reflections (diagrams by the A., 1986 and 1989).

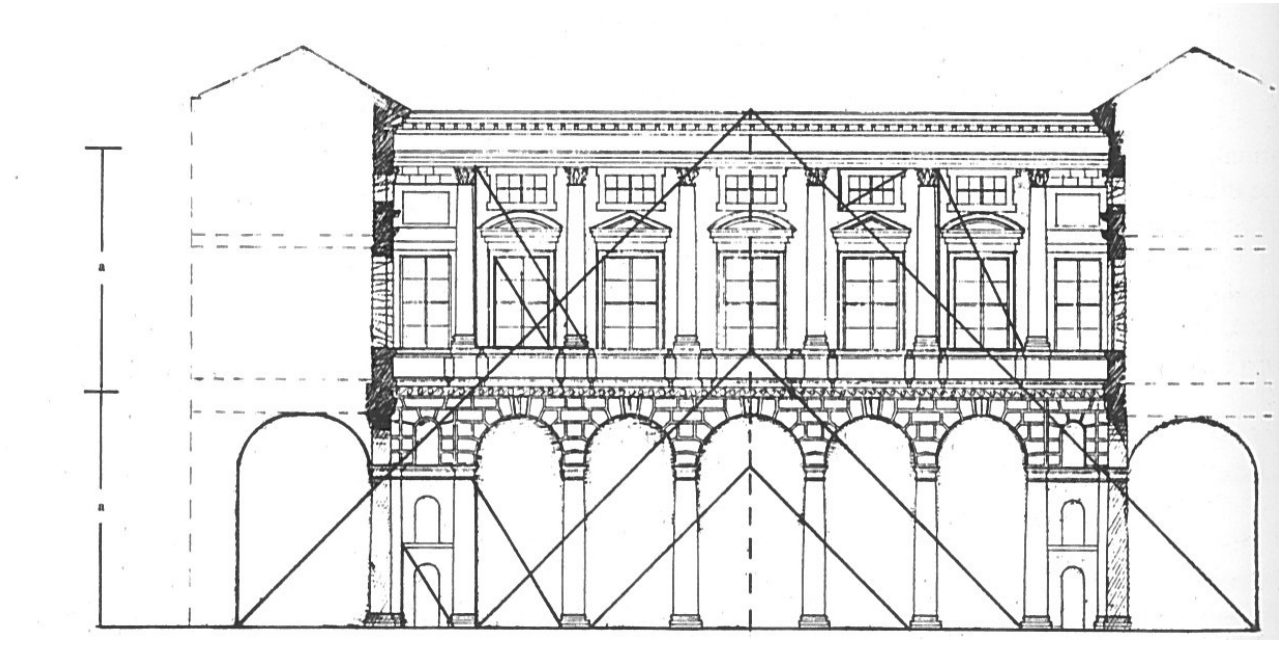


Fig. 12. Landshut, Stadtresidenz, courtyard, proportional reflections (diagrams by the A., 1986 e 1989).

The analysis will therefore consist in the identification of the various masonries present and their period of construction. Thus it will be possible, through the method of stratigraphic archaeology, to read the various wall structures in elevation (6).

The theme of decorations

The study of the decorations inside the monument allows, through their understanding, be they, for example, a series of mosaics, mural paintings, frescoes, oil, tempera, etc., an enrichment through the understanding of the constructive events linked to episodes of faith, art and history. It will also be important to study any superpositions, repaintings, etc., that the various artistic expressions may have produced in the past.

If we once again consider the Martorana, we can find in just a few square meters iconographic schemata meeting theological and liturgical criteria, with respect for proportioned surfaces and with rigorous symmetry between the various icons.

At first, George of Antioch founds the church, entrusting it to the Byzantine clergy. The vertical dimension of the ascension towards the heavens is favoured, the christian turns his gaze toward the Pantocrator Christ, dominating the scene from the dome.

Later, the Benedictine community of the Martorana gains use of the church from Alfonso the magnanimous and Pope Eugene IV.

The current architectural organism shows this impact between the two very different cultural and religious worlds, the Graeco byzantine and the Western Latin, with a vision of reality that is completely Benedictine, monastic and feminine. The 17th-18th century pictorial decoration imitates the schema of the mosaic decoration with biblical scenes on the walls and in the intrados ovals. The imitation is formal, some saints are reproposed in the spirit of the 18th century. The saints in the intradoses obey a rigorous hagiographic synthesis and bear homage to the tastes of popular worship.

Thus, from some 1500s frescoes, covered up in the 18th century, one moves on to the exuberance of the slabs of multicoloured inlaid and "*tramischi*" marbles and perfectly dressed stone paraments, owed to the interventions carried out in the second half of the 19th century (7).

Spolia and reemployed

The reemployed of existing elements will be an eventual in-depth examination to be carried out if the building possesses such artistic expressions.

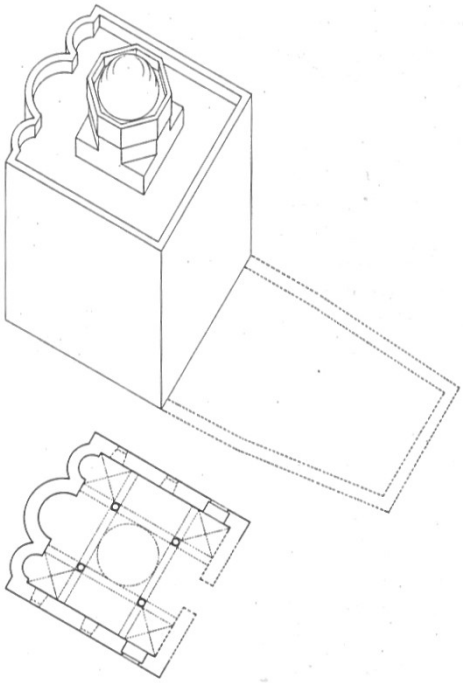
Such re-use can be found in all genres of art, from architecture to sculpture, to the minor arts.

In reemployed, the ancient element, from being purely antiquarian, becomes a historical object and, because of this, it must also be evaluated from a historical perspective. Rosario Assunto stated, regarding reuse, how the "habit of reusing spolia materials is born out of the wish to inject into new constructions the strength and the glory of the ancient" (8).

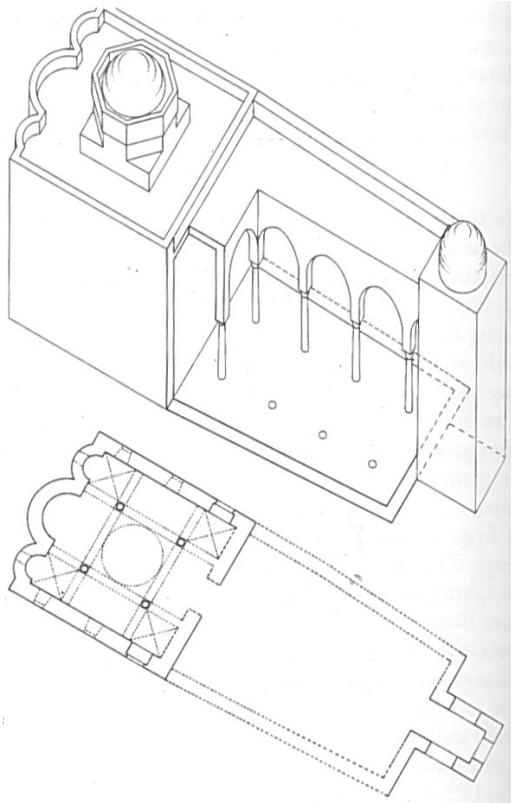
Comparisons: analogies and differences

The study is aimed at understanding the cultural references. These can be carried out via comparisons with constructions in the same geographic area pertaining to prior and coeval realisations, or even by the same author.

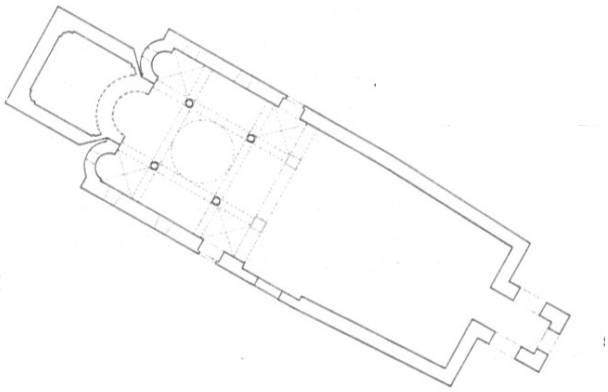
Some graphic representations of the historic processuality of the architectural organism are presented to show the synthesis of monument in time.



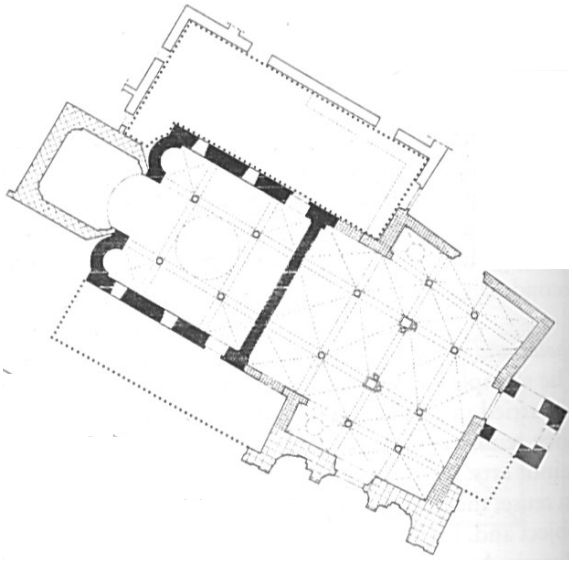
The initial core, 1143



The church at the end of 12th century with the bell tower, the first two floors and the courtyard.



The addition at the end of 16th century (1588). The apsis breakthrough and the construction of the chapel (1683-86).



Synthesis of the church's construction phases:

- INITIAL CORE 12nd CENTURY
- ADDITIONS OF 15th-16th CENTURIES
- ADDITION OF THE SECOND HALF OF 16th CENTURY
- BAROQUE FAÇADE
- INTERVENTIONS OF G. PATRICOLO

Fig. 13. Church of Santa Maria dell'Ammiraglio, synthesis of the monument over time (diagrams by the A., 1985-86).

One can also carry out a more in-depth examination through the constructive investigation, highlighting analogies and differences. In the comparative analyses of these architectures, one can include plans, elevations or some constructive and decorative details.
Once again, one should keep in mind the fundamental importance of the contribution of the research in libraries and archives previously mentioned. This section could be open to continuous study and in-depth examination in subsequent courses. From the studies carried out on various architectural cases from different periods of the history of architecture, always through precise surveys, bibliographic and archival investigations and the continuous interrogation of the architectural organism, just to recall a few episodes, it was found that in the case of the Assunta in Sermoneta, there was a constant presence of those features of solid continuity in the masonry and plain simplicity, in the architecture of Cistercian derivation. The clear analogies emerged between the Assunta in Sermoneta and the San Liberatore alla Majella, or San Pietro ad Oratorium in Capestrano, and again with Santa Maria della Libera in Aquino or San Domenico in Isola Liri, and lastly with San Pietro della Ninfa (9).
For an episode from the 1500s, the Landshut Residence has reemerged from oblivion near Munich. It was shown how, for the realisation of this Renaissance palace, the commissioning body and the workforce must have been familiar with the architecture of Giulio Romano, possibly even suggesting a paternity of an earlier project, and again the constant application of some precise references to Sebastiano Serlio, in particular for the chapel of the palace, which approaches the Ghisilardi Chapel in Bologna (10).
Lastly, with regard to the Benedictine Monastery of San Martino delle Scale in Sicily, near Palermo, and its late-18th century additions, affinities have been found with some Vanvitellian architectures and the continuity of the great Benedictine architecture of the European Baroque (11).

Reading of the architectural organism: synthesis of the monument in time
This consists in a series of graphic representations synthetically illustrating the historic processuality of the architectural organism starting from the documentation collected in the historical research and the survey.
From the registries previously drafted in the form of historical reports, we proceed on the basis of the existing bibliography, the archival sources, the iconographic repertoires and the analyses carried out, to the development of hypotheses on the additions and the stratifications of the architectural organism over time. The long route from the founding to the current state will be examined by placing in evidence the various constructive phases in the various historical periods. It may be stated that this section, due to the continuous in-depth examinations, could appear to be unlimited, but this will demonstrate the increasing passion and enthusiasm towards research that one tries to stimulate in young students (Fig. 13).

Analysis of the deterioration and the programme of interventions
The third phase consists in technical knowledge and intervention proposals.

Analysis of the current state
A dominating aspect in the understanding of the analysis of the current state of the existences architecture is that of the appropriate reading and identification both of the disturbances in the various structures and the deterioration of the individual materials.

For the disturbances in the structure, it will be opportune to initiate the familiarisation of the overall systematic description of the cracks present (12).
The operation is verified from the load-bearing elements using methods of science and building technology, where calculated tensions are compared with those of reference.
The analysis of the loads and the calculation of the tensions are data to be uniformly surveyed in the horizontal sections of any towers or bell towers. The importance should be kept in mind of identifying the various specific gravities of the materials constituting the construction, proceeding with the calculation of the base areas for the individual materials, calculating the volume, the unitary load and, lastly, the weight. The elementary vertical force (FVi) and the horizontal seismic force (FHi) will also be introduced.
For the calculation of the tensions, one will have to calculate the values of the σ, the tensions of the vertical loads of the τ, the thickness of the masonry, afterwhich the slenderness λ is calculated. Lastly, one will need to introduce the coefficient of reduction φ, V (from the technical norms for the planning, execution and testing of masonry edifices and for their consolidation), and the eccentricity of a tower or bell tower will need to be obtained (Figs. 14, 15, 16).

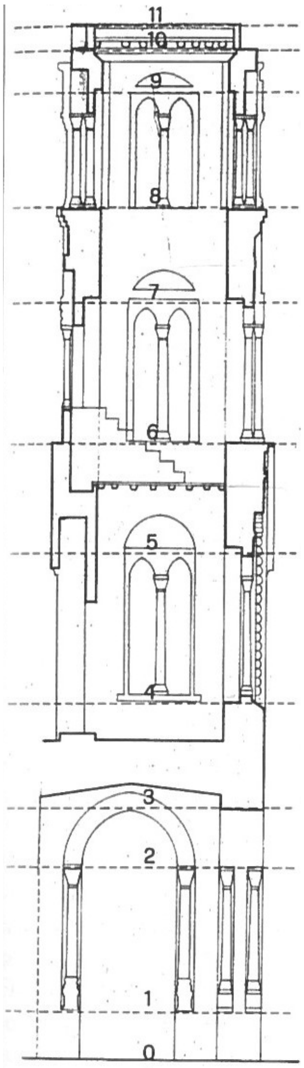
Analysis of the deterioration
Specific graphic representations are expected on the structural reading and the overall systematic description of the cracks present, illustrated with attention for graphic comprehensibility. Special care should be had in the normalisation of the graphic representations with the apposite conventions, which have been codified in the Normal Lexicon (13). On the basis of the architectural survey and through inspections and detail photographs, the various typologies and disturbances identified in the surfaces and the structures are surveyed and reported graphically. More in particular, for the surfaces, it is deemed that the problem of the maintainence "of the external façades of historical edifices, that is, in the majority of cases,... require, first of all, the understanding of such events as veritable restoration operations, seen as they are works which in any case affect the material consistency and the form of the monument... Therefore the... colour should not repeat the original, or one of the others which followed, but rather construct a critical addition, that is to say, the only contribution today's historical-artistic culture can make toward the solution of the issue" (14).
Lastly, at the same time, the operative instructions will have to be supplied for the treatment of the existing surfaces which are also subject to environmental deterioration, such as the consistency of ancient and modern mortars (15).
The causes will have to be identified that have caused the identified phenomena, through the various analysis prescribed by diagnostic procedure.
Students should also remember the in-depth examinations to be conducted through laboratory analyses (16).
This phase starts with chemical analyses, aimed at classifying the components of a masonry, especially those of the mortar. Next come the tests aimed at defining the physical characteristics of a material present.
Then we proceed with the mechanical characteristics, conducted on the materials, particularly to determine the coefficients of resistance and deformability. One can also initiate analyses of the current state, also simulating proper worksite investigations with the aid of the instruments provided. For example, one can measure the tensile state of the chains, the tension, etc...

Loads analysis

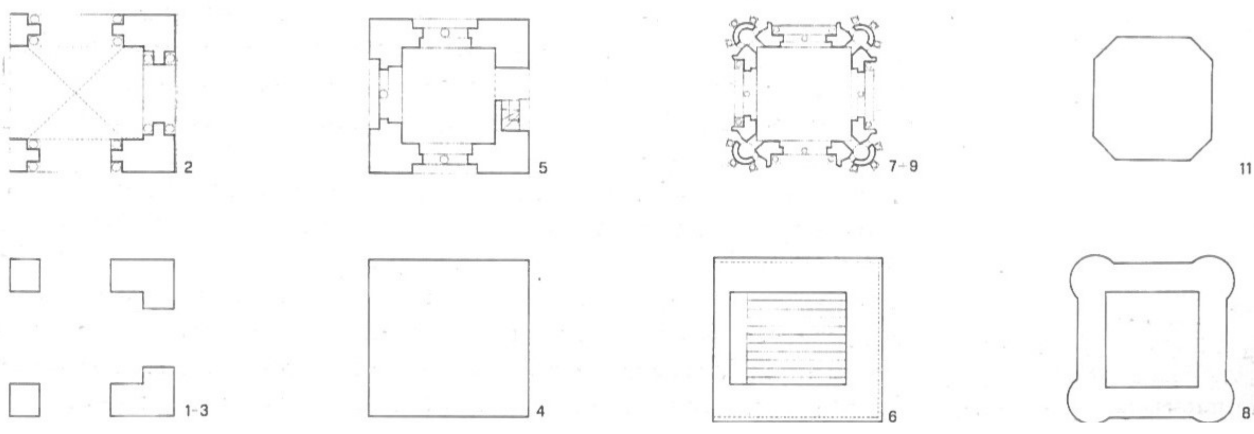
N		A	hi	Vi	γi	Pi	FVi/ΣFVo	FHi	li	FHi·li	Yi	Fi·FHi·yi	Mi	
11	M	5,46	0,55	3,00	2500	7500	18336	1284	22,40	28761	1,929	2477	2477 · 0,275 = 681	681
	S	18,06	—	—	600	10836	18336							
10	M	12,96	1,05	13,61	2200	29938	29938	2096	21,60	45274	1,860	3899	2477 · 1,325 + 3899 · 0,525 = 5329	5329
							48274							
9	M	4,49	2,40	10,78	2200	23716	26236	1837	19,90	36556	1,743	3167	2477 · 3,725 + 3899 · 2,925 + 3167 · 1,20 = 24408	24408
	C	0,42	2,40	1,01	2500	2520	74510							
8	M	12,96	2,20	28,51	2200	62722	68546	4799	17,65	84685	1,520	7293	2477 · 5,924 + 3899 · 5,125 + 3167 · 3,40 + 7293 · 1,10 = 53586	
	S	7,28	—	—	800	5824	143056							
7	M	4,49	2,85	12,80	2200	28160	31185	2183	15,00	32745	1,291	2818	2477 · 8,775 + 3899 · 7,975 + 3167 · 6,25 + 7293 · 3,95 + 2818 · 1,425 =	
	C	0,42	2,85	1,21	2500	3025	174241							105322
6	M	14,42	2,50	36,05	2200	79310	85806	6006	12,35	74176	1,063	6384	2477 · 11,275 + 3899 · 10,475 + 3167 · 8,75 + 7293 · 6,45 + 2818 · 5,925 + 6384 ·	
	S	8,12	—	—	800	6496	260047						1,25 =	162387
5	M	7,72	3,20	24,70	2200	54340	58690	4108	9,50	39026	0,818	3360	2477 · 14,475 + 3899 · 13,675 + 3167 · 11,95 + 7293 · 9,65 + 2818 · 9,125 + 6384 ·	
	C	0,54	3,20	1,74	2500	4350	318737						4,45 + 3360 · 1,60 =	251020
4	M	22,54	2,30	51,84	2200	114048	116484	8154	6,80	55447	0,585	4770	2477 · 16,775 + 3899 · 15,975 + 3167 · 14,25 + 7293 · 11,95 + 2818 · 11,425 + 6384 ·	
	S	8,12	—	—	300	2436	435221						6,75 + 3360 · 3,90 + 4770 · 1,15 =	324079
3	M	5,85	1,20	7,02	2200	15444	15444	1081	5,00	5405	0,430	465	2477 · 17,975 + 3899 · 17,175 + 3167 · 15,45 + 7293 · 13,15 + 2818 · 12,625 + 6384 ·	
							450665						7,95 + 3360 · 5,10 + 4770 · 2,35 + 465 · 0,60 =	365332
2	M	4,60	3,20	14,72	2200	32384	36734	2571	2,90	7971	0,250	688	2477 · 21,175 + 3899 · 20,375 + 3167 · 18,65 + 7293 · 16,35 + 2818 · 15,825 + 6384 ·	
	C	0,51	3,20	1,74	2500	4350	487399						11,15 + 3360 · 8,30 + 4770 · 5,55 + 465 · 3,80 + 688 · 1,60 = 474775	
1	M	5,85	1,20	7,02	2200	15444	15444	1081	0,60	649	0,092	56	2477 · 22,375 + 3899 · 21,575 + 3167 · 19,85 + 7293 · 17,55 + 2818 · 17,025 + 6384 · 12,35 +	
							502843						3360 · 9,50 + 4770 · 6,75 + 465 · 5,00 + 688 · 2,80 + 56 · 0,60 = 519589	
0	M	26,50	1,00	26,50	2200	58300	58300	35379		610700		35357		
							561143							

Calculation of tensions

N	Pkg (carico ver.)	A (m²) (sup. res.)	σv (kg/cm²) (ten. ver. v.)	Ro (m) (lung. l. int.)	τ (m) (spes. mur.)	λ (snellezza)	φv	σvλ	M (kg m)	e (m) (eccentricità)	Jxo	Jyo	Wx1/y	Wx2/y	Wy1/	Wy2/y	σo	σT1	σT2
11	18336	5,46	0,34	0,55	0,40	1,4	99,1	0,34	681	0,04	14,22	13,69	1,06	1,06	1,09	1,09	—	0,34	0,34
																		0,34	0,34
10	48274	12,96	0,37	1,05	0,60	1,7	99	0,37	5329	0,11	30,93	28,53	0,97	0,97	0,96	0,96	—	0,37	0,37
																		0,37	0,35
9	74510	4,49	1,66	2,40	0,65	3,7	97,8	1,70	24408	0,33	10,00	8,75	0,91	0,94	0,85	0,85	0,64	1,30	1,02
													2,45	2,45	2,30	2,30	0,64	1,02	2,30
8	143056	12,96	1,10	2,20	0,45	2,6	98,4	1,12	53586	0,37	30,93	28,55	0,97	0,97	0,96	0,96	0,43	1,53	0,67
													2,43	2,45	2,30	2,30	0,43	0,67	1,53
7	174241	4,49	3,88	2,85	0,65	4,4	97,4	3,98	105322	0,60	10,00	8,75	0,91	0,91	0,85	0,85	2,77	6,65	1,11
													2,45	2,45	2,30	2,30	2,77	1,11	6,65
6	260047	14,42	1,80	2,50	0,95	2,6	98,4	1,83	162387	0,62	39,41	34,44	1,12	1,12	1,04	1,04	1,08	2,88	0,72
													2,45	2,43	2,30	2,30	1,08	0,72	2,88
5	318737	7,72	4,13	3,20	0,95	3,4	98	4,21	251020	0,79	21,78	22,55	1,30	1,32	1,27	1,27	8,56	6,49	1,57
													2,46	2,44	2,30	2,30	8,56	1,57	6,49
4	435221	22,54	1,93	2,30	0,95	2,4	98,6	1,96	324079	0,74	45,10	39,75	0,82	0,82	0,77	0,77	1,87	3,80	0,06
													2,45	2,45	2,30	2,30	1,87	0,06	3,80
3	450665	5,85	7,70	1,20	0,35	1,3	99,2	7,76	365332	0,81	16,86	18,23	0,93	1,39	1,36	1,36	6,69	14,39	1,01
													3,09	1,81	2,30	2,30	3,92	3,78	11,62
2	487399	4,60	10,60	3,20	0,95	3,4	98	10,82	474775	0,97	14,40	16,20	0,97	1,88	1,40	1,40	10,60	21,20	0,00
													3,21	1,69	2,30	2,30	5,57	5,03	16,17
1	502843	5,85	8,60	1,20	0,35	1,3	99,2	8,67	519589	1,03	16,86	18,23	0,93	1,39	1,36	1,36	—		
													3,09	1,81	2,30	2,30	5,58	3,02	14,18
0	561143	26,50	2,12	—	—	—	—	—	537267	0,96	62,03	55,21	0,88	0,82	0,83	0,83			
													2,65	2,66	2,50	2,50			



Cross section



Horizontal sections 1:50

Fig. 14. Church of Santa Maria dell'Ammiraglio, analysis of the current state, the bell tower (survey and tables by the A., 1985-86).

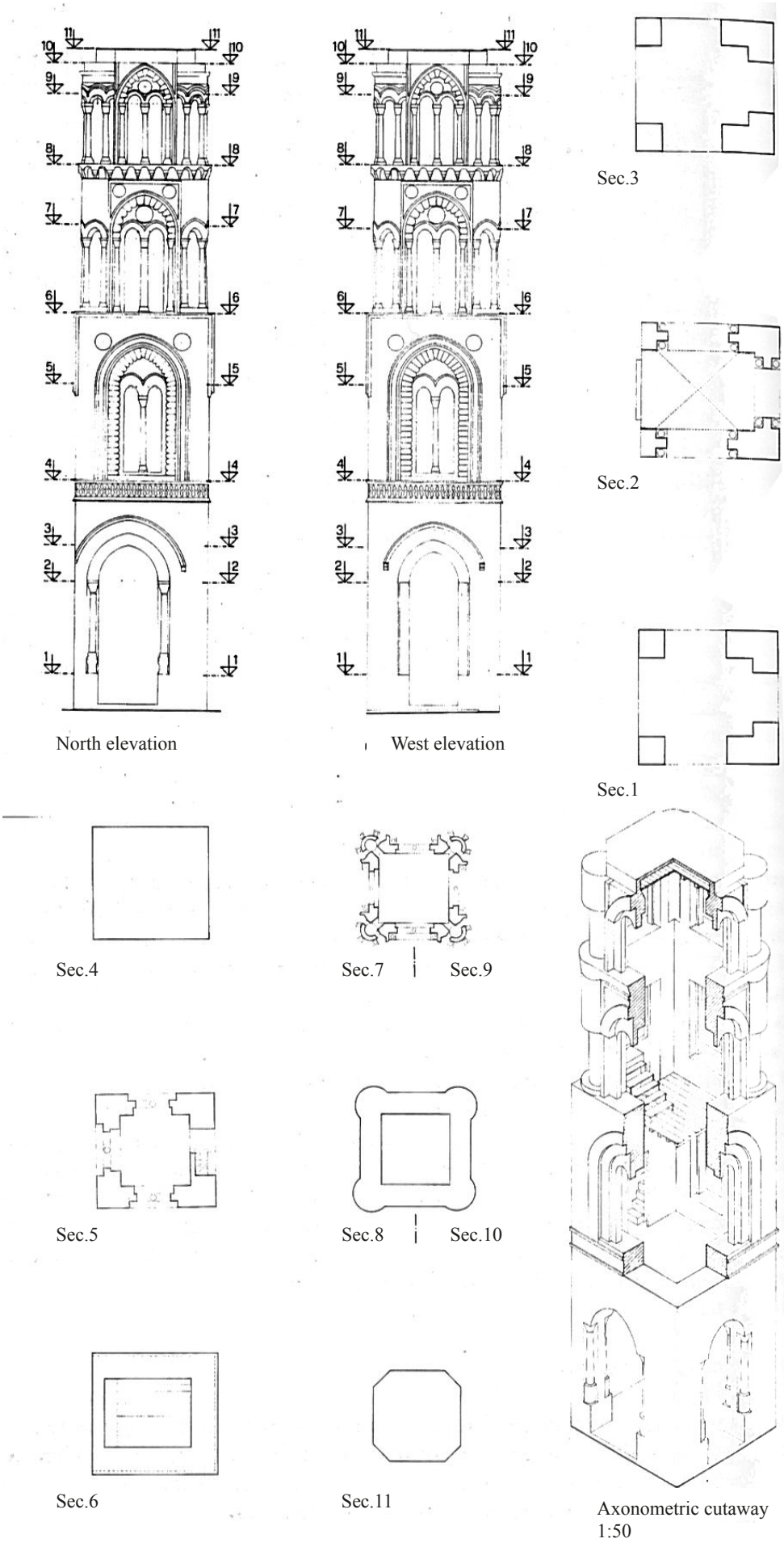


Fig. 15. Church of Santa Maria dell'Ammiraglio, analysis of the current state, the bell tower (survey by the A., 1985-86).

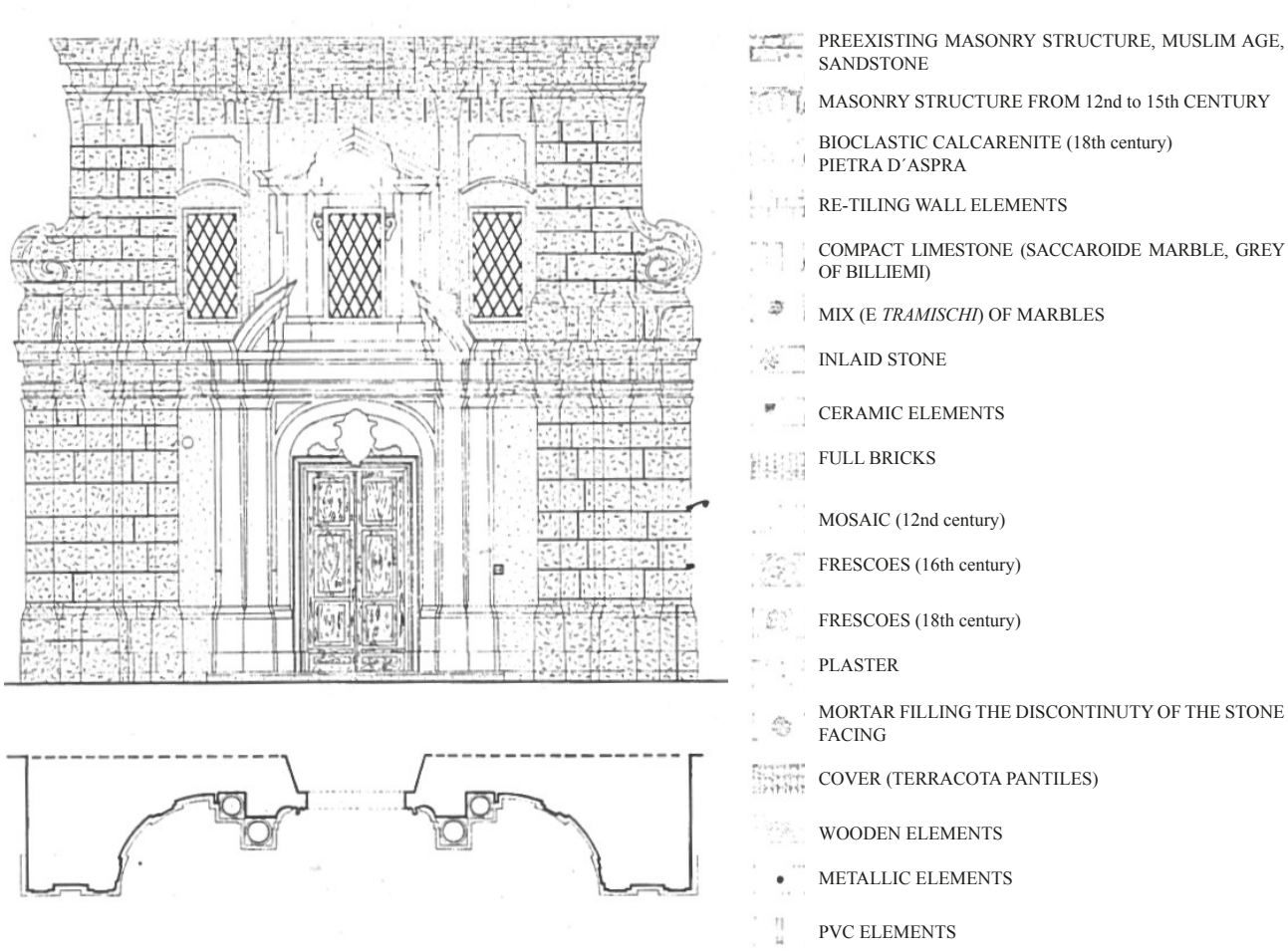
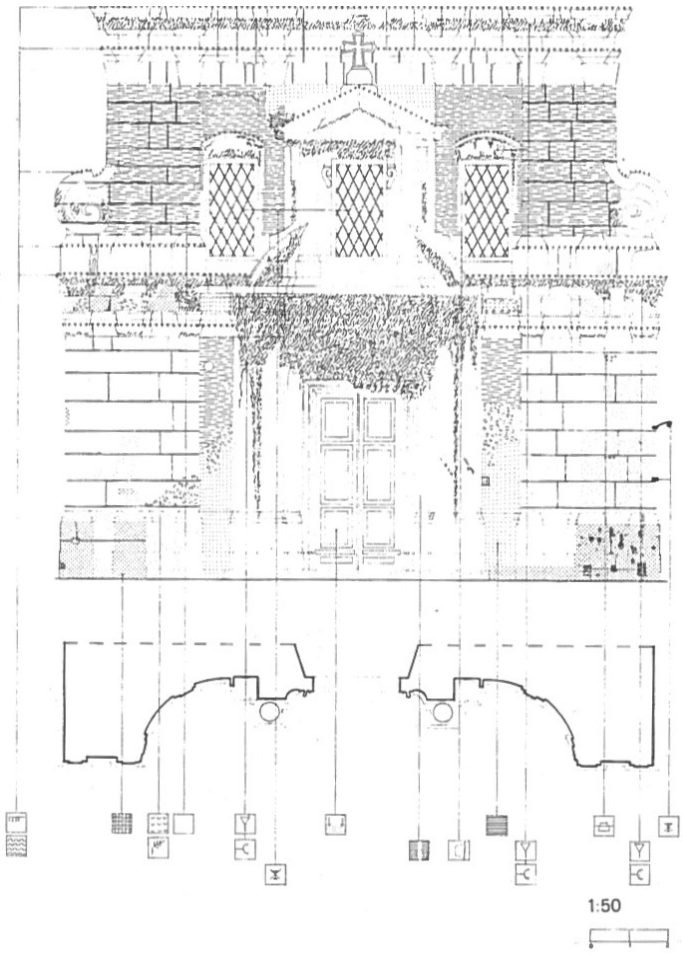


Fig. 16. Church of Santa Maria dell'Ammiraglio, analysis of the current state, analysis of the construction materials and finishings (survey by the A., 1985-86).

At the same time, students of the laboratory should gain proficiency with some instruments such as, for example, the deformometers, the flexometers, the humidty measuring device and also equipment such as georadars and flat jacks. Through the use of some of these tools provided at the laboratory, one should be able to understand and illustrate the system of cracks present and the state of humidity.
The illustration, or should one say the mapping of the humidity must be reported at least schematically on the architectural graphic representation.
As an illustrative case, one may think of an experience of study and practice carried out a few years ago in Florence, in concert with the Superintendence for Environmental and Architectural Properties and the city of Florence. The case is that of the "*Cappellone*" degli Spagnoli in Santa Maria Novella, in which the arisen humidity stretched over 2 metres in height. This anomalous phenomenon, it was found, was due, in part, to improper additions carried out in the adjacent locales. The other side of the wall was partly covered with tiles and hygiene facilities had been installed nearby and therefore a boiler room (Fig. 19).

Programme of interventions
The intervention proposals are derived from the survey of the state of the defects (deterioration of the materials and disturbances in the structures) and delineate the operational procedures essential to conserving the architectural property examined (cleaning, consolidation, protection, reintegrations).

Fig. 17. Church of Santa Maria dell'Ammiraglio, analysis of the current state, survey of the faults and proposal for interventions (survey and diagrams by the A., 1985-86 and 1987).



The Baroque façade

THE "DEFECTS" SURVEY

MASONRY, STONE MATERIALS

- BLACK ENCRUSTATIONS
- SUPERFICIAL DEPOSITS
- RUN-OFF / LEACHING
- EFFLORESCENCES
- REINTEGRATION SIMILAR MATERIALS
- REINTEGRATION DIFFERENT MATERIALS
- FISSURES
- FRACKING
- CERAMIC FRAGMENTS
- EROSION AND ABSENCE OF MATERIAL
- ALVEOLIZATION
- PITTING
- LACK OF MATERIAL, HOLES
- FALL OF INLAYING IN LAVA ROCKS
- METALLIC AND ORGANIC STAINS
- VEGETATION

PLASTERS

- EFFLORESCENCES
- REINTEGRATION DIFFERENT MATERIALS
- FISSURES
- SEPARATION EXTERNAL LAYER
- SEPARATION EXTERNAL AND MIDDLE LAYER
- " " " AND CONTACT
- SEPARATION TENDENCY EXTERNAL LAYER

PLASTERS, STONE MATERIALS

- HUMIDITY

THE INTERVENTIONS

CLEANING

- REMOVAL OF WEEDS
- APPLICATION OF BIOCIDE AND/OR HERBICIDE
- CLEANING WITH SORGHUM BRUSHES
- MECHANICAL REMOVAL, PLASTIC SPATULAS
- ATOMIZED WATER
- ELIMINATION OF METALLIC STAINS
- ELIMINATION OF METALLIC ELEMENTS
- SOLVENT GELATINOUS PASTE

CONSOLIDATION

- GROUND CONSOLIDATION
- FOUNDATIONS CONSOLIDATION WITH MICROPILES
- STRUCTURAL CONSOLIDATION
- FLOOR AND COVERING ELEMENTS CONSOLIDATION
- IMPREGNATION WITH ACRYLIC RESIN
- " " AND INERT MATERIAL

PROTECTION

- HUMIDITY BARRIER
- INSECTICIDE APPLICATION

REINTEGRATION

- ANCHORS APPLICATION OR REPLACEMENT
- GROUTING OF FISSURES WITH PLASTIC PRODUCTS
- RECONSTITUTION OF MASONRY COMPOSITION
- FIXTURES REPLACEMENT
- WATER DIPOSAL SYSTEM

COMPLETION ELEMENTS

- PLASTERS

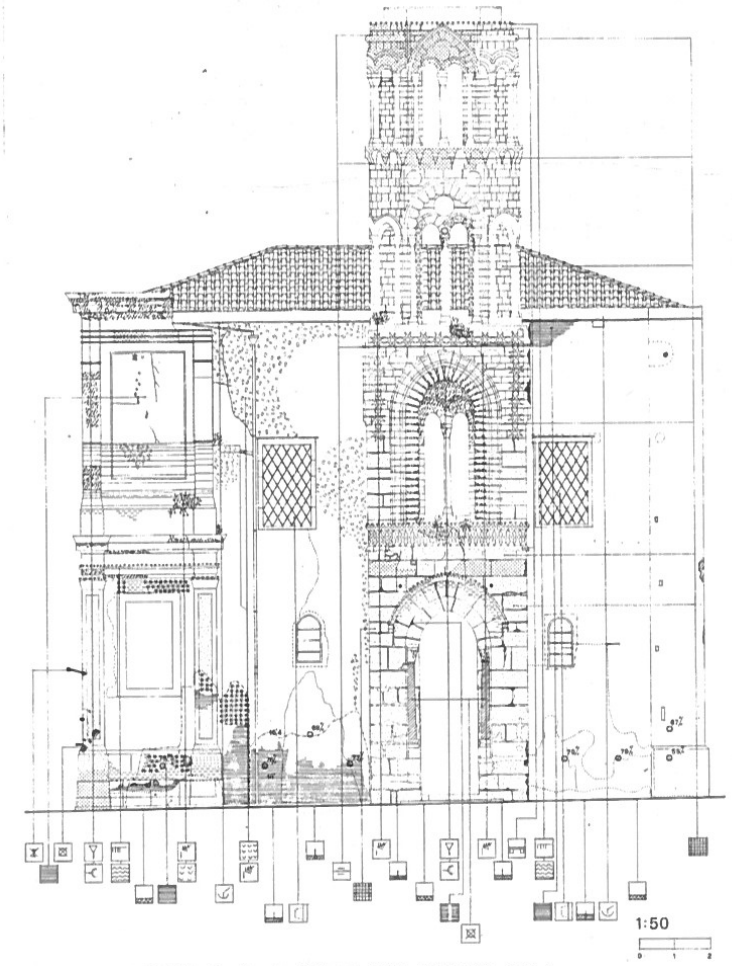


Fig. 18. Church of Santa Maria dell'Ammiraglio, analysis of the current state and proposal for the interventions (survey and diagrams by the A., 1985-86 and 1987).

The western façade

THE "DEFECTS" SURVEY

MASONRY, STONE MATERIALS

- BLACK ENCRUSTATIONS
- SUPERFICIAL DEPOSITS
- RUN-OFF / LEACHING
- EFFLORESCENCES
- REINTEGRATION SIMILAR MATERIALS
- REINTEGRATION DIFFERENT MATERIALS
- FISSURES
- FRACKING
- CERAMIC FRAGMENTS
- EROSION AND ABSENCE OF MATERIAL
- ALVEOLIZATION
- PITTING
- LACK OF MATERIAL, HOLES
- FALL OF INLAYING IN LAVA ROCKS
- METALLIC AND ORGANIC STAINS
- VEGETATION

PLASTERS

- EFFLORESCENCES
- REINTEGRATION DIFFERENT MATERIALS
- FISSURES
- SEPARATION EXTERNAL LAYER
- SEPARATION EXTERNAL AND MIDDLE LAYER
- " " " AND CONTACT
- SEPARATION TENDENCY EXTERNAL LAYER

PLASTERS, STONE MATERIALS

- HUMIDITY

THE INTERVENTIONS

CLEANING

- REMOVAL OF WEEDS
- APPLICATION OF BIOCIDE AND/OR HERBICIDE
- CLEANING WITH SORGHUM BRUSHES
- MECHANICAL REMOVAL, PLASTIC SPATULAS
- ATOMIZED WATER
- ELIMINATION OF METALLIC STAINS
- ELIMINATION OF METALLIC ELEMENTS
- SOLVENT GELATINOUS PASTE

CONSOLIDATION

- GROUND CONSOLIDATION
- FOUNDATIONS CONSOLIDATION WITH MICROPILES
- STRUCTURAL CONSOLIDATION
- FLOOR AND COVERING ELEMENTS CONSOLIDATION
- IMPREGNATION WITH ACRYLIC RESIN
- " " AND INERT MATERIAL

PROTECTION

- HUMIDITY BARRIER
- INSECTICIDE APPLICATION

REINTEGRATION

- ANCHORS APPLICATION OR REPLACEMENT
- GROUTING OF FISSURES WITH PLASTIC PRODUCTS
- RECONSTITUTION OF MASONRY COMPOSITION
- FIXTURES REPLACEMENT
- WATER DIPOSAL SYSTEM

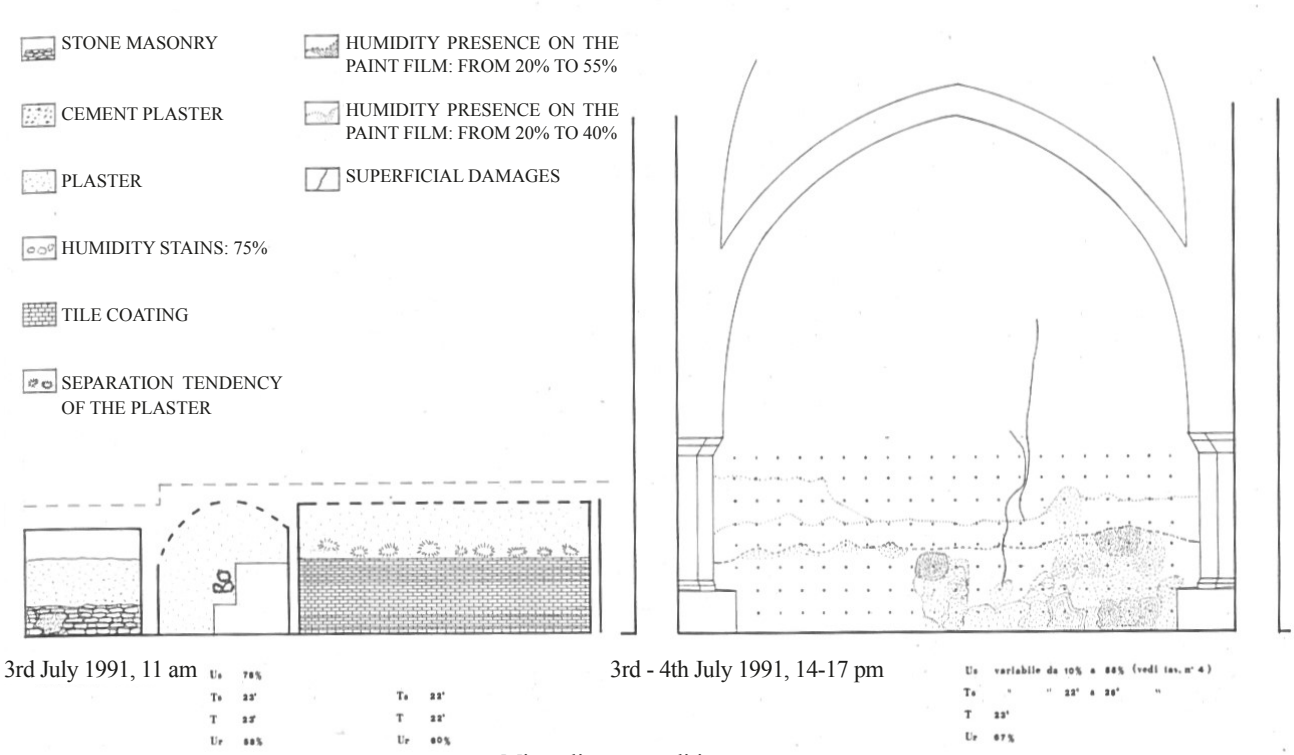
COMPLETION ELEMENTS

- PLASTERS

The intervention means to adhere to the appropriate methodological criteria of current restoration. Thus, one takes the line of conservation critique with respect for the reality of the architecture as has been handed down to us through the centuries. Knowledge of the organism and our critical judgement will guide the phases of the project.
The critical-conservative line stresses the compatibility of materials, a substantial minimal intervention, a potential reversibility, but at the same time asserts the features of durability and authenticity. Contemporary insertions must be recognisable to ease the distinguishability of the origin from other additions.
As another illustrative case, see the intervention carried out by Giuseppe Zander on the façade of St. Peter's between 1984 and 1985 (17).
A subsequent episode of less importance, but in the same cultural approach, is that carried out by myself on Palazzo Roverella in Ascoli Piceno (18).
The planning phase requires other specific graphic representations, such as, for example, the scheme of water drainage, which is meant to highlight risk areas affected by the various types of humidity (19).
Another, study concerns non-invasive tests, to obtain a picture of the consistency also of structures and/or of surfaces not immediately visible.
On the basis of the graphical mapping of the deterioration phenomena identified and on the basis of the analysis of the causes of these, we move on to the restoration project.
The proposed intervention will concern both the conservation of the surfaces and the structural consolidation of the architectural organism, dedicating much attention to the issue of its use. In some episodes, in which the architectural organism manifests problems of stability, these are tackled, trying to propose adequate solutions compatible with the architectural reality (Fig. 20). Where the existing wall has plaster finishings and paint, a programme of restoration is planned with the specific treatment of the surfaces (Figs. 17, 18, 21).
Lastly, the critical spirit of the project proposals is to be made appreciable in the graphic representations, so one can graphically render, for the surfaces, for example, the three operational trends in which the restoration can be distinguished. A first representation showing an intervention aimed at the reintegration of the image of long ago, a second showing the current trend of pure conservation, a third depicting the critical-conservative proposal, that which is most respondent to the themes of the course.

Liturgical adaptation.
Should the student have to prepare a church restoration project, it is deemed essential to elaborate a study for the liturgical adaptation, according to the current attitudes in liturgy, *semper reformanda* (20).
For the fruition of the Eucharist, one must tackle and solve the issues relative to the insertions of the altar, the ambo, the seat and the baptismal font, if one is to intervene on a parish church. Furthermore, the issues relative to illumination systems, security and climate control should not be underestimated.

Museal conversion
One may also develop project solutions for museal conversions, be they permanent or temporary, with the attribution of new, compatible uses of architectural and archaeological properties, all in the respect of the expressive potential of the existing architecture (21).
The role of museography in conservation interventions is insisted on. The use of existing structures for current functions is one of the cornerstones of heritage



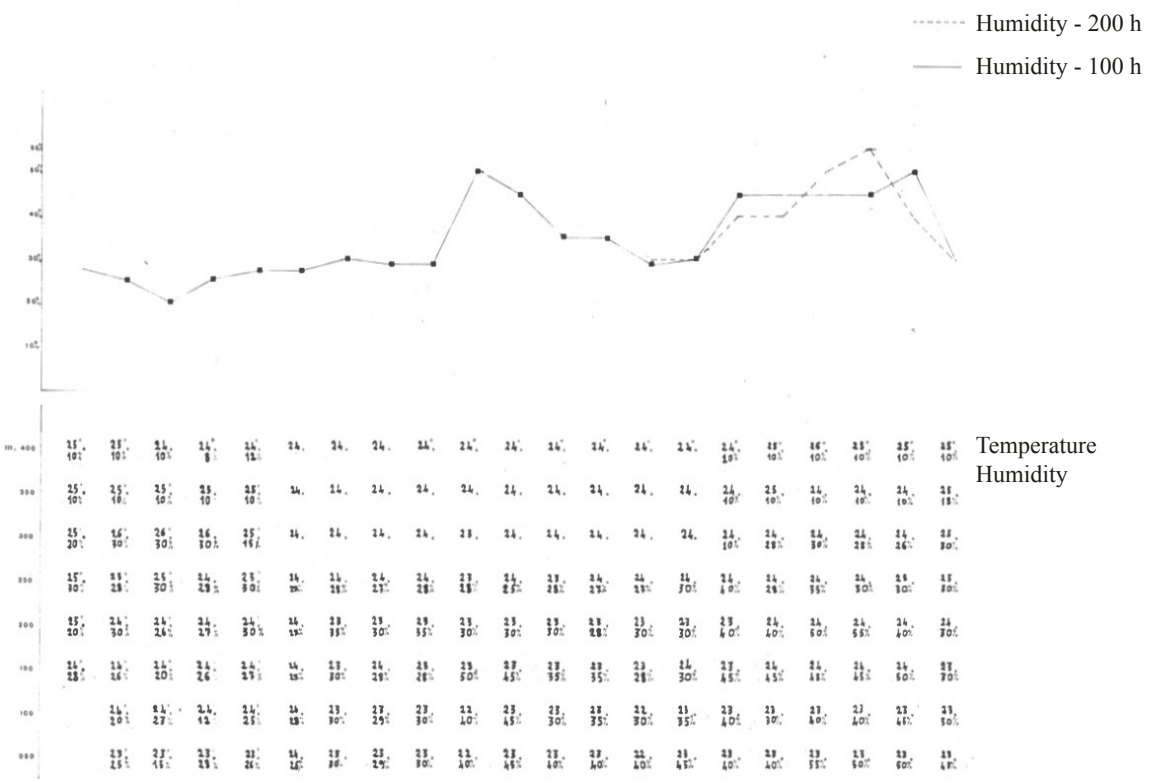
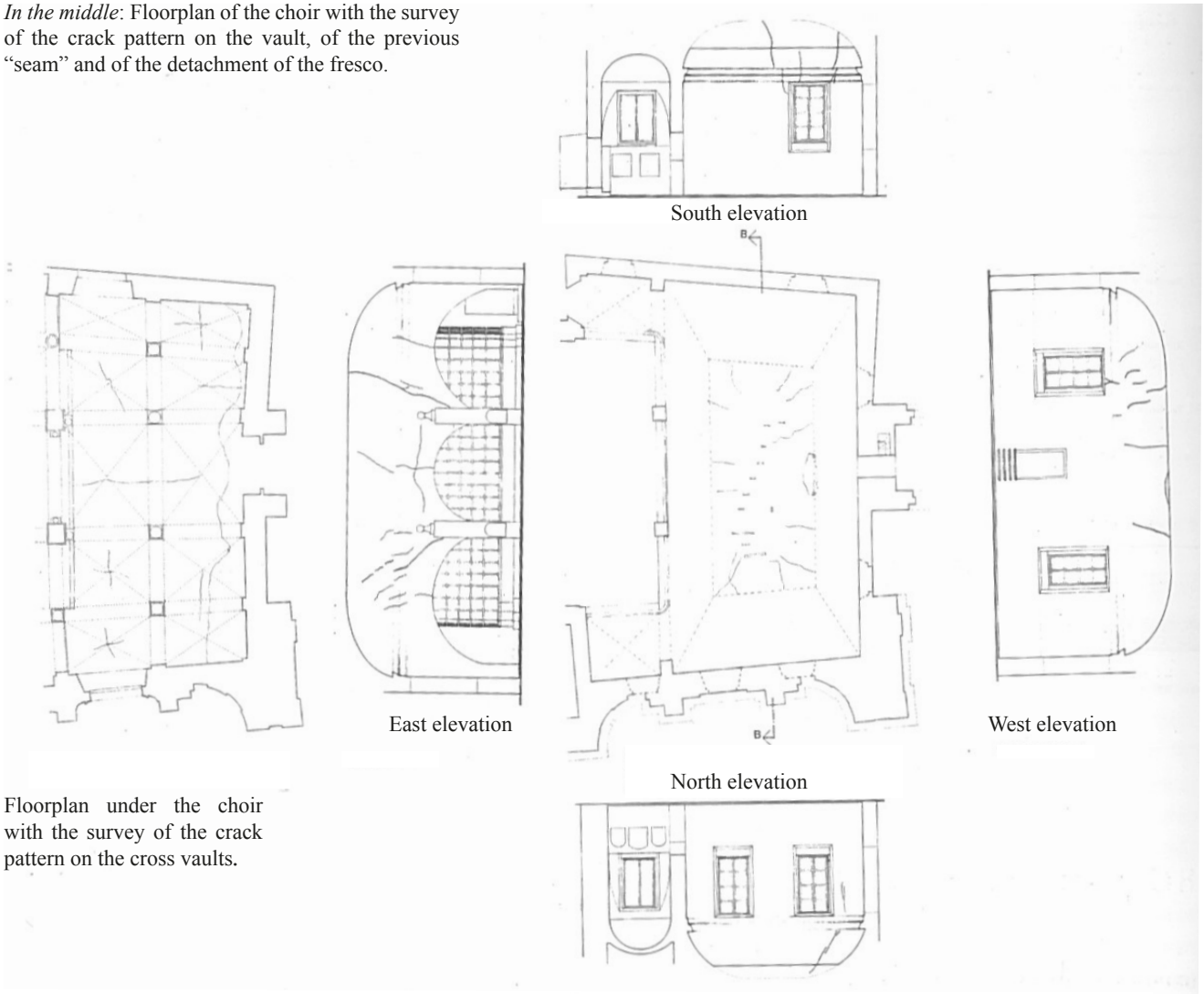


Fig. 19. Firenze, Santa Maria Novella, Spanish Chapel, illustrative diagram with indications of measured temperature and superficial humidity, 1991.

In the middle: Floorplan of the choir with the survey of the crack pattern on the vault, of the previous "seam" and of the detachment of the fresco.



Floorplan under the choir with the survey of the crack pattern on the cross vaults.

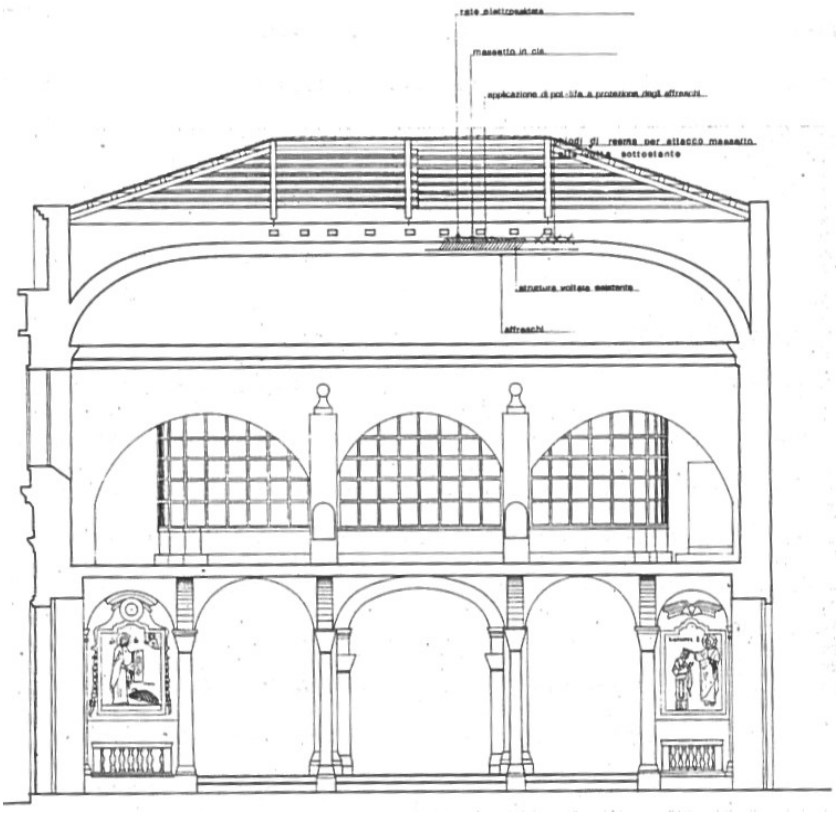
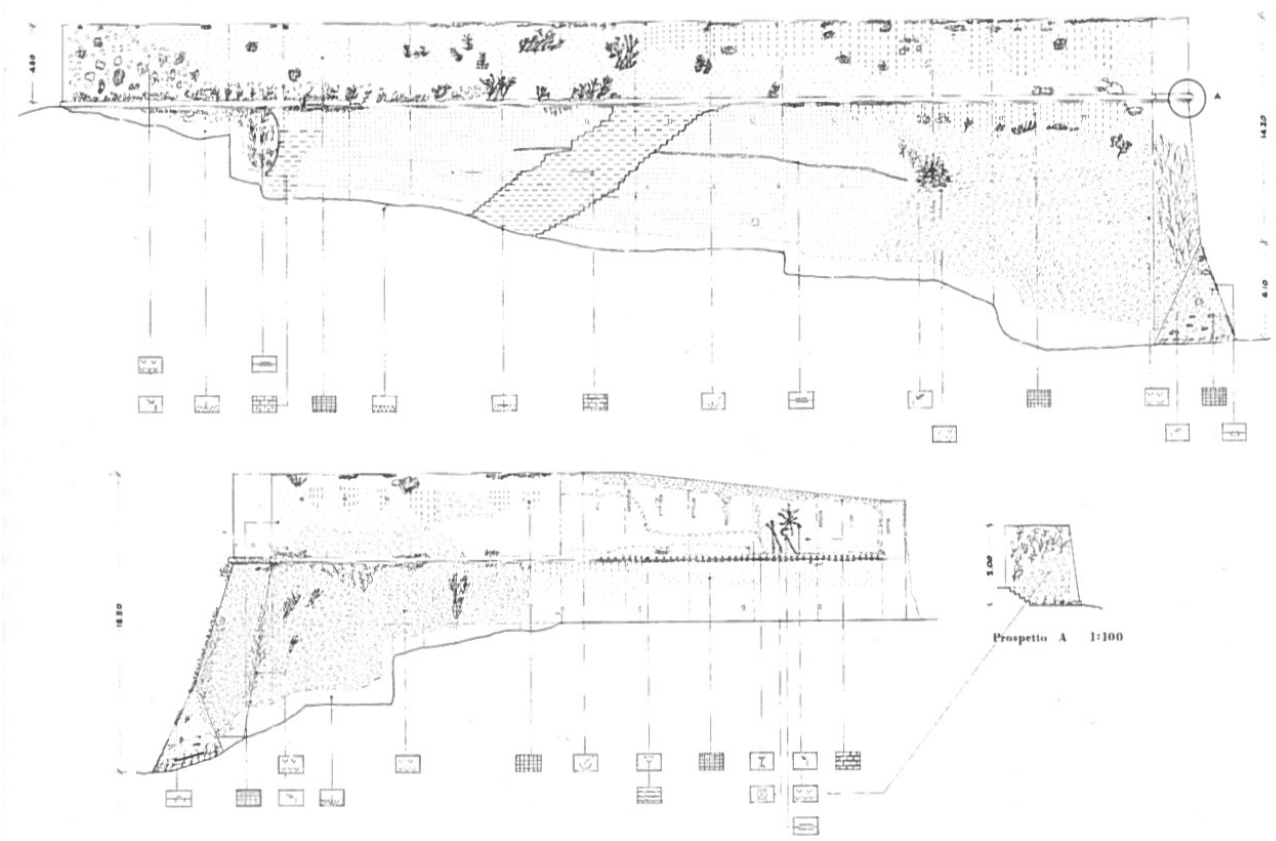


Fig. 20. Church of Santa Maria dell'Ammiraglio, analysis of the current state, analysis of the faults and indications for the consolidation intervention (proposal by the A., 1987).



C elevation, front towards Porta San Paolo 1:100

THE "DEFECTS" SURVEY

- SUPERFICIAL DEPOSITS
- BLACK ENCRUSTATIONS
- RUN-OFF / LEACHING
- EFFLORESCENCES
- VEGETATION
- EROSION
- LACK OF MATERIAL, HOLES
- METALLIC ELEMENTS
- METALLIC STAINS
- SEPARATION EXTERNAL LAYER
- SEPARATION EXTERNAL AND MIDDLE LAYER
- FISSURES
- HUMIDITY
- FRAGMENTS
- REINTEGRATION SIMILAR MATERIALS
- REINTEGRATION PARTIALLY DIFFERENT MATERIALS
- REINTEGRATION DIFFERENT MATERIALS

THE INTERVENTIONS

CLEANING

- REMOVAL OF WEEDS
- APPLICATION OF BIOCIDE AND/OR HERBICIDE
- MECHANICAL REMOVAL, PLASTIC SPATULAS
- SOLVENT GELATINOUS PASTE
- NEBULIZED WATER
- ELIMINATION OF METALLIC ELEMENTS
- ELIMINATION OF METALLIC STAINS

CONSOLIDATION

- GROUND CONSOLIDATION
- FOUNDATIONS CONSOLIDATION WITH MICROPILES
- STRUCTURAL CONSOLIDATION
- IMPREGNATION WITH ACRYLIC RESIN AND INERT MATERIAL

PROTECTION

- HUMIDITY BARRIER
- INSECTICIDE APPLICATION

REINTEGRATION

- WATER DIPOSAL SYSTEM
- ANCHORS APPLICATION
- RECONSTITUTION OF THE BRICK MASONRY COMPOSITION

Fig. 21. Rome, Bastion of the Colonnella. The survey, the state of the faults and the programme of interventions (project by the A., 1989).

conservation process. The idea that a museum collection (of archaeological, historical-artistic, demo-ethno-anthropological properties) could be conveniently hosted in a historical edifice, although it may appear to be a coherent and logical idea, entails complex articulations for the project proposals. We cannot mortify and eliminate the essence of an existing architecture in order to forcedly insert a museum into them (recall the case of the Gare d'Orsay or of Palazzo Grassi itself). The insertions should always be carried out with a spirit of critique, with respect for the historical stages of the architectural organism.

Archaeological sites

With regard to archaeological sites and their museal conversion, the activity is limited to a maintenance with the goal of conservation, excluding scenographic interventions. One must plan museographic interventions aimed at highlighting the significances of the relationships of dependence in the surviving architectures, the environmental routes and aided fruition. Think of the well-known solution of the perspective binoculars used in some archaeological sites to balance the rapport with the surrounding landscape that was vandalised in the last decades. An extremely significant theme is also that of protective works for sites. These will have to contribute to the goal of re-evoking for visitors the image and the significance of the existing building while avoiding fanciful and/or repristinating/ reconstructive solutions.

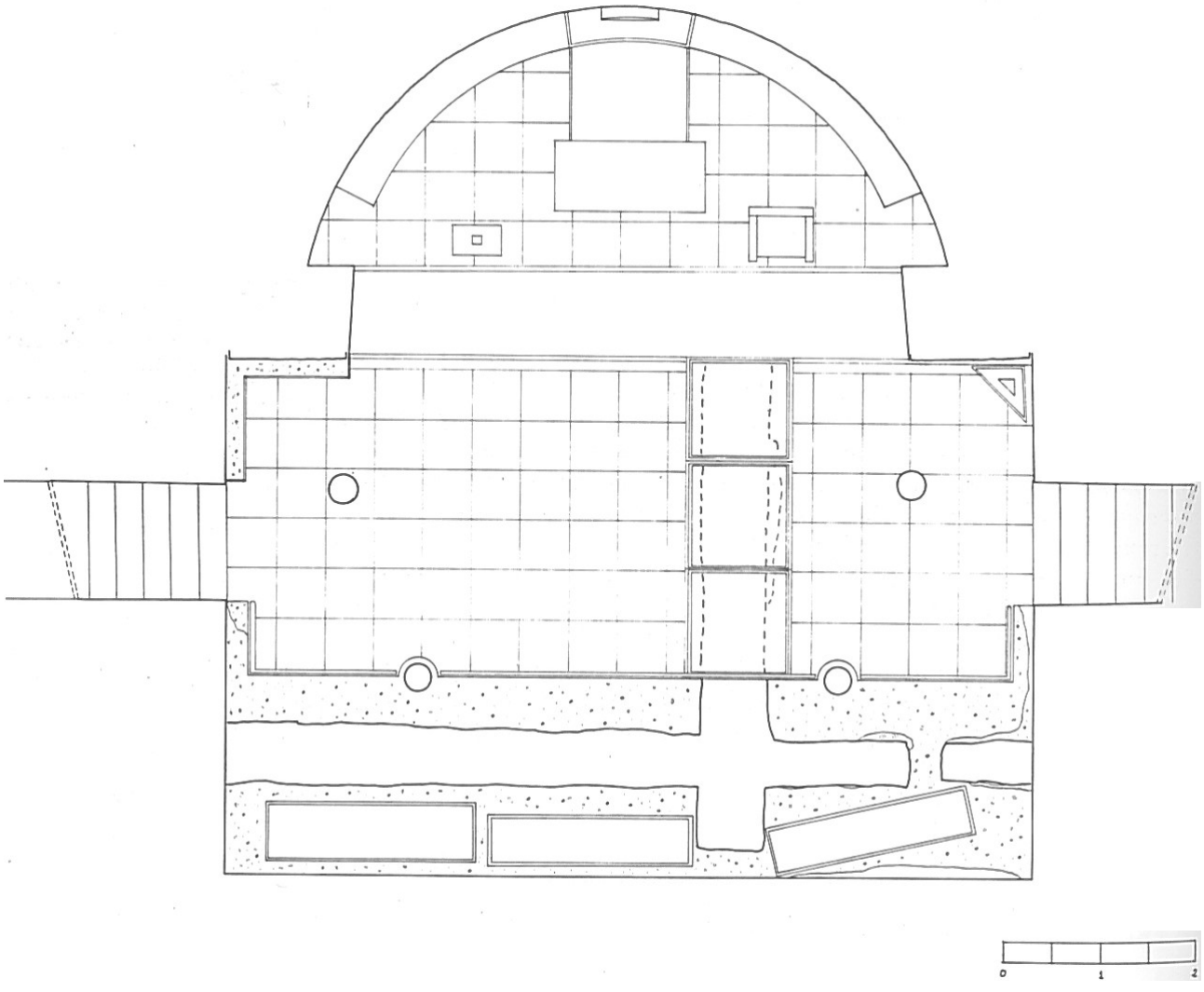


Fig. 22. Roma, Santa Maria in Domnica, chapel used in working days, adaptation and first proposal for site museum. The three glass slabs shown on the floor (diagram by the A.).

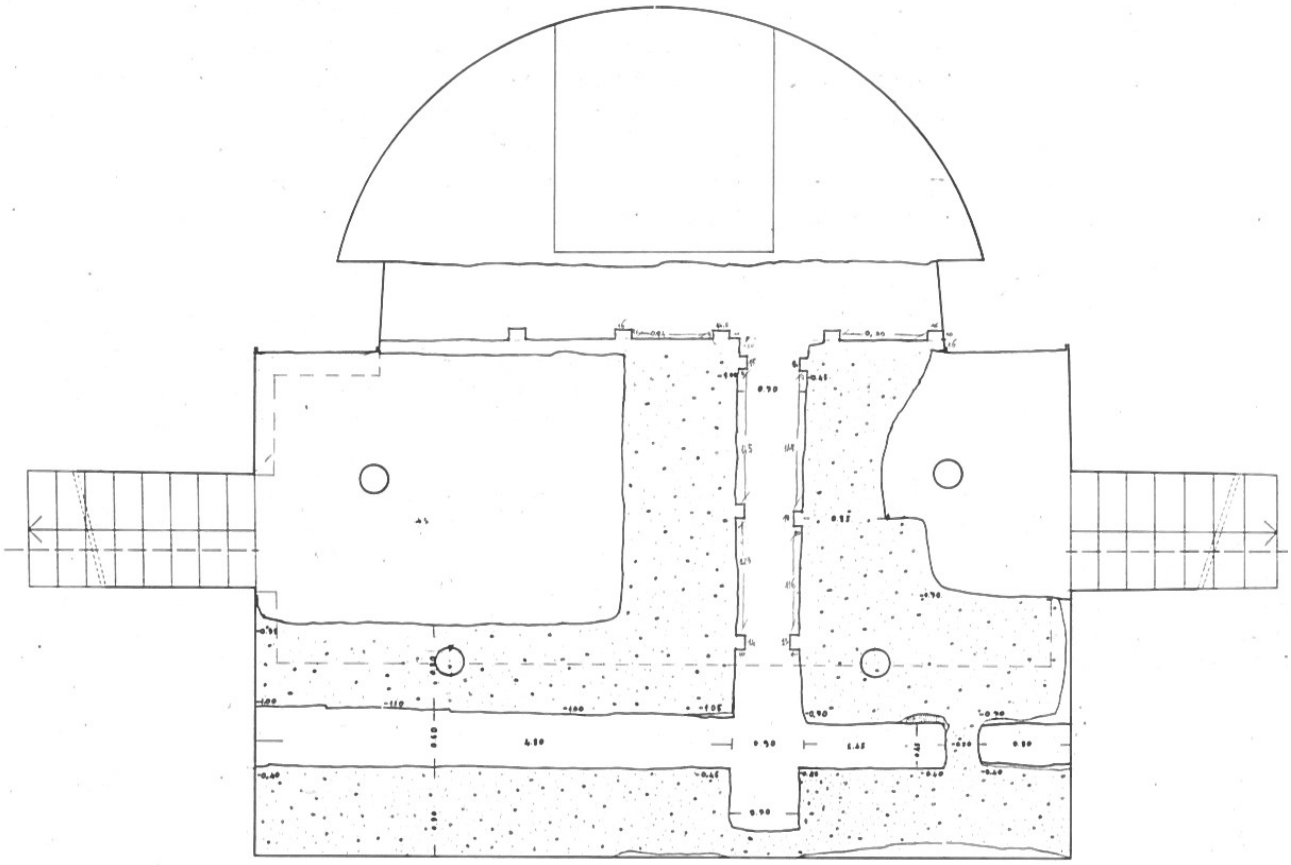
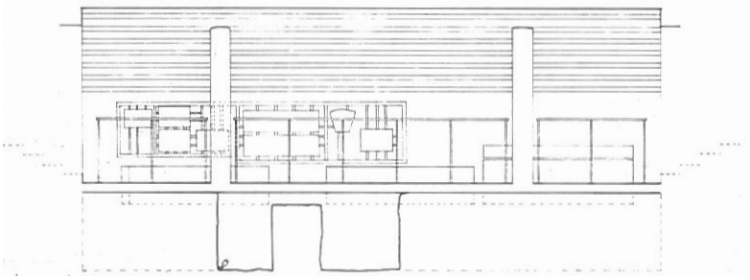


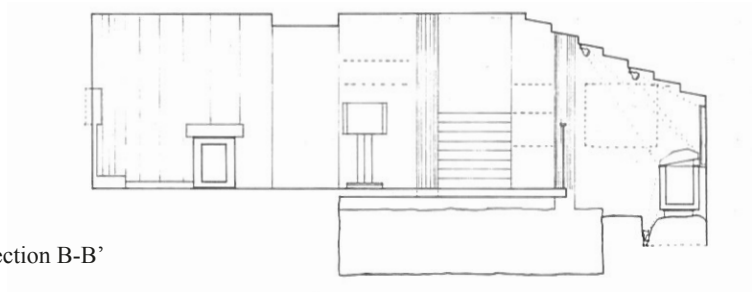
Fig. 23. Roma, Santa Maria in Domnica. The survey after the dig with the re-emerged wall structures and the indication of the four new little pilasters (survey by the A.).

Conclusion

The guidelines constitute only a first part of the totality of architectural, environmental and archeaological properties studies in the courses.
In this document, it was hoped to present a review that could be illustrative of the existing architectural monuments, so as to depict, with the help of graphic representations, the method of study adopted and to be continued subsequently in the courses of Elements of Restoration and Restoration Laboratory.
The results achieve seem to show how students approach architectural restoration with enthusiasm, considering it to be an essential component of their training as future European architects.
If a certain number choose to continue their training in the sector, they may enrich their preparation through the elaboration of a degree thesis and then, at the post-graduate level, frequent the prestigious School of Specialisation for the Study and the Restoration of Monuments at our university.



Longitudinal section A-A’



Cross section B-B’

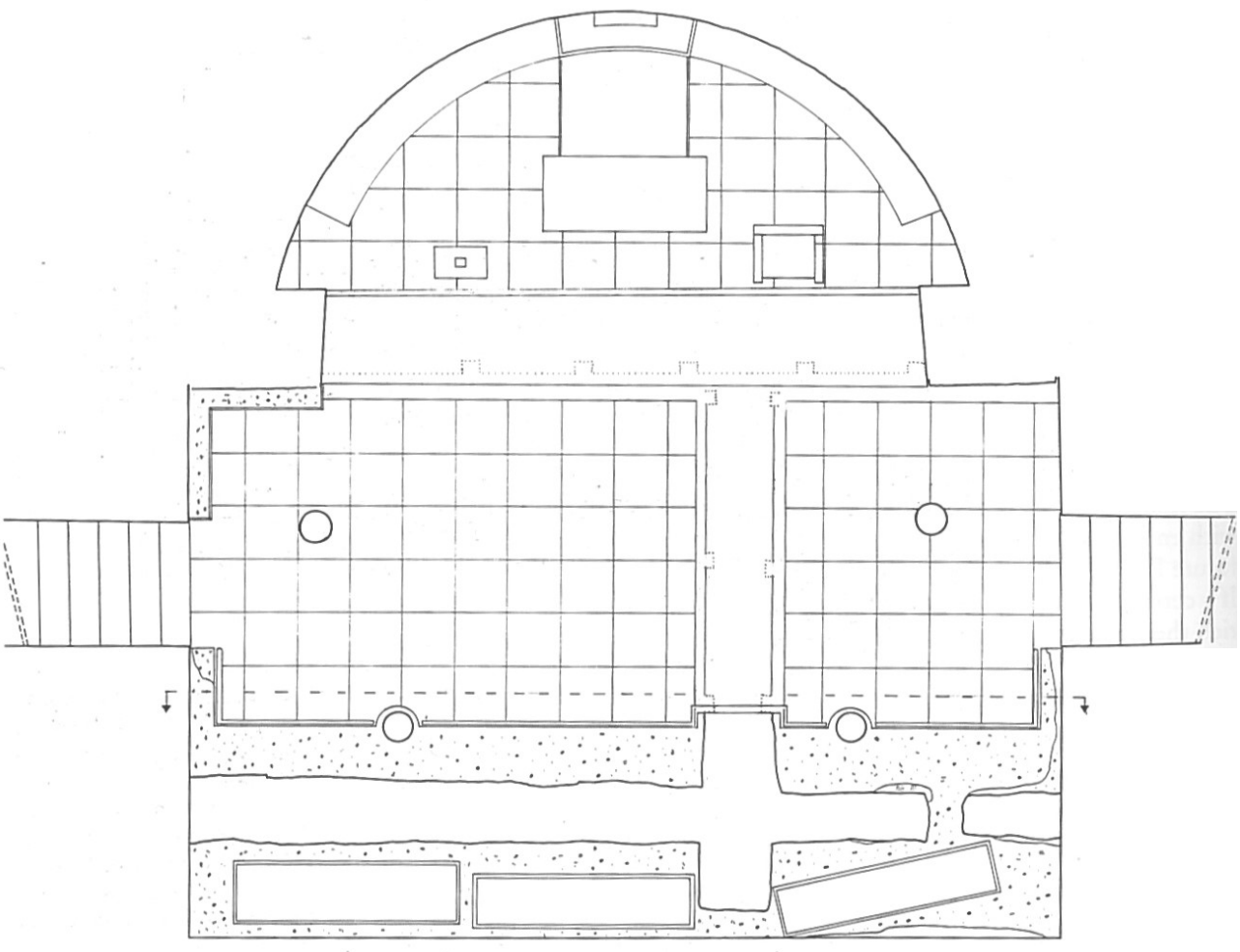


Fig. 24. Roma, Santa Maria in Domnica, used in working days, adaptation and second proposal for the in situ museum, with the highlighting in the pavement of the traces of the underlying walls.

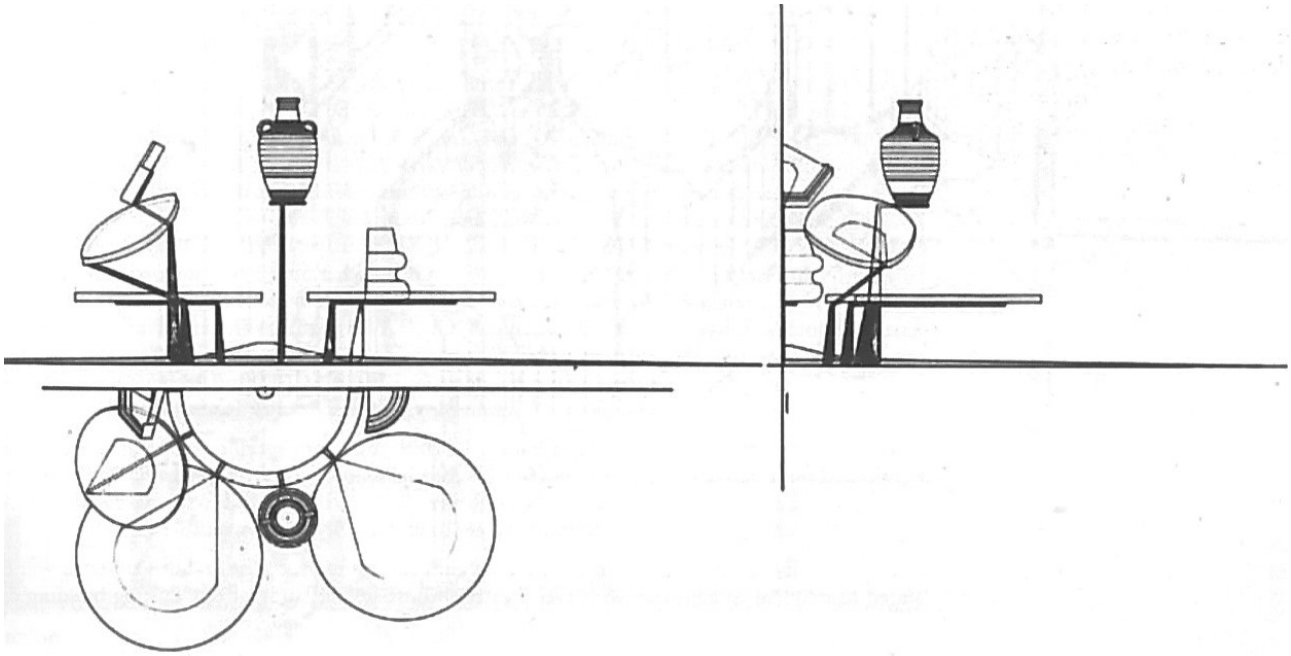


Fig. 25. Palermo, Santa Maria dell'Ammiraglio. Details of some supports bearing medieval finds.

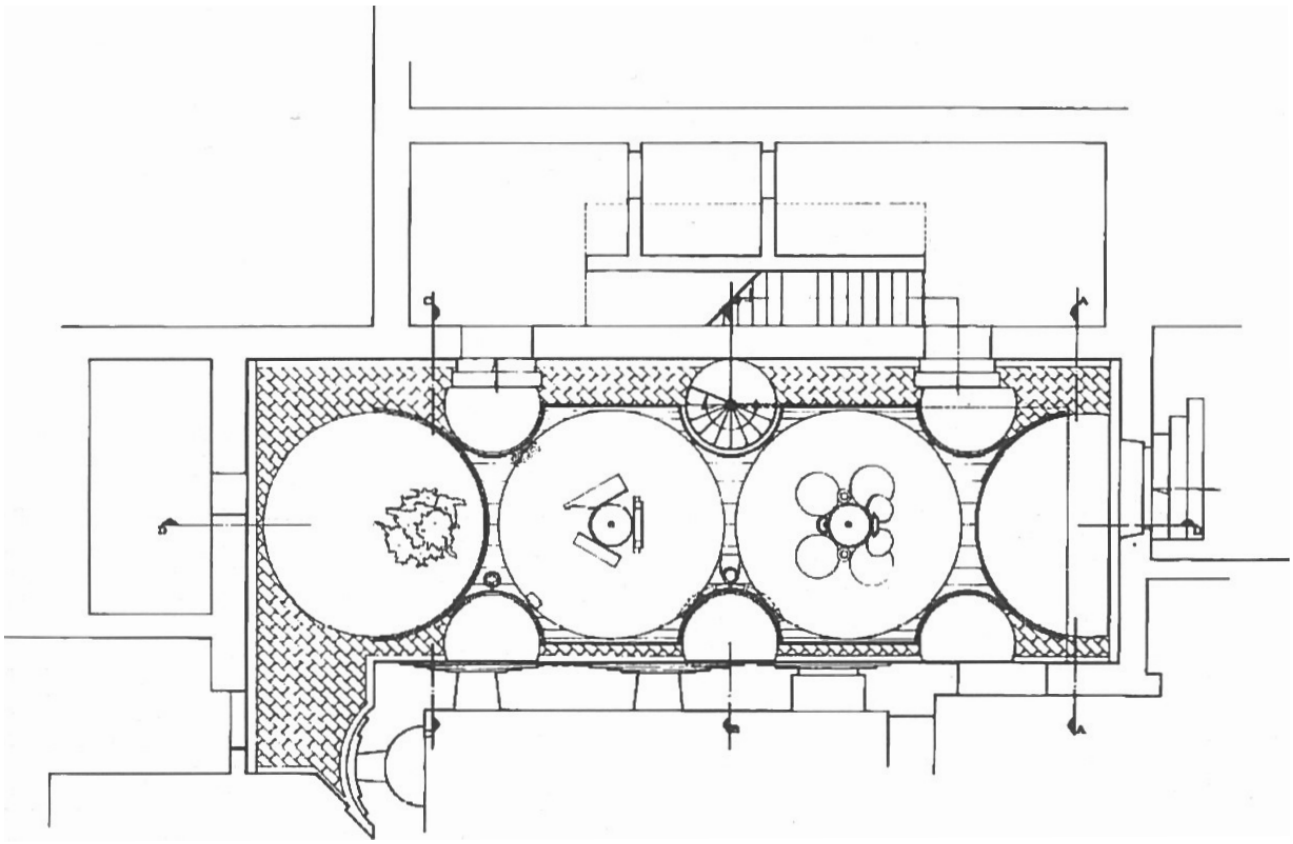


Fig. 26. Palermo, Santa Maria dell'Ammiraglio. museum adaptation of the space between the church and the rectory with a transparent, reversible structure.

Notes

1. For the methodical study of the architectural organisms, see the masters of the Roman School of Architecture, from Gustavo Giovannoni to Vincenzo Fasolo, though it should be permitted to mention, as a summary, G. DE ANGELIS d'OSSAT, *Guide to the methodical study of monuments and causes of their deterioration, Guida allo studio metodico dei monumenti e delle loro cause di deterioramento*, Roma 1972. ID., *Norme per la redazione dei grafici di rilievo e di restauro dei beni architettonici*, a.a. 1977.78, ICCROM – Faculty of Architecture of the University of Rome, Roma 1977.

G. CARBONARA, *Restauro dei monumenti, Guida agli elaborati grafici*, Roma 1985, Napoli 1990.

G. ZANDER, *Scritti sul restauro dei monumenti architettonici*, Roma 1993, in particular, students are urged to study the appendix *Testimonianze sopra un antico metodo di studio dell'architettura.*

Also to be noted are the surveys conducted by S.A. CURUNI - L. DONATI, *Creta Bizantina, rilievi e note critiche su ventisei edifici di culto in relazione all'opera di Giuseppa Gerola*, Roma 1987.

Lastly, on the same didactic lines, the more modest C. BELLANCA, *Ascoli Piceno e i suoi monumenti, primi avvicinamenti e riflessioni attraverso lo studio e le proposte di restauro,* Roma – Ascoli Piceno 2000 and C. BELLANCA,*Una didattica per il restauro,* Roma 2008.

2. For some references on the study of Baroque architecture, with specific territorial references, see P. PORTOGHESI, *Roma Barocca*, Roma 1966; S. BOSCARINO, *Juvarra architetto*, Roma 1973; ID., *Sicilia Barocca, architettura e città 1610-1760*, Roma 1981; C. BELLANCA, *Niccolò Palma a S. Maria dell'Ammiraglio (La Martorana)*, in "Storia Architettura", IX, 1986, 1-2, pp. 125-142.

3. A necessarily summary guide to the libraries and, subsequently, to the archives students will be required to frequent to approach with ever greater enthusiasm the study of our existing building can be found in G. CARBONARA, *Restauro dei monumenti, Guida agli elaborati grafici,* op. cit.

4. For some references on the theme of domes from the Norman period, see the studies, always valid, by F. BASILE, *L'architettura della Sicilia Normanna,* Catania 1975. Also, see the now dated but still valid studies by G. DE ANGELIS d'OSSAT, *Le influenze Bizantine nell'architettura romanica*, Roma 1942. M. RUMPLER-SCHLACHTER, *Le Triomphe de la coupole dans l'architecture Byzantine,* Strasbourg 1947; ID., *La coupole dans l'architecture byzantine et musulmane,* Strasbourg 1956. Lastly, I would like to mention R. KRAUTHEIMER, *Early Christian and Byzantine Architecture*, Harmondsworth 1965, Italian ed. *Architettura Paleocristiana e Bizantina*, Torino 1986.

5. There are numerous references for metrological and proportional studies. For metrology, see A. MARTINI, *Manuale di Metrologia,* Torino 1883. M. SALVATORI, *Osservazioni di metrologia antica ed altomedievale e dei coevi paramenti murari*, in "Opus", 3, 1993, pp. 5-42. M. SALVATORI, *Manuale di Metrologia, per architetti studiosi di storia dell'architettura ed archeologici,* Napoli 2006.

For proportional investigations and spatialities, there are many studies published by De Angelis d'Ossat, collected in the two volumes edited by Laura Marcucci and Daniele Imperi, G. DE ANGELIS d'OSSAT, *Realtà dell'Architettura, apporti alla sua storia*, 1933-1978, Roma 1982. Also, G. DE ANGELIS d'OSSAT, *Proporzioni e accorgiment visivi negli interni, in Francesco d'Assisi, Chiese e conventi,* Milano 1982, pp. 150-161. ID., *Le scelte proporzionali di Raffaello, in Raffaello e la sezione Aurea*, Bologna 1984.

6. R. PARENTI, *Una proposta di Classificazione tipologica delle murature post-classiche, in Conoscenze e sviluppi teorici per la conservazione di sistemi costruttivi tradizionali in muratura*, Atti del Convegno di Studi (Acts of the Congress of Brixen), Bressanone 23-27 June 1987, ed. G. BISCONTIN and R. ANGELETTI, Padova 1987, pp. 49-61. ID., *Sulle possibilità di datazione e di classificazione delle murature*, in R. FRANCOVICH – R. PARENTI (ed.), *Archeologia e restauro dei monumenti,* Firenze 1988, pp. 280-304. D. FIORANI, *Tecniche costruttive medievali, il Lazio meridionale*, Roma 1996. F. DOGLIONI, *Stratigrafia e restauro,* Trieste 1997. D. ESPOSITO, *Tecniche costruttive murarie medievali, murature a tufelli in area romana,* Roma 1998. Lastly, the recent *Tecniche costruttive dell'edilizia storica. Conoscere per conservare*, ed. D. FIORANI – D. ESPOSITO, Roma 2005. D. ESPOSITO, *Gustavo Giovannoni e lo studio diretto dei monumenti. Alcune osservazioni sull´analisi delle tecniche costruttive murarie*, in *Gustavo Giovannoni. Riflessioni agli albori del XXI secolo,* Atti della Giornata di Studio dedicata a Gaetano Miarelli Mariani (1928-2002), in Roma, 26 June 2003, edited by M.P. Sette, Bonsignori, Roma 2006, pp. 195-200.

7. Among the numerous studies on complex and stratified architectural organisms, I would like to mention, at least, the unforgettable volume which has impressed many young students from different generations: R. BONELLI, *Il duomo di Orvieto e l'architettura italiana del Duecento – Trecento*, (1948) Città di Castello 1952, II ed. Roma 1972, Orvieto 2003. For a preliminary summary of the constructive history of the Martorana, see C. BELLANCA, *La chiesa di Santa Maria dell'Ammiraglio (la Martorana) a Palermo*, in Atti del Convegno Internazionale di Studi (Acts of the International Convention of Studies), *Architettura, Processualità e Trasformazione*, Roma 24-27 November 1999, in "Quaderni dell'Istituto di Storia dell'Architettura", 34-39 (1999-2002), Roma 2002, ed. M. CAPERNA – G. SPAGNESI, pp. 189-196.

8. R. ASSUNTO, *La critica d'arte nel pensiero medievale*, Milano 1961. For some specific references to the theme of reuse, see: L. De LACHENAL, *Spolia, uso e reimpiego dell'antico dal III al 'XIV secolo*, Milano 1995. A. ESCH, *Reimpiego*, in Enciclopedia Medievale dell'arte, vol. IX, Roma 1998, pp. 876-883 with ample bibliography. Also, S. CIRANNA, *Spolia e caratteristiche del Reimpiego nella basilica di San Lorenzo fuori le Mura a Roma*, Rome 2000. *Rilavorazione dell'antico nel Medioevo,* ed. M. D'ONOFRIO, Roma 2003. C. BELLANCA, *Recupero riciclo, uso del reimpiego fra dottrina e attuazione con particolare riferimento ad alcune forme di reimpiego devozionale*, in *Il reimpiego in architettura. Recupero, trasformazione, uso,* edited by Jean-François Bernard, Philippe Bernardi e Daniela Esposito, Roma 2008, pp. 217-228.

9. See, chronologically: C. ENLART, *Origines française de l'architecture gothique en Italie*, Paris 1894; R. WAGNER RIEGER, *Die Italienische Baukunst der Gotik. II. Sud und Mittelitalien,* Graz-Cologne 1957; R. BONELLI, *L'edilizia delle chiese Cistercensi*, in *I Cistercensi e il Lazio*, Acts of the sessions of study of the Institute of the History of Art of the University of Rome, 17-21 May 1977, Roma 1978, pp. 37-42. G. CARBONARA, *Iussu Desiderii,* Roma 1979. G. CARBONARA, *Edilizia e urbanistica di Ninfa*, in *Ninfa una Città, un giardino*, in Acts of the discussion of the Fondazione Camillo Caetani, Rome, Sermoneta, Ninfa, 7-9 October 1988, ed. L. Fiorani, Rome 1990, pp. 223-245. C. BELLANCA, *La chiesa dell'Assunta a Sermoneta*, in *Sermoneta e i Caetani,* Acts of the Congress of the Fondazione Camillo Caetani, Roma-Sermoneta, 16-19 June 1993, Roma 1999, pp. 403-419.

10. For the Landshut Residence, see C. BELLANCA, *L'italienischer Bau della residenza di Landshut: un episodio di tecniche costruttive del cinquecento romano e mantovano in Baviera*, in *Die Landshuter Stadtresidenz, Architektur und Ausstattung*, ed. I. LAUTERBACH, K. ENDEMANN and C.L. FROMMEL, Munich 1998, pp. 85-86; H.P. RASP, *Die Landshuter Stadtresidenz: Stilcharakter und Baugeschichte der Italienischen Trakte,* in "Vernhandlungen des Historischen Vereins für Niederbayern", 1974, pp. 108-184; H. KRONTHALER, *Die Ausstattung der Landshuter Stadtresidenz unter Herzog Ludwig X: 1536-1543,* Institut für Kunstgeschichte, München 1987; G. SPITZLBERGER, *Der geistesgeschichtliche Hintergrund der Bildausstattung in der Landshuter Stadtresidenz*, in "Vernhandlungen des Historischen Vereins für Niederbayern", Vol. 118/119, 1992, pp. 139-163; H. GÜNTHER, *Il Deutscher Bau della residenza di Landshut: funzioni e tipologie*, in *Die Stadtresidenz Landshut,* Munich 1998, pp. 65-76; C.L. FROMMEL, *Zur Struktur des Italienischen Baus der Residenz in Landshut*, in *Die Stadtresidenz Landshut,* Munich 1998, pp. 77-84. See also the catalogue by Gerhard Hojer, of the Bayerische Verwaltung der Staatlichen Schlösser, Gärten und Seen, *Der italienische Bau, Materialien un Undersuchungen zur Stadtresidenz Landshut*, Landshut 1994. For multiple references to the architecture of the first half of the 16th century between Rome and Mantua, see at least A.A.V.V., *Giulio Romano*, Milano 1989. At the end, see C. THOENES, *Sebastiano Serlio*. Atti del VI Seminario Internazionale di Storia dell´Architettura, Milano 1989. C. BELLANCA, survey in *Fürstenhöfe der Renaissance, Giulio Romano und Die Klassische Tradition*, Kunsthistorisches Museum Neue Burg, Wien 1989, p. 233.

11. For the studies on the architecture of the secondhalf of the 18th century and in particular for the Abbey of San Martino delle Scale and the essential references with coeval European architecture, see: C. BELLANCA, *Giuseppe Venanzio Marvuglia a San Martino delle Scale,* in A.A.V.V., *L'Abbazia di San Martino, Storia, Arte, Ambiente,* Palermo 1990, pp. 51-97. The contributions of some masters should also especially be remembered: R. PANE, *Luigi Vanvitelli e la parabola dell'Illuminismo,* in *Luigi Vanvitelli e il 700 Europeo,* International Congress of Studies, vol. 1, Napoli-Caserta 5-10 November 1973, Napoli 1979, pp. 3-19; see also R. BONELLI, *Vanvitelli e la cultura europea: proposte per una lettura europeista della Reggia di Caserta*, in *Vanvitelli*,... op.cit., pp. 135-147. C. NORBERG-SCHULZ, *L'architettura tardo barocca*, Milano 1972, ed. 1980. G. ZANDER, *Architettura monastica d'occidente, architettura benedettina*, in *Abbazie e conventi*, Milano 1973.

12. For the thematics relative to the study of disturbances and the remedies for structures, see some texts that are classics in the structural sector, from the volumes of Carlo Cestelli Guidi to the studies by Giorgio Croci and Giorgio Macchi. More in particular, the following are recommended: S. MASTRODICASA, *Dissesti statici delle strutture edilizie*, Milano 1943, ed. 1978, and subsequents. A. GIUFFRÉ, *Monumenti e terremoti: aspetti statici del restauro,* Roma 1988. Again by A. GIUFFRÉ, *Letture sulla meccanica delle strutture storiche*, Rome 1991. Then F. PICCARRETA, *I meccanismi dell'equilibrio delle strutture murarie. Lezioni di statica delle costruzioni in blocchi lapidei,* Roma 2000. L. BOSCOTRECASE-F. PICCARRETA, *Edifici in muratura in zona sismica*, Palermo 2006. A. GALLO CURCIO, *Sul consolidamento degli edifici storici*, Rome 2007, and also the *Trattato di Restauro architettonico*, ed. G. CARBONARA, voll. 1-4, Torino 1996. Articles from the journal "Materiali e Strutture. Problemi di conservazione" and from the journal "Palladio".

13. For the Normal lexicon, see ICR (Istituto Centrale del Restauro), *Raccomandazioni Normal, alterazioni lapidei e trattamenti conservativi. Proposte per l'unificazione dei metodi sperimentali di studio e di controllo*, Roma 1988. See also, *Trattato di Restauro architettonico*, ed. G. CARBONARA, Vol. 1-4, Torino 1996.

14. On the topic of the conservation of surfaces, see some specific chapters in that which is considered to be the textbook for restoration courses in numerous Italian faculties. P. PHILIPPOT, *La notion de patine et le nettoyage des peintures*, in "Bulletin de l'Institut Royal du Patrimonie Artistique", IX, 1966, pp. 138-143; L. MORA, P. MORA, P. PHILIPPOT, *La conservation des peintures murales*, Bologna 1977, ed. inglese, *Conservation of Wall paintings*, London 1984;P. BALDI, M. CORDARO, L. MORA, P. MORA, *Architecture - coleur, in Mortars, Cements and Grouts used in the Conservation of Historic Buildings*, Symposium (3-6.11.1981 Rome), ICCROM, Roma 1982, pp. 133-140; *Il colore nell'edilizia storica. Riflessioni e ricerche sugli intonaci e le coloriture*, "Bollettino d'Arte", suppl. al n. 6,1984; P. PHILIPPOT, L. MORA, P. MORA, *Il restauro degli intonaci colorati in architettura: l'esempio di Roma e la questione di metodo, in Intonaci, colore e coloriture,* op. cit., pp. 139-142; Paul Philippot´s intervention in the Seminary about *Il colore della città tenutosi in Roma*, february 1988, in M. P. SETTE, *Colore e città storica, Consonanze e dissonanze nel dibattito contemporaneo*, in "Studi Romani", XXXVI, 1988, 1-2, pp. 73-86, particularly p. 76. For a general consideration about the topic of roman façades ´coloring, refer to: P. PHILIPPOT, *Le couleurs de Rome*, in "Bulletin de l'Académie Royale de Belgique, Classe des Beaux-Arts" 5, serie LXX, 1988, 10-12, pp. 259-292. G. CARBONARA, *Avvicinamento al Restauro, teoria, storia, monumenti*, Napoli 1997. More in particular, see pp. 515-517. One should also consider the recent elaboration of the doctoral thesis in *Riqualificazione e Recupero insediativo*, cycle XVIII, by O. MURATORE, *Il colore dell'architettura nella città storica: presupposti teorici-pratici per una ricerca su possibili metodologie d'intervento*, Roma 2007. G. CAPPONI, C. D´ANGELO, U. SANTAMARIA, *Nuove acquisizioni sulle finiture architettoniche. Esempi romani tra Cinque e Seicento*, in *Trattato del Restauro Architettonico*. Secondo aggiornamento, directed by G. Carbonara, Torino 2008, vol.X, first tome, pp. 227-253. O. MURATORE, *Il colore dell'architettura storica. Un tema di restauro*, Firenze 2010. O. MURATORE, *The colour of the historical town*, in *Methodical approach to the restoration of historic architecture*, edited by C. Bellanca, Roma 2011, pp. 41-53.

15. G. TORRACA, *La cura dei materiali nel restauro dei monumenti*, Roma 2001. See also C. MONTAGNI, *Materiali per il restauro e la manutenzione,* Torino 2000. B.P. TORSELLO – S.F. MUSSO, *Tecniche di restauro architettonico*, vol. 2, Torino 2003.

16. By the laboratory we refer to the scientific activities carried out in the analysis laboratory that has been active for over twenty years inside the Department of the History of Architecture, Restoration and Conservation of Architectural Heritage of our university.

17. G. ZANDER, *Lavori sulla facciata della Basilica di San Pietro eseguiti nel biennio 1985-1986 dalla Reverenda fabbrica di San Pietro per la munificenza dell'Ordine dei Cavalieri di Colombo,* Città del Vaticano 1987.

18. For the study and the restoration on the episcopal palace of Ascoli Piceno, the reader is referred to a preliminary reflection: C. BELLANCA, *Palazzo Roverella di Ascoli Piceno, prime riflessioni attraverso lo studio e l'intervento di restauro delle superfici,* in "Recuperare l'Edilizia", IV, 2000, 17, pp. 56-62. C. BELLANCA, *Ascoli Piceno, Palazzo Roverella. Preliminary reflections through study and restoration of surfaces*, in *Methodical approach to the restoration of historic architecture*, edited by C. Bellanca, Roma 2011, pp. 139-147.

19. The following text is considered a classic on this topic: G. - I. MASSARI, *Risanamento Igienico dei Locali umidi*, Milano 1981, and subsequent editions. See also ICR, *Fattori di deterioramento, corso sulla manutenzione di dipinti murali, mosaici, stucchi,* Dimos II.1. Roma 1979.

20. In approaching the topics of liturgical adaptations and, at the same time, the vast subject of insertions of contermporary art in churches, see: G. ZANDER, *Opere d'arte nuove nelle antiche chiese d'Italia*, in "fede e Arte", 1957, pp. 205-207; L. GRASSI, *Considerazioni sul problema dell'adeguamento delle chiese*, in *Architettura e Liturgia*, Assisi 1965. G. ZANDER, *Le antiche chiese e gli adattamenti, l'area liturgica presbiteriale*, in "Atti del XII Convegno Nazionale di Arte Sacra – Ascoli Piceno 23-26 settembre 1970", Ascoli Piceno 1970, pp. 71-83. C. CHENIS, *Fondamenti teorici dell'arte sacra, magistero postconciliare*, Roma 1991. G. SANTI, *L'adeguamento delle chiese secondo la riforma liturgica*, Reggio Emilia, 2001. Still one of the main, fundamental texts is *L'Enchiridion dei beni Culturali della Chiesa*, Bologna 2002. S. DELLA TORRE – V. PRACCHI, *Le chiese come Beni Culturali, suggerimenti per la conservazione*, Milano 2003. C. BELLANCA, *La formazione tra chiesa e università per affrontare le esperienze di conservazione, restauro e adeguamento liturgico*, in *Per un nuovo umanesimo in Europa*, Acts of the European Symposium "Università e Chiesa", ed. L. LEUZZI, Roma 2005, pp. 348-355. P. CULOTTA, *L' architettura dell'adeguamento liturgico e della nuova chiesa*, in *Architettura e arti per la liturgia* edited by Ephrem Carr, Roma 2001, pp. 215-228; A. MARCHESI, S. SACCOMANI, *Adaptation to the liturgy : cathedral or monument?. /Adeguamento liturgico : cattedrali o monumenti?,* in *"*Arkos: scienza e restauro dell'architettura", Nuova serie Anno 4, N. 3, Firenze 2003, pp. 16-25; D. BAGLIANI, A. RONCAROLO, *Adeguamento liturgico, tra conservazione e innovazione,* in *Le cattedrali del Piemonte e della Valle d'Aosta* edited by C. Castiglioni, L. Cervellin ..., Rovereto 2008, pp. 73-80; D. CONCAS, *Vademecum per la conservazione e il restauro dell'architettura religiosa di culto cattolico*, dipartimento Storia e restauro Università Sapienza, Roma 2010; T. GRISI, *Note architettoniche sull'adeguamento liturgico della chiesa cattedrale*, in *Le cattedrali del Lazio* edited by di Fabrizio Capanni e Giampiero Lilli, Milano 2015, pp. 63-65.

21. For the issue of the museal conversion of existing building, a useful micro-bibliography could be: C. BRANDI, *Struttura e Architettur*a, Torino 1967, see pp. 225-232 in particular. F. MINISSI, *Conservazione dei beni storico artistici e ambientali*, Restauro e musealizzazione, Roma 1978. F. MINISSI, *Il museo negli anni ottanta*, Roma 1983. F. MINISSI, *Conservazione Vitalizzazione Musealizzazione*, Roma 1988. S. POLANO, *Mostrare, storia dell'allestimento in Italia dagli anni Venti agli anni Ottanta*, Milano 1988. L. ALLEGRET, *Musei*, Milano 1992. R. SCHAER, *Il museo-tempio della memoria*, Milano 1996. C. BELLANCA, *Il museo civico di Viterbo nell'allestimento di Franco Minissi,* in "Recuperare l'Edilizia", III, 1999, 14, pp. 26-35. *Il progetto illuminotecnico per la Galleria Borghese,* ed. Centro Studi e Ricerca iGuzzini, Milano 1999. C. BELLANCA, *La progettazione sulle preesistenze architettoniche e ambientali*, in "Progettare, Architettura, Città Territorio", I, 2002, 5, pp. 48-53. P.C. PELLEGRINI (ed.), *Allestimenti museali*, Milano 2003. E. TOTI, *Santa Maria della Scala*, Siena 2003. F. BUCCI – A. ROSSARI (ed.), *I musei e gli allestimenti di Franco Albini*, Milano 2005. C. DESMOULINS, *25 musées*, series "25 réalisations", Paris 2005. S. RANELLUCCI, *Allestimento museale in edifici monumentali*, Roma 2005. *Cantiere Uffizi*, ed. R. CECCHI – A. PAOLUCCI, Roma 2007. G. SPINOLA, *Gli scavi archeologici e la loro musealizzazione,* in *I Musei Vaticani nell'80 anniversario della firma dei Patti Lateranensi 1929 - 2009* edited by Antonio Paolucci e Cristina Pantanella, Firenze 2009, pp. 459-469; S. RANELLUCCI, M. DEZZI BARDESCHI, *Conservazione e musealizzazione nei siti archeologici,* Roma 2012 G. RIZZO, *Franco Minissi e la musealizzazione in situ: il caso della villa romana al Casale di Piazza Armerina (1957 - 1963),* in *Scritti di museologia e di storia del collezionismo in onore di Cristina De Benedictis* edited by Donatella Pegazzano, Firenze 2012, pp. 289-297; F. FABBRIZZI, *Con le rovine, la musealizzazione contemporanea del sito archeologico*, Firenze 2015.

As a Guideline for a full immersion in Conservation and Restoration, from the Theory to Practice: G. CARBONARA (edited by): *Trattato di restauro architettonico*, Torino 1996, 4 volumes; *Restauro architettonico e impianti*, Torino 2001; *Atlante del restauro*, Torino 2004, 2 tomes; *Trattato di restauro architettonico. Primo Aggiornamento. Grandi temi di restauro*, Torino 2007; *Secondo Aggiornamento. Grandi temi di restauro*, Torino 2008; *Terzo Aggiornamento. Grandi temi di restauro*, Torino 2008; *Quarto Aggiornamento. Grandi temi di restauro. Progetti e realizzazioni*, Torino 2011.

2. Palermo, the Church of Santa Maria dell'Ammiraglio

Calogero Bellanca

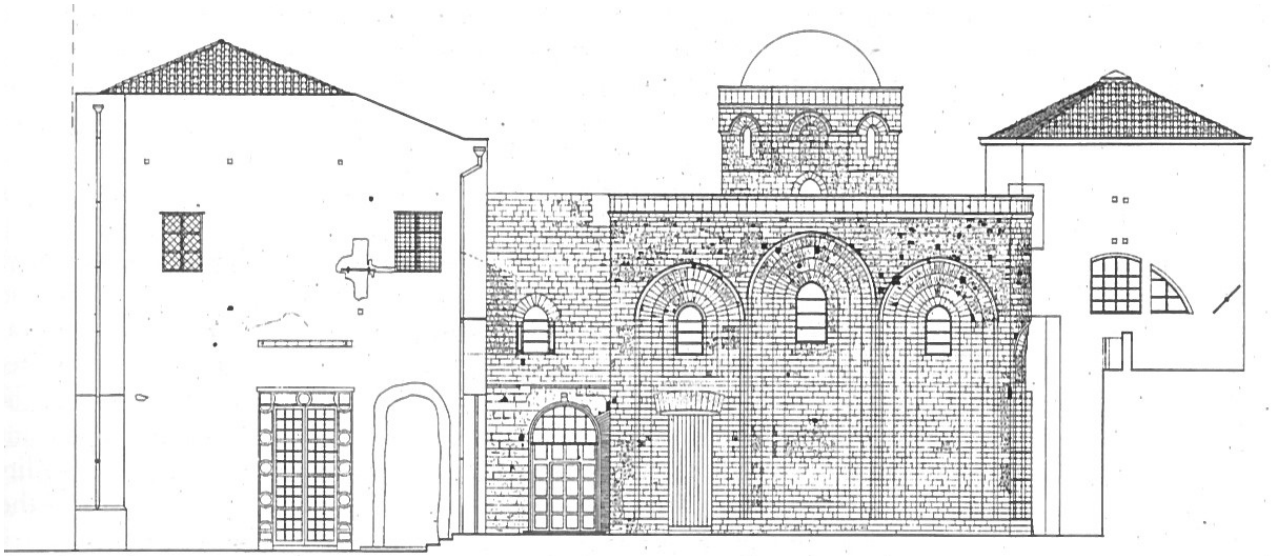
Fig. 1. Palermo, Church of Santa Maria dell'Ammiraglio, interior view (Archive of the Superintendency for the Environmental and Architectural Properties of Palermo). The image dates back to the post-World War II period, when it was being planned to "repristinate" the decoration of the Norman period along the side walls of the medieval nucleus.

The Church of Santa Maria dell'Ammiraglio presents itself, externally, as a block of compact and elongated architectural aggregations, which rise up to enclose the south-eastern part of Piazza Bellini, a few steps from the crossroads of Piazza Vigliena, the heart of the historic centre of Palermo (Figs. 1, 2).
The whole seems to represent one of the exemplifications of the continuity of making architecture over the past, at least up to the middle of the 17th century. The interventions are characterised through the employment of linguistic codes pertaining to their figurative world. These contributions, qualified by the highest sincerity of language and expression, are inserted into the medieval existent structure from the 12th century, reshaping its architecture organism and adapting it to the tastes of the time by way of the principle of coexistence. While the studies on the medieval nucleus (1), on the mosaics (2) in addition to those on Eastern Liturgy (3) are exhuastive, the same cannot yet be said for that on the organism of the church. This contribution means to present some clarifications and make a summary of the research done.
Studies (since 1984) have been articulated through a campaign of targeted surveys and through the enumeration of the documentary sources, mostly unpublished, together with the analysis of the stylistic and constructive features set within the most articulate historical and critical knowledge, hence understanding, of the "monument in time" (4).

The goal set was that of clarifying the significant moments in the historical process and identifying the various constructive phases, through the studying of the first additions to and transformations of the initial 12th century nucleus and, afterwards, of the first "restoration" interventions and of the modern age (Renaissance and Baroque), up to the actions carried out to bring back into view that medieval phase which had been expressed in the long parable of stylistic restoration (5).

Some previous contributions

Numerous reflections with multiple interpretations have been dedicated to the Church of Santa Maria dell'Ammiraglio (Fig. 3).
Chronologically, it would be opportune to recall some texts, at least, from the early 19th century, in particular: J.I. Hittorff and L. von Zanth 1835, H. Gally Knight 1838, Duke of Serradifalco 1838, G. Di Marzo 1858, C. Boito 1867, G. Patricolo 1882, C. Diehl 1894 and 1926, G.B. Rivoira 1914, E. Calandra 1938, G. De Angelis d'Ossat 1942, R. Krautheimer 1965, P. Basile 1975 and, lastly, E. Kitzinger 1990.
J.I. Hittorff and L. Zanth, 1835, underline some combinations of features of "Saracen" origin and of "Greek" origin (6). The Duke of Serradifalco, in 1838, describes the church and summarises some events: "before barbaric innovations came to deface the most elegant temple...". His opinion of the interventions of the 1700s was negative: "and the reason of the design and taste seemed to have been completely lost, the mosaics fell apart shortly after, and the marble slabs covering the lower part of the lateral walls were brought down, so that they could be replaces by the indecent and contorted encrustations of modern marbles" (7).
Also in 1838, Henry Gally Knight drew attention to the belfry: "this belfry is curious and full of character. Under it is porch with pointed arches, and a plain cross vault. The second story… is older than the upper story, is very Saracenic in its character, and has windows surrounded with the Saracenic billet, exactly similar to those of the cathedral. The upper half strongly resembles the French Norman" (8). Gioacchino Di Marzo, in 1858, continues the negative attitude toward the Baroque; in fact, he expresses regret at the loss "of the medieval integrity. A repugnant design, that of extending it, was thought of in the 16th century… Nor did the fatal destruction end here, for, with the intent of constructing a spacious choir for nuns, the church was made even longer by constructing a lower level… Subsequently, the apse was also destroyed, to allow for a quadrangular tribune… furthermore, the mosaics and the great slabs of Parian marble decorating the lower part of the lateral walls were also lost, replaced by cartouches and encrustations of coloured marbles" (9).
With Camillo Boito, a clarification is recorded with regard to the constructive features of Sicilian medieval churches: "Domenico Lo Faso Pietrasanta, Duke of Serradifalco, calls them Sico-Norman from the very beginning; and Siculo-Norman was what Di Marzo also called them… but Amari… talks about Sicilian Arabic art, while G.B. Gravina… defined that art as being Siculo-Byzantine. So we have Byzantines, Arabs, Normans… There are some who described such architecture with the epithet Arabo-Greek, Arabo-Byzantine, Arabo-Norman or simply Byzantine or Norman or even, see for yourself, Gothic or ogival … We prefer to call it: Sicilian art of the Middle Ages".
Besides highlighting the constant exaggerations made by Gravina, Boito clarifies a certain historical process for the belfries themselves and concludes



South elevation 1:50

Fig. 2. Church of Santa Maria dell'Ammiraglio, southern elevation, with the characterisation of the stone materials, the plaster finishings and the presence of metallic elements. The graphic representation also presents the numerous holes due to the placement of beams and the absences or losses of materials. Lastly, also the wooden elements and drain pipes for the disposal of rainwater (survey by the A., 1985-86).

that: "such Baroque or modern restorations are very easy to identify; the evil lies not, archaeologically speaking, in that which was added to the construction, but that which was either damaged or destroyed in order to make the additions …" (10).

Giuseppe Patricolo supplies news on the restorations and resumes the traditional eclectic derivation of the constructive matrix: "it is but the reproduction of one of the many Greek churches erected in the Orient… with regard, then, to the decorations… it takes much from the Arab monuments of the Cairo… one can conclude that the church… is a veritable type of Arabo-Byzantine architecture" (11). Charles Diehl, in a first text in 1894, focusses his position on the Baroque: "*l'église… fut au XVI et au XVII siècle scandaleusement remaniée au goût du jour… des additions du goût le plus prétentieux s'etalèrent à la place des mosaïques*" ["the church… was, in the 16th and the 17th centuries, scandalously altered according the tastes of the time… some additions of the most pretentious taste were laid out to replace mosaics"] (12); while, in 1926, he insists on the constructive matrix of byzantine derivation (13).

Giovan Battista Rivoira, in 1914, analyses some constructive features with regard to the "angular junctions" of the tympanum of the Martorana, of San Cataldo and of the Palatine Chapel, identifying direct descendencies from the "low junctions of the vestibule of the mihrab of Hakan II in Cordova" (14).

Enrico Calandra, in 1938 (ed. 1997) draws attention, among other things, to the reading of the features: "these are compositions based on the compositional play of simple volumes: cubic… cylindrical, hemispheric, set off in all their worth by small, precisely cut, decorations in polished stone, without overbearing outcroppings on the part of cornices, which is further lightened by slight niching" (15).

Guglielmo De Angelis d'Ossat, in 1942, summarised the convergence of the various Norman, Arab and Byzantine trends "assimilated immediately by the intelligence of the local builders", while, with regard to the figurative mosaic decorations, he points to models from the Byzantine tradition, the same applying also to the use of pulvins, the domes and the very quadrangular architectural plan *"coperte a volte"* on central supports. Lastly, the scholar specifies that in all of southern Italy, and especially in Sicily, "domes from the Roman times show Byzantine reflections, sometimes mixed with Arab influences, which are often more insistent" (16).

Richard Krautheimer, in 1965 (ed. 1986), resumes the traditional derivation of the Byzantine reading with the exception of the belfry; in fact, he considers the Martorana to fall under the category of churches "with Middle Byzantine architecture"; while the mosaics and the inscriptions only serve to stress the contrast between the mosaics and the architecture. He then analyses the proportions, which he finds to be "not at all elegant", while, for the columns and the capitals, he points out the presence of looted materials. Lastly, with regard to the tower, he overbalances himself in favour of North European attributions: "... it is in French style, not Byzantine, a precocious derivation of Laon Cathedral" (17).

Francesco Basile, in 1975, draws attention to the architectural structure: "it is a new generation of architects, which steps into the spotlight and shows itself ready to broaden the register with inventive renovations… The church has a plan of an uncertain definition, between a basilica and a central plan, namely because of its collected form, almost a triabsidal square. The dome sticks out in the centre over two semicylindrical vaults which join at a right angle… as the author includes a play with lower vaults in the prismatic form of the surrounding walls. The tympanum, with an octagonal base, rises in the centre to crown the overall volumetric form..." (18).

Synthesis of the church´s construction phases

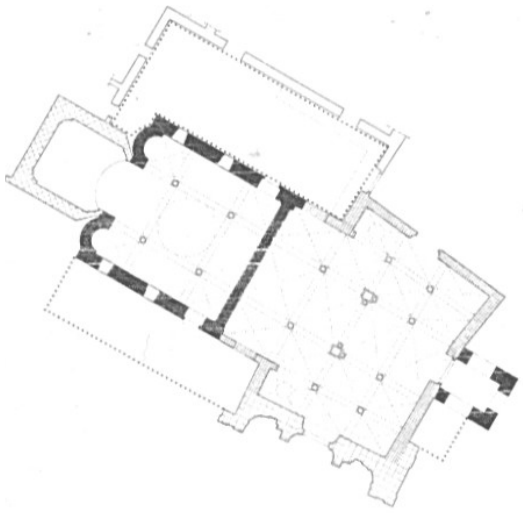


Fig. 3. Synthesis of the main construction phases of the Martorana from the first medieval nucleus to the Renaissance and Baroque stratifications and additions and also the perimeterings of the structures demolished in the interventions by Patricolo, in 1860-1870 (1988). Every major historical cycle is distinguished by a different fill (45°, perpendicular, etc.). See figure 15 in chapter 1.

Fig. 4. Palermo, 1985 view of the northern side of Piazza Bellini with the Church of the Ammiraglio and, on the right, that of S. Cataldo.

Ernst Kitzinger's volume from 1990 concludes this repertoire of reflections. The author, with his far-reaching study on the history of the mosaics manages to clarify the multi-secular historical process of the mosaic decorations; nevertheless, some concerns emerge on the architectural reading by Slobodan Curcic: in particular, when he writes that: "the church represents one of those curious conservative compromises which do not correspond to any particular state of the historical development of the edifice". And again, when he adopts the definition of "restructuring" as if one could employ this term to indicate the historical process of the monument (19). Furthermore, the very same reconstructive schemata show weaknesses also in the graphical representation, while the architectural aspect of the Baroque façade continues to be underestimated (20).

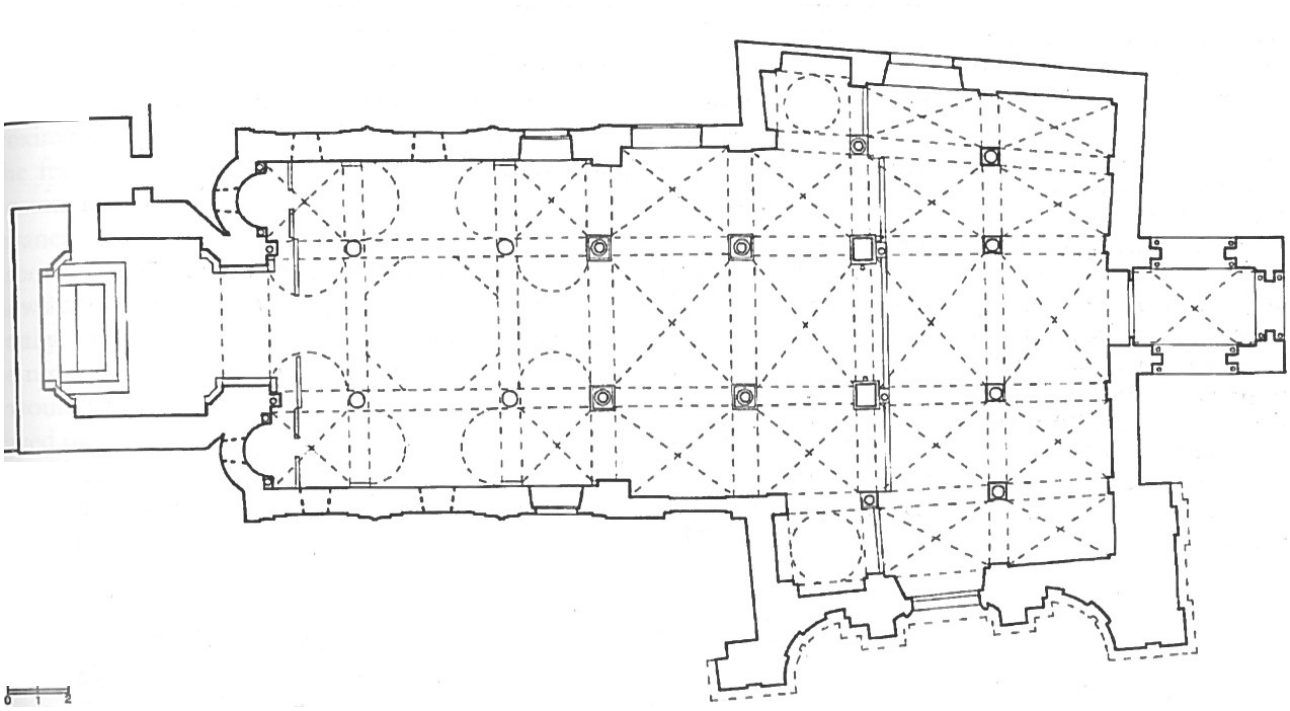


Fig. 5. Church of Santa Maria dell'Ammiraglio, plan at the height of 1.20 m (survey by the A., 1986).

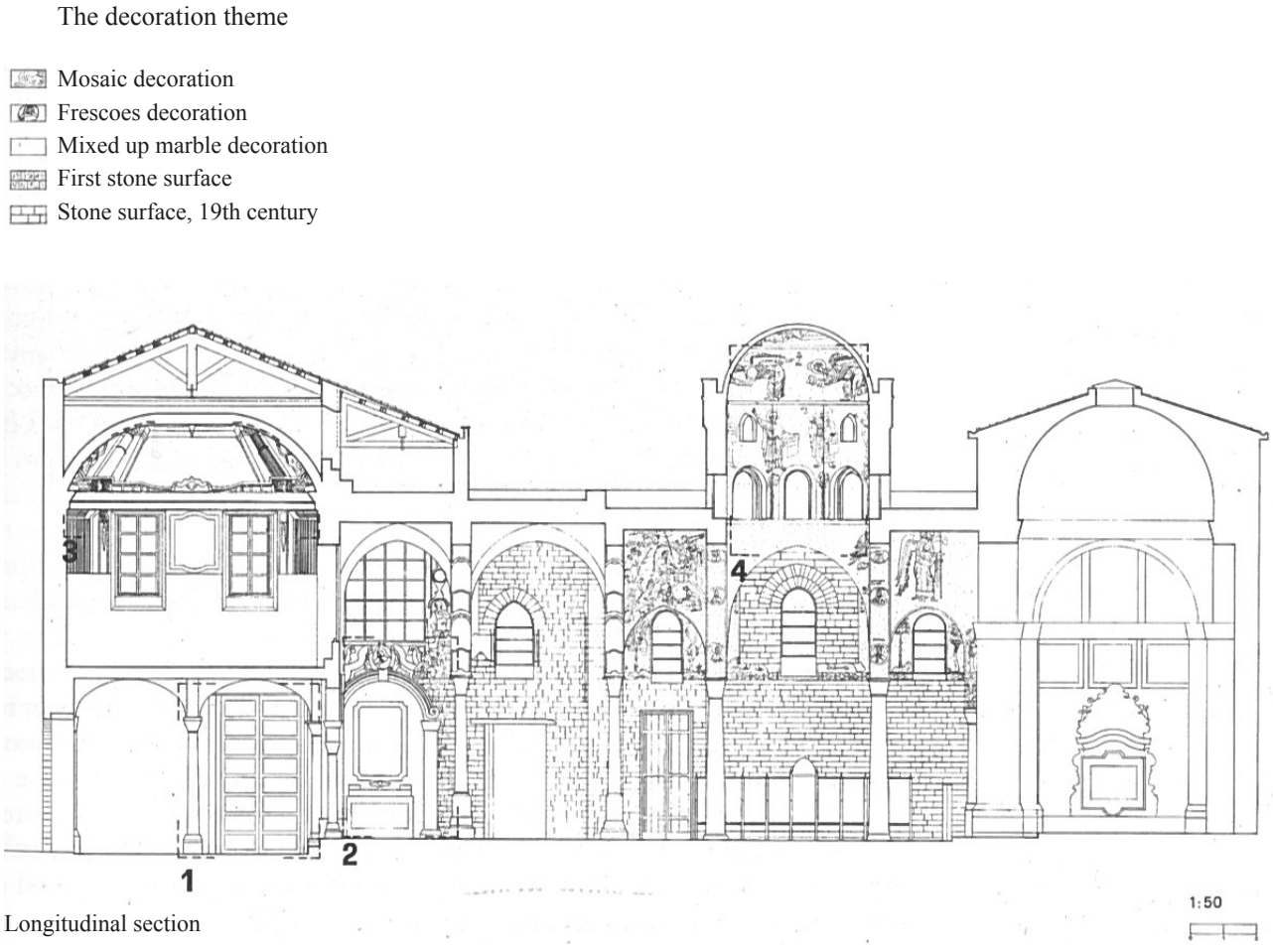
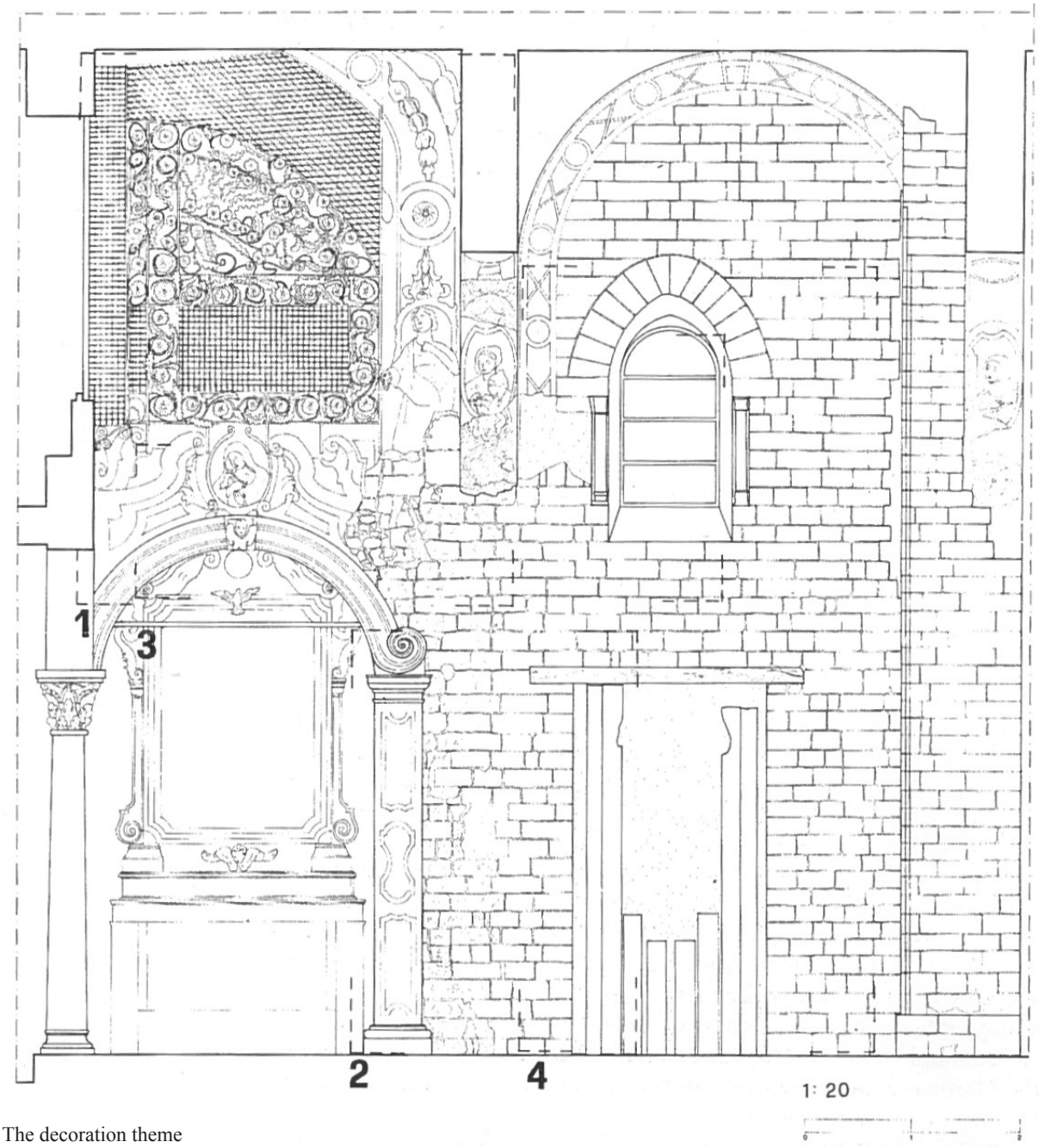


Fig. 6. Church of Santa Maria dell'Ammiraglio, longitudinal section with indication of the mosaic decorations, the frescoes and the stone paraments (survey by the A., 1987).



The decoration theme

Fig. 7. Church of Santa Maria dell'Ammiraglio, detail of the decorative composition (survey by the A., 1987).

The architecture features of the nucleus in the norman period

The initial nucleus dates back to the 12th century and, to be more precise, as confirmed by the foundation diploma of the Admiral George of Antioch, to May 1143 (21). A preliminary reading of the architectural enclosure reveals a complex structural stratification, albeit in the constant adoption of a constructive model composed of the frame of the perimeter wall and by the column-arch system, on which stand the cross vaults beyond the octagonal tympanum supporting the dome. The addition of the 16th century and 18th century church is based on the same system, but with lowered cross vaults holding up the choir. The latter is delimited above by a *cavetto* vault.

The organism pertaining to the Norman period is constituted externally by a regular cube, delimitated above by the hemisphere of a dome encapsulated in an octagonal tympanum. There are three couples of concentric, blind arcades which mould the exterior surfaces of the elevations composed by the regular ashlar. The constructive material consists in ochre coloured tufaceous rock with variations in tonality and grain. The small squared blocks highlight the average height of approximately 20cm with a very thin stratum of mortar (Fig. 4).
The frame wall consists in the disposition of the above-mentioned ashlar (orthostats and bondstones) and not a simple covering as in other sites of the Mediterranean. With regard to the arches, attention is due to the customary radial disposition, while the dome, in relation to the others decorated with mosaics, shows concentric rings which were completed during the so-called work day (22). Finally, the joint between the rectangular element and the dome is achieved by the niches set at 45°.
It would be opportune to remember, in this brief profile, the theme of the reemployed of ancient architectural elements: in particular, the church of the Norman period has four reclaimed columns constituting the *naos*, three are in beige marble with broad veins, one fluted, while the other is made of Red of Chios. All of them are delimitated by Corinthian capitals, of which two are ancient and the other two are "worked *ex novo* into a highly classicist style" (23).

The theme of the belfry

This church has "a belfry supported by marble columns of various colours… it is made of domes and planes superimposed upon one another… it is called the belfry of the columns". This summary description from the 12th century, handed down to our day thanks to the Arab traveller Ibn Gobair, influenced its reading for some centuries. In fact, the prismatic form of the first two orders contrasts with that of the others. The different draftings of the two blocks are given by a lower wall surface that is distended and continuous with a greater thickness and a flat finishing. On the other hand, the complex structure of the last two planes shows a different configuration, particularly in the corners with the insertion of cylindrical elements, as well as featuring a reduced height of the arcades; hence it seems opportune to assert the two different phases of construction.
From the reading of the features, from the size of the sandstone blocks and from the decorations applied in the Aragonese period (1282-1410), it can be asserted that, in the Norman period, the first two planes were extant and the dome was placed to crown these first two levels.
A series of analogous interventions with the addition of orders for medieval belfries in southern Italy in the Norman period can be found, to cite but a few, at the Cathedral of Palermo, the Cathedral of Cefalù, the Cathedral of Gaeta and the Cathedral of Caserta Vecchia (24).
Hence, with regard to the final crowning it can be deemed that the finding of the document on the 1726 earthquake in Palermo, with the "removal of the spire" or of the "summit pyramid" (25) from the belfry, can confirm the above hypothesis of a pyramidal top added only in the Aragonese period.

The Renaissance and Baroque additions

On 7 December 1433, the church is inserted among the properties of the adjacent Benedictine monastery of the Martorana. From this period, a series of continuous

additions and stratifications commences, such as to render the whole an architectural complex with an open constructive cycle.
In fact, on 30 September 1434, King Alfonso of Aragon separates the administration of the church from that of the Palatine Chapel and the construction begins of some elements onto the southern façade. The same double-arcaded portico, still existing today, situated in front of the southern door, dates back to that period (26).
The first significant addition and transformation of the church dates back to 1588 with a veritable elongation of the structure: the medieval four-sided portico is covered, even going so far as to enclose one of the four sides of the bell tower. This intervention, dating back to the time of the abbess Eleonora Bologna, consisted in the recomposition of the organism: "They have embellished it and adorned it with columns, and have reduced it to a single body" (27) (*L'han fatto racconchiare et adornata de coloni, et redurla in un corpo solo*).
A religious space more appropriate for the new monastic needs is proposed, as well as an ample upper choir reserved for the nuns. The irregularity of the lower choir is in fact due to the adaptation of the new perimeter to the limitations of the existing medieval structures. One should keep in mind that, for the realisation of the new church and in order to maintain the height level with the customary surpassed arch and let the Norman dome emerge from the flat roof, four columns were erected as a continuation of the Norman ones, adapting them *in situ*.
In fact, on 16 July 1588, four white marble columns were acquired from the Confraternity of Santa Caterina all'Olivella, which were reassembled with the granite column from the atrium "divided into four pieces" (28).
It should furthermore be noted that, according to the regest of the construction, the sacresty and the Chapel of San Benedetto were realised between 1680 and 1683. The accomplishment of these works covered by two thirds the height and the entire length of the medieval southern façade (29). A subsequent construction refers to the demolition of the central, mosaic-decorated apse, with the "substitution" of the large Baroque chapel between 1683 and 1686. The so-called four-sided big chapel is realised under the abbess Caterina del Castello, designed by Paolo Amato. The two marble pilasters situated at the entrance were finished in 1701 (30) (Figs. 5, 6).
The aspect of the decorations is emblematic of the place and the religious order. The exuberant decoration of marbles with statues and reliefs marble facing (*mischi e tramischi*) also presents a St. Benedict and a St. Placid to the sides of the tabernacle, while a St. Rosalia and a St. Agatha are situated at the entrance. Among the reliefs, two *tondi* are of note, the death of St. Benedict and that of Scholastica. The colours vary from white to yellow, red and "*paragone"* black (31).
Processual architecture can also find other expressions, first in the exuberant frescoes of 1717 and of 1728, by the Flemish Guglielmo Borremans, the pavement dating to 1738, as well as the Baroque façade by Nicolò Palma. As for the cycle of 1700s frescoes, it would be opportune to keep in mind that those situated in the "new church" were carried out over the 1500s wall paintings, which have now re-emerged in parts (Fig. 7).
The pavement is by the city senate architect, Nicolò Palma, who had spent long years in Rome and had come into contact with the circle of Carlo Fontana and of the Accademia di San Luca.
The prevalent features still express the Baroque exuberance, together with the broad surfaces of ancient marble, granite and porphyry, alongside some of the marbles of the Sicilian 1700s: the red from Piana degli Albanesi and the yellow from Castronovo di Sicilia (32).

The "*nova facciata*"

Finally, the Baroque "*nova facciata*" (new façade) closes, in a way, the cycle of the continuity of realising architecture over the existent structure.
This façade, realised between 1751 and 1752, completes the 1600-1700 set of the piazza, together with the existing church of the Dominican Convent of Santa Caterina, with which the Benedictines of the Martorana found themselves in overt artistic competition when they entrusted the construction of the above-mentioned façade to Nicolò Palma (Fig. 8).
That of the Martorana, at least in its initial draft, can be considered among the "tower-like".
The latter determine fifths, straight lines or curves, and are among the most frequent. Furthermore, the upward character is to be noted, by way of the lateral volutes (*volute di raccordo*), while the space reserved for bells was in the last order.
It breathes life into a vibrant image, a veritable "perspective canal", if one reads it from Piazza Pretoria, between the Palazzo Senatorio and the convent of Santa Caterina. The whole is softened to dissolution, if the vision is transformed into a foreshortening from the adjacent streets, all as a function of the hour of the day, with the illuminated sections or just those in shadow.
It has a horizontal length of 15.40 m, while the actual height without the Belvedere is of 14.60 m.
The current façade, slightly concave with two lesenes coupled to the wings, carries out the traditional theme of the the superposition of the orders with a particular characterisation in the central part. The lower order is articulated with regular, jutting lesenes, enriched with panelling (33). In the central part, the bases of the orders are attic, with a plinth upon which a lower tore, a listel, the scotia, the hawksbeak and then the upper tore and the column shaft. The capitals show the influence of post-Michelangelo echoes, as they bear Ionic molding with vine shoots.

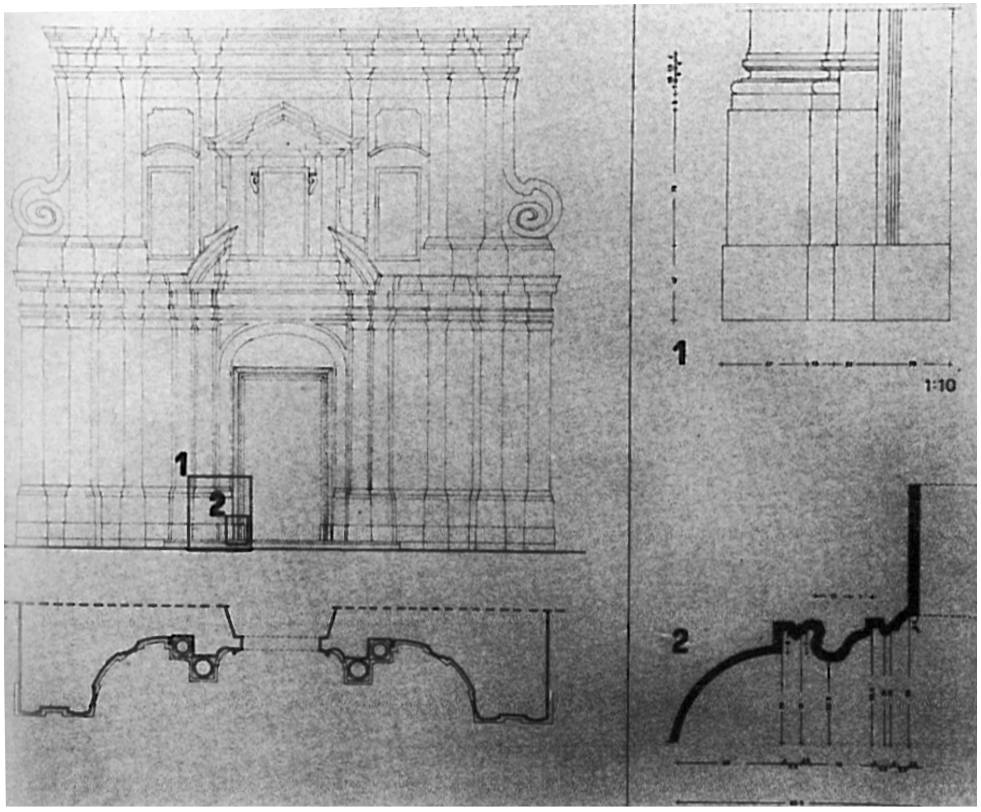


Fig. 8. Church of Santa Maria dell'Ammiraglio, façade 1:50 and architectural details 1:10. The insertion of these details means to highlight the importance of first-hand surveys for an ever more profound understanding of the architectural organism (survey by the A., 1987).

The order ends at the top with a continuous trabeation, correct in its language but not very refined, upon which the upper section is situated. The second order continues with lesenes with internal panels, bordered by composite capitals. The junction is constituted by the scrollwork, which seem to wish to conserve the unity with the lower order, besides delimiting its character in its horizontal layout, which simultaneously provides vertical momentum. The contribution of the first generation of the Roman Baroque is absorbed: evidence of the obedience of each element to a structural law, no longer analytically expressible, but realisable in virtue of a consummate experience of the visual values of the forms, is given by the scrollwork which, in its abstract configuration, feels the centripetal force dominating the composition and inflects, almost attracted by the compositional fire. In this order, one can read some decorative elements, especially to the sides of the tympanated aedicula which ends the portal, in the selfsame triangular tambour and the frames of the windows. The compositional intensification manifests in the central part, in the pediment, where the adhesion to the Baroque language is more evident. The architectural chassis, consisting of the portal and the upper aedicula, is that which gives a "*chiaroscuro"* value to the façade: this is the part which is flooded with light, the ideal centre of the image, the point where the matter is most vibrant. This façade is, in conclusion, a clean architecture, without being bunched up: there are no half lesenes, but only complete ones.

There is a return to the sonorous Baroque, albeit well proportioned, which shows some originality. The scrollwork, local inspiration, is full bodied, but turns rather well. It distinguishes itself from the Roman works because it is not only on the plane of the wall, but continuous laterally, at least that on the right, like a small trunk. Thus this is an architecture in which the fineries are to be sought, besides in the cautious environment of the Sicilian Baroque, also in the Roman one, from which it draws inspiration and references (34).

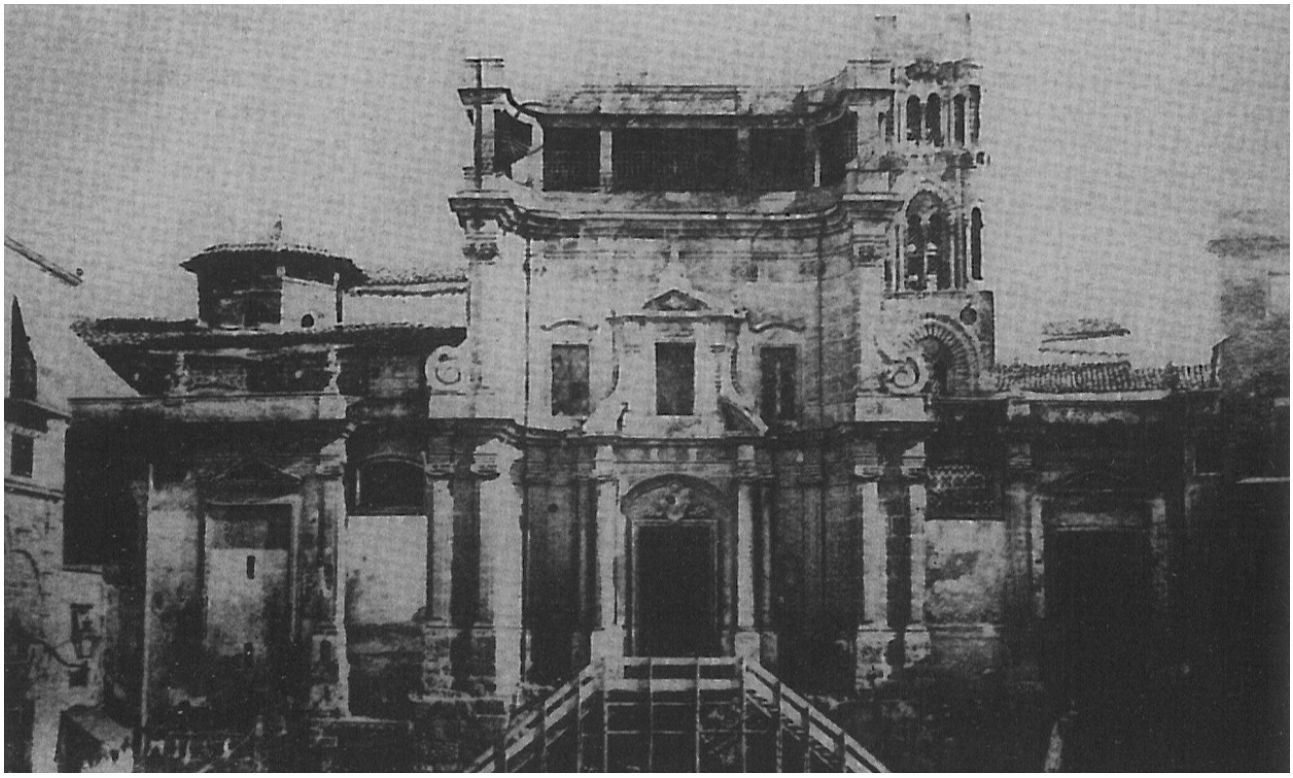


Fig. 9. Façade of the church before the interventions carried out by the Public Works Office in 1874 for the demolition of the covered roof terrace and the restorations carried out by G. Patricolo (Superintendence of Environmental and Architectonic Properties of Palermo, Archive).

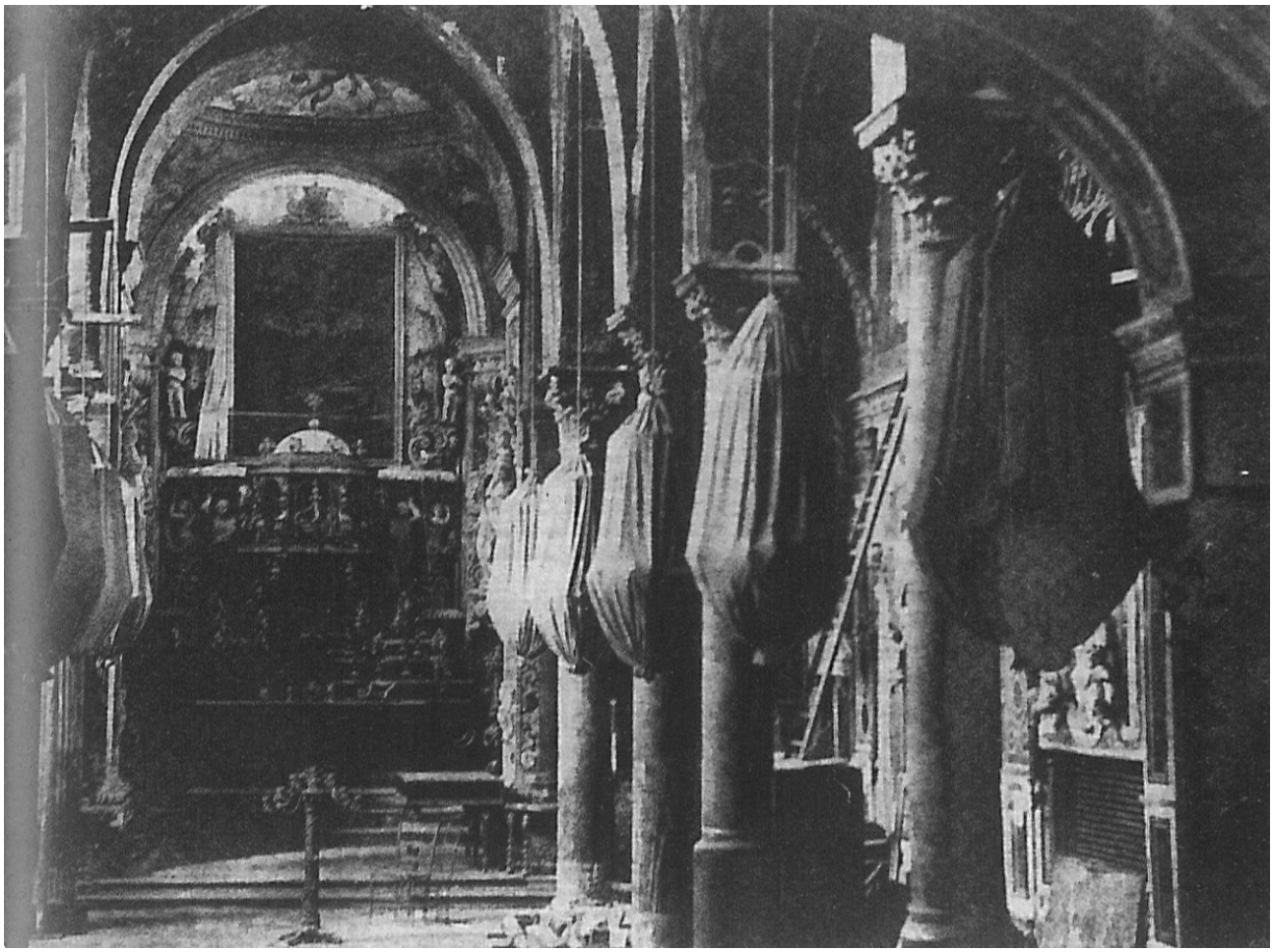


Fig. 10. Interior view of the church during the intervention by G. Patricolo (Superint. of Environ. and Arch. Properties of Palermo, Archive).

The 1800s

The ensemble of the attitudes on the existent architecture in the 19th century, particularly in the '70s and the '80s, reflects, in the microcosm of the Martorana, some Italian and European views on restoration, understood both as stylistic restitution and as the conservation of architectural stratification.
Even though the attitude of repristination "in both styles" would prevail, implemented by Giuseppe Patricolo with the elimination of the Baroque decorations from the Norman nucleus (35) (Figs. 9, 10), it seems opportune to draw attention to a text that is not well known but which is effective with respect to the continuity of doing architecture, by Ernesto Renan, predecessor of Anatole France, who stated in 1876: "what to say of the Martorana, that little masterpiece of a church, with its Arabic and Greek inscriptions, bizarrely become a chapel for nuns, who, without altering much the primitive parts, adapted them to their uses by means of additions in a style that may be pretentious, but is also pleasing in its simplicity? The question of the restorations emerges here in all its clarity. Is it necessary to suppress those small frivolities of copper and polychromatic marble, which so pleased the poor recluses; those beautiful gilded gratings which allowed them to satisfy their curiosity without breaching their cloister… that tribune, or rather, that Pompadour salon in which they sang on holy days; those little panels in which primitive mosaics mixed with the most unruly Baroque puerility? For my part, I would hesitate to lay my hands on them. The Baroque is expressive in its own fashion. What is history if not the most ironic and incongruous association of ideas?

"A monument must be accepted as the past which binds it; however possible it may be, its destruction must be avoided, that is all. In France, this measure has been surpassed, for with the pretext of leading the edifices back to a pretended epochal unity, which they never had, there has been destruction, modification, termination, completion and thus preparation of the curses of future archaeologists, whose task has been rendered so singularly difficult by this indiscreet retouchings… Under the pretext of making the edifices that which they once were, the 17th and the 18th century were suppressed… If, by removing the frivolities of the Martorana, it could have been hoped to find ancient, hidden elements, I would myself deem that they should be removed; but the disappearance of those frivolities would not render us an atom of that which has been lost… The 17th century is now being destroyed as insipid and devoid of character. Who knows what will be the tastes of posterity and if the 19th century will not itself be treated, in turn, as a vandal? There is but one sure way to avoid this bad name… not to destroy the monuments of the past in their present state" (36).
A subsequent reflection by Salvatore Cavallari, quoting Adolphe Didron, and expressed the hope for history not to be mystified "not in order to conduct a systematic opposition to rifacimentos to the new, mummified under the pretence of restoration, but because I have the conviction… that of the ancient monuments only that which exists should be conserved" (37).
Essentially, what is witnessed is the taking of a stand, unfortunately still one that is in the minority, with respect to the prevailing climate, but effective inasmuch it would attempt to make a contribution to the differences between restoration and "remaking" which are ever current issues.

Postscriptum

Over the course of the summer of 2008, the lengthy administrative phases have been concluded for the approval of the executive phases for the restoration project.
Two decades from the presentation of the first study and the relative restoration project for the Martorana and the museum conversion of the courtyard between the presbytery, the church and the upper choir, it seems that a new cognitive phase is starting for this case of faith, art and history. The task will be that of going into more depth with new reflections and meditated essays.

During the last years, after the complex interventions of restoration executed by a team of experts in the different sectors of the discipline, the results of the previous researches can be read. In particular, for the outside they've been carried out, after the necessary cleaning, the appropriate reintegrations of the image of the different constructive characters, particularly for the bell tower and for the Baroque façade. For the interiors, the critic-conservative method has prevailed, to maintain as much as possible, the spirit of the time.

I would like to express my most sincere gratitude first to Prof. Renato Bonelli who suggested this theme to me, Prof. Salvatore Boscarino, who guided me in the initial years of my research. I would also like to thank Prof. Giovanni Carbonara for the constant interest shown for this reflection on the constructive history of the Martorana and for all the preparation phases of the restoration project.

Notes

All photos are by the author except when indicated.

1. G. DI STEFANO, *Monumenti della Sicilia Normanna*, Palermo 1955, ed. 1975, pp. 41-44; W. KRONIG, *Il Duomo di Monreale e l'architettura normanna in Sicili*a, Palermo 1965; L. RUSSO, *La Martorana*, Palermo 1969; F. BASILE, *L'architettura della Sicilia Normanna*, Catania 1975, pp. 68-86.

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6. J.I. HITTORFF, l. VON ZANTH, *Architecture moderne de la Sicile ou Recueil des plus beaux monuments religieux et des édifices publics et particuliers le plus remarquables de la Sicil*e, Paris 1835, p. 8, and table LXXIV, fig. 4.

7. D. LO FASO DUCA DI SERRADIFALCO, *Del Duomo di Monreale e di altre chiese siculo normanne, ragionamenti tre*, Palermo 1838, p. 35.

8. H. GALLY KNIGHT, *The Norman in Sicily: being a sequel to an Architectural tour in Normandy,* London 1838, pp. 261-265.

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10. C. BOITO, *Le chiese del XII secolo*, in *Architettura del Medio evo in Italia*, January 1867, Milano 1880, pp. 67-68, 77, 88, 100, 105, 107, 110, 112-113.

11. G. PATRICOLO, *La chiesa di Santa Maria dell'Ammiraglio in Palermo e le sue antiche adiacenze*, in "Archivio Storico Siciliano", II, 1877, pp. 137-138.

12. C. DIEHL, *L'art byzantin dans l'Italie meridionale,* Paris 1894, p. 222.

13. Id., *Manuel d'Art Byzantin*, Paris 1926, pp. 550-555.

14. G.B. RIVOIRA, *L'architettura musulmana: sue origini e suo sviluppo,* Milano 1914, pp. 159-168.

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18. F. BASILE, *L'architettura della Sicilia Normanna*, Catania 1975, pp. 73-80.

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20. C. BELLANCA, *Niccolò Palma a Santa Maria dell'Ammiraglio, (La Martorana)*, in "Storia Architettura", IX, 1-2, 1986, pp. 125-142. This was the first essay by myself on the Martorana, stemming from the rediscovery of a document, unpublished at the time, concerning the construction of the façade.

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25. A succinct description of the events relating to the earthquake of 1726 can be found in A. MONGITORE, *Chiesa di Santa Maria dell'Ammiraglio*, manuscript of the Biblioteca Comunale di Palermo, sec. CVIII, Qq. E. 8.

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30. A preliminary profile of the big Baroque chapel can be found in G.B. COMANDÈ, I*l cappellone della Martorana,* in "Casa Nostra", 78, Palermo 1958, pp. 25-28.

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37. S. CAVALLARI, *I ristauri della chiesa di S. Maria dell'Ammiraglio, e la traduzione di una memorie del professore finlandese C.G. Estlander*, Palermo 1887, pp. 19-20. On the long and lively debate on the intervention of restoration on the Martorana, see also the Acts of the commissione di Antichità e Belle Arti, published in "Nuove Effemeridi Siciliane" in 1876, with texts by G. Daita, G. Meli, G. Patricolo, A. Salinas. Furthermore, the texts by C.G. ESTLANDER, *Santa Maria dell'Ammiraglio in Palermo*, Palermo 1885; A. SALINAS, *Restauri nella chiesa dell'Ammiraglio detta la Martorana,* in "Rassegna Archeologica Siciliana", 4 January 1872; ID., *Trafori e vetrate nelle finestre delle chiese medievali in Sicili*a, Palermo 1810; E. SALEMI, *Sulla conservazione dei monumenti,* speech read by the author before the Società Siciliana per la Storia Patria in the sessions of 14 January and 28 February 1877; A. COPPOLA, *Della vita e delle opere del prof. arch. G. Patricolo*, commemorated on 17 June 1908, Palermo 1908, p. 24; the selfsame memoir of Patricolo by A. Coppola, and the documentation kept at the Archivio Centrale dello Stato, the fund of Francesco Valenti kept at the communal library of Palermo and, lastly, the recent synthesis by G. LA MONICA, *Giuseppe Patricolo restauratore*, Palermo 1976 and F TOMASELLI, *Il ritorno dei Normanni,* Roma 1994.

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3. Sermoneta, the Church of Santa Maria Assunta

Calogero Bellanca

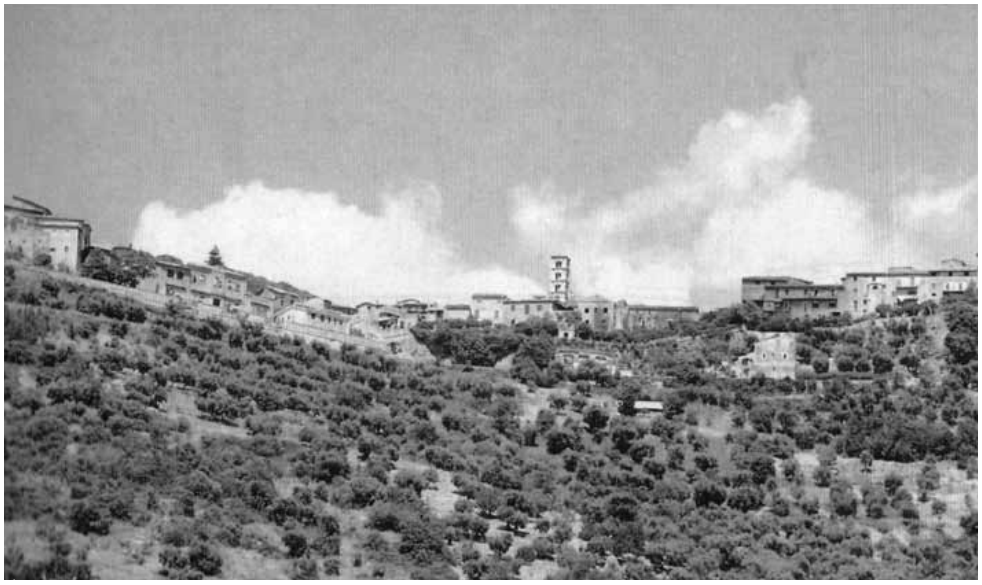


Fig. 1. Partial view of Sermoneta, with the bell tower of the Assunta seen from the Pontine Plain.

The Church of the Assumption in Sermoneta

The Church of the Assumption presents itself today as a compact, oblong block of aggregations of buildings, rising to compose and enclose the space of Piazza Santa Maria as well as that of the sections adjacent to the old town centre. Lacking a true frontal view, the monument can be seen both through the various visual channels determined by the layout of the roads of the residential area and as a raised structure in the panoramic vistas from the surrounding territory of the Lepini Mountains and the Pontine Plains (Fig. 1).
The goal set was that of clarifying the significant moments "of the monument in time"; to this end, a study was initiated with the direct examination of the existing constructions (Figs. 2, 11). At the same time, the historical-critical analysis was carried out, with the aim of identifying the stylistic-constructive and figurative features present, as well as the various phases of construction, through the study of the first additions and transformations affecting the initial nucleus, and afterwards of the first "restoration" interventions of the modern age (Renaissance and Baroque), and also the actions aimed at bringing back to the fore some moments of the history of the monument.

The previous contributions

Various contributions have been produced on the Assunta of Sermoneta, with, at times, discordant interpretations, both of the sources and of the architectural organism. Chronologically, I would like to mention the writings of Pantanelli, Marocco, Raymondi and Corniola, Enlart, Muñoz, Terenzio and also those of Wagner-Rieger, Tamanti, de Sanctis and, lastly, some observations made in a pubblication by Longo and Sassoli.

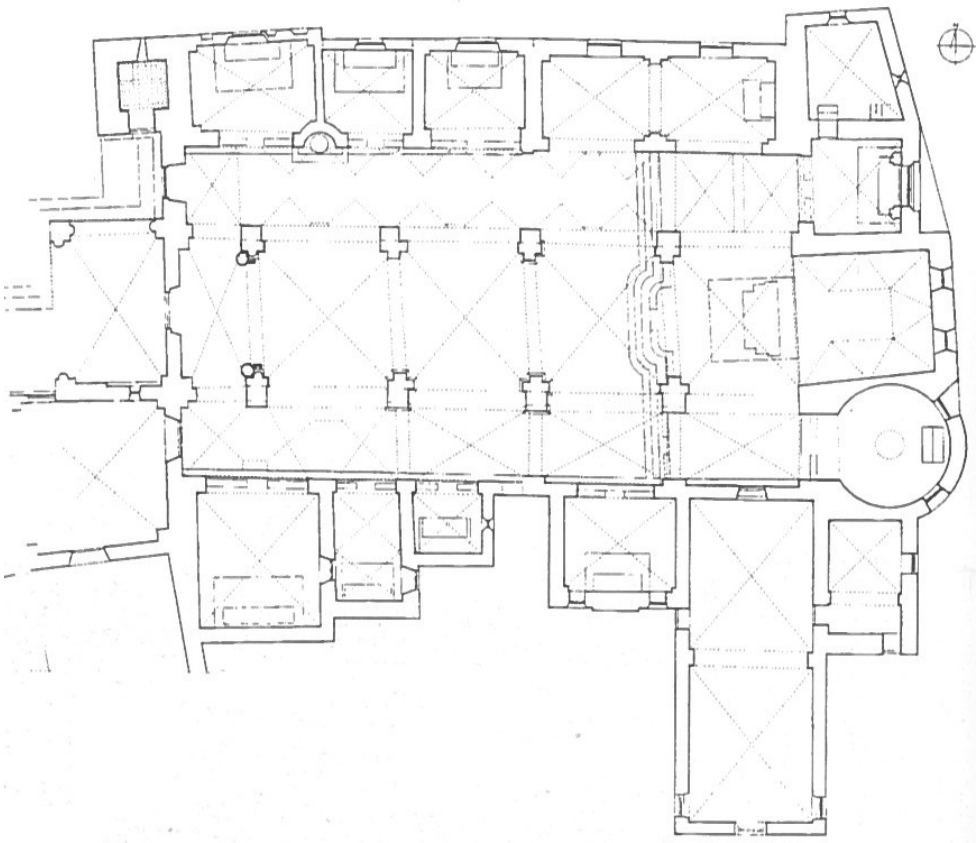


Fig. 2. The architectural survey. The plan.

Pantanelli writes:
"The temple is mediocre but of a barbarian structure; having been destroyed around the year 1030 due to the civil wars, by Lano Maggiore... it was then remade, as we can see, accordance to the ignorance of those dark centuries; and, what is worse, thus were all its ancient documents lost; hence its archive has no scrolls older than this period... It is built with vaults, lancet arches, three naves, but originally it did not have chapels. The nave of the Gospel did not communicate with that in the middle, as is clear by the truncated corbels of the vaults, on the occasion of the opening of the arches; hence it is not improbable that it would be used by women in centuries of greater circumspection... The chapels have been erected in different periods by the piety of the faithful and are all dissimilar from one another. Originally, the choir was in the form of a tribune and semicircular" (1).
Marocco mainly focusses on the ancient Altar, on the painting of Benozzo Gozzoli, on the Caetani Chapel and mentions some visits by Pope Gregory XIII, Charles V and Frederick III (2). Raymondi and Corniola reprise the citations by Pantanelli and focus on some particulars, among which the collapse of the spire of the bell tower, the construction of the new sacristy of 1733 and the painting in the niche of the bell tower (3).
Enlart reprises from Pantanelli with regard to the citation of the sources and accepts their dating of the destruction and the subsequent state of neglect until the second quarter of the 13th century. He sets the date of the reprise of construction at around 1235, linking the initiative to the intervention of the "School of Fossanova" through a careful philological reading of the monument and considering the dating of the portico to be later than previously thought, although without specifying it; lastly, he cites the date of 1734 as the date of alterations left unspecified (4).

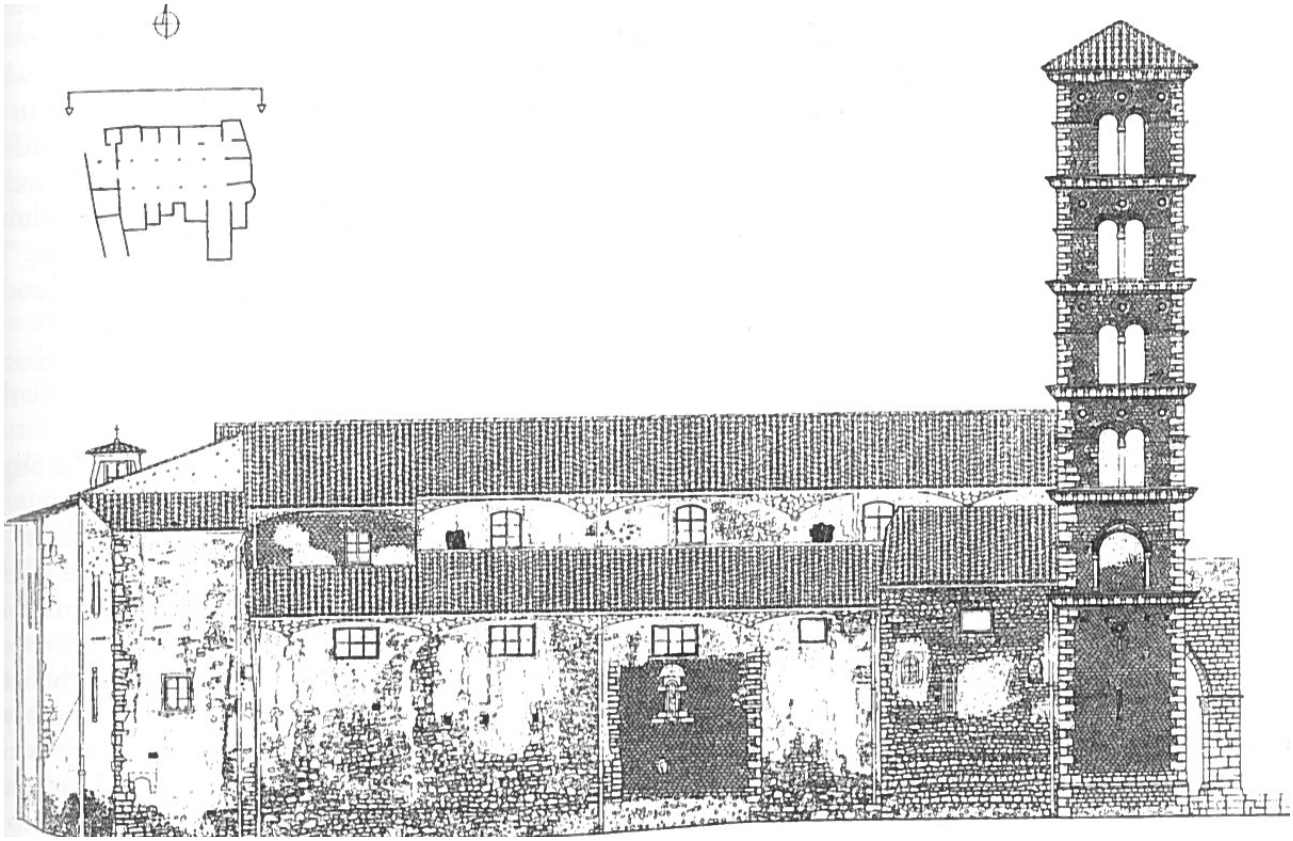


Fig. 3. Southern elevation.

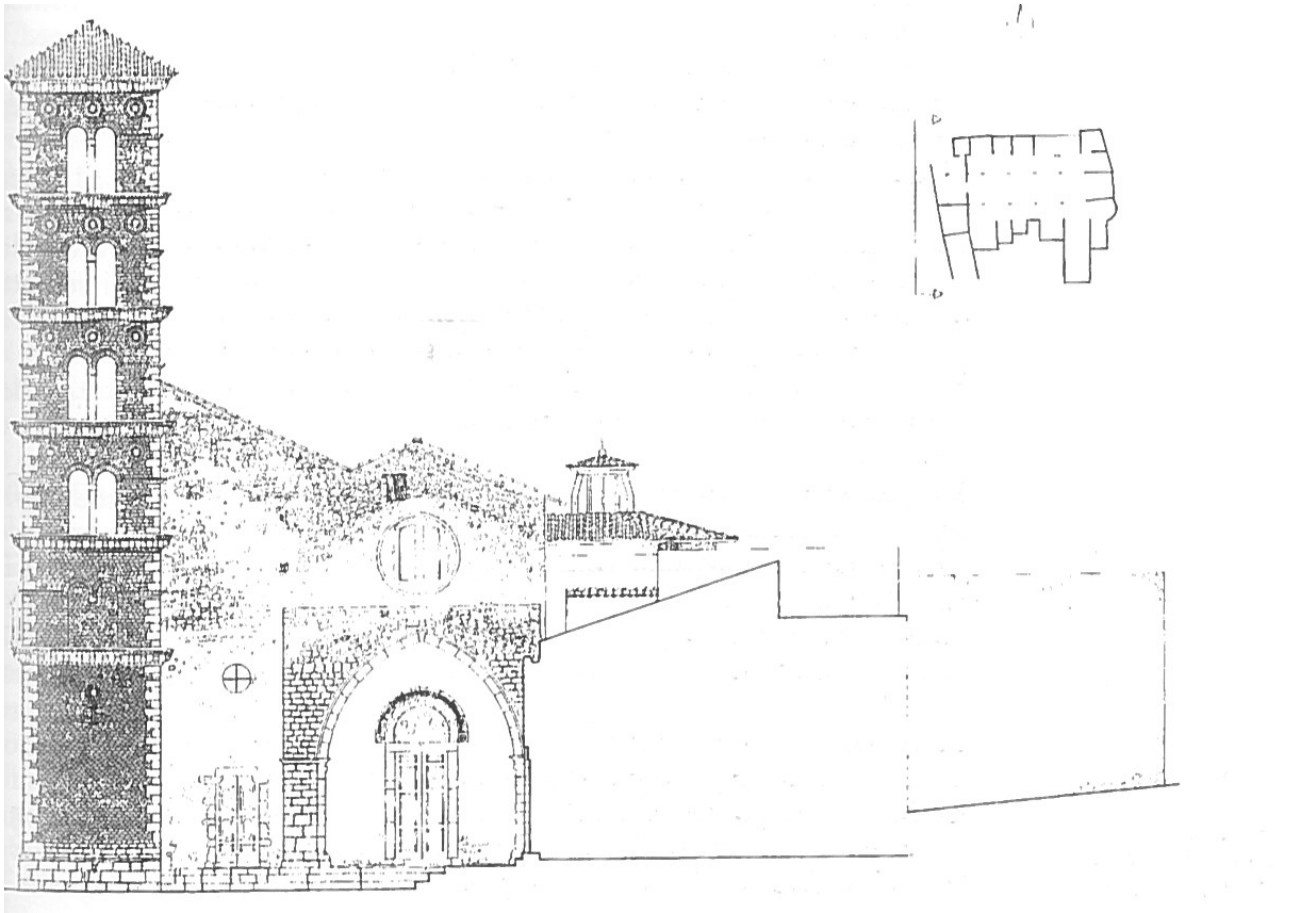


Fig. 4. Western elevation.

Muñoz especially highlights the moment of the constructive renovation, when the church "acquired the gothic character in the restorations it underwent in the 13th century, but unfortunately was reworked in approx. 1734"; he also synthetically describes some emerging features: "the transept, the nave with four arches, the lateral naves, the ribbed vaults which rest on cruciform columns; the columns of the minor naves are, instead, detached from the floor, ending in cones. The capitals have two rows of leaves terminating either in groups of small acanthus leaves, or flowers, or human heads" (5).

Serafini concentrates his attention on the bell tower, hypothesising its realisation to be coeval with the first church, "at the beginning of the 12th century"; he then describes its stylistic features (6). Alberto Terenzio supplies news on the restorations just completed by the Superintendency: for a long time, its gravely deteriorated state was a cause for great concern: the noteworthy overhang on the western side; a broad crack from the base level to the first order; broken and abraded cornices... broken arches in the mullioned windows. In order to strengthen the conditions of staticity, some clumsy restoration work was carried out: the wall of the façade of the church was lengthened to buttress the bell tower, the mullioned windows were walled up, often destroying the cornices of their arches... a clock was installed on its walls; the only ancient entrance to the bell tower was walled up and the another was opened by demolishing the wall of the bell tower communicating with the church.

Among the damages caused by time and those determined by hasty and quick restorations, the bell tower was... compromised... The recent restorations must have been totalitarian... All the walls were then joined together, the lesions stitched up, the corner facing the portico of the church was completely underpinned, the arbitrarily opened door was closed and the ancient one opened... Lastly, the wall between the church and the bell tower was not removed due to static necessity, but was instead consolidated and reduced in height.

Next was the second part of the works, that is to say, to return the bell tower to its initial appearance: the clock was removed, the mullioned windows were reopened excepting those of the second order, replacing their missing or broken columns and capitals, the dividing cornices were reprised... and the ceramic plates... Thus the bell tower was restored its normal, impeccable eurhythmy of voids and fills, its bold height, its rich, polychromatic decoration (7).

Wagner-Rieger's contribution diverges in part from Enlart's thesis, as it considers the Assunta as being closer to the Church of Valvisciolo Abbey and relates the two of them to the presence of the Knights Templar (1177-1183).

With regard to the "massive rectangular columns" which englobe the previous ones and become the module of the new church, the Austrian scholar proposes a possible derivation from Vaux-de-Cernay, which is superimposed to that of Fossanova and Casamari (8).

Tamanti accepts and develops the hypotheses of Camille Enlart and Renate Wagner-Rieger, reading two constructive moments in them. She describes the present state of the church, dwelling especially on the bell tower and on the works carried out by the Superintendency to Monuments for Lazio in 1963, "which removed the 1700s plaster and brought into view the structure of the columns and the arches". In fact, the scholar concludes her contribution by comparing the Assunta of Sermoneta with the ruins of the Church of Santa Maria of the Monastery of Mount Mirteto (9).

De Sanctis reaffirms, both for the Assunta and for the Church of San Michele in Sermoneta, a clear Cistercian presence and highlights the role carried out by the works of this order in various instances in the territory. Refering to the studies of

A.M. Romanini, she interprets these experiences especially along the lines that from Fossanova, through Priverno and Sezze, reach Sermoneta and Valviscio (10). Longo and Sassoli's volume does not go beyond a precise description of the Church of Santa Maria Assunta, with its chapels, but its cited as a useful update of the existing periegetic literature on Sermoneta (11).

The architectural features

A preliminary reading of the architectural enclosure reveals a complex structural stratification, albeit in the constant presence of those "features of straightforward simplicity and of solid continuity of the masonry" (12), typical of architecture of cistercian derivation (Figs. 3-11). The initial nucleus dates back to the first years of the 12th century, as other documents also seem to confirm; direct observation and the survey allow the identification of a church with three naves, with a simple absidal termination, without a transept. The breadth of the apse corresponds to the central nave, which is in a proportional ratio of 2:1 with the lateral naves.
The "Romanesque" organism was subdivided by 16 quadrangular columns in nine spans for each side; of these columns only 8 remain at present, englobed in the structures of the subsequent phase, which, with the expansion of the spans, cause the abolition of the missing ones. With reference to the plan, I will report the dimensions, all unique, of the initial columns. Marking the first column on the left with the letter A, the first on the right with the letter B, C the second on the left and so on: A (95 cm x 62 cm, maximum measurement), B (87 cm x 87 cm), C (89 cm x 61cm), D (92 cm x 84 cm), E (95 cm x 64 cm), F (95 cm x 86 cm), G (107 cm x 65 cm) and H (95 cm x 81 cm). For this group of columns, the height of the individual stones, laid horizontally with some exceptions,with a maximum height of 38 cm, varies from a minimum of 10 cm to a maximum of 27 cm. Their rhythm was regular, with an intercolumnal space of 10 Roman palms. Along the walls of the central nave opened 18 single-light windows, 9 a side, some still legible after the "flaying" operations carried out in the 1950s and the '60s. Other, smaller windows opened along the external walls of the lateral naves; of these latter apertures there are traces along the northern and southern façades. The masonry structure, constituted of horizontal layers, was divided into two levels, that of the arches and that of the wall above with the windows.
With regard to the initial apse, replaced in the Cistercian phase by the choir, one can hypothesise an assonance with that of the Church of San Pietro in Ninfa, also due to the very similar proportional ratios, which present two organisms (Figs. 8, 10) (13). The covering of the central nave was with a roof, with wooden trusses, while along the lateral naves, slightly lower, there was a simple wooden frame. The building measured 26.45 m in length (equal two 89 Roman feet) without taking into account the thickness of the walls; in width, it measured 14m (47 Roman feet). Also with regard to the raised parts, we can see the use of exact measurements: 10 Roman feet for the size of the arches up to the springer, another 10 feet from the springer of the arches to the base of the single-light windows, which, in turn, measured 5 feet (Fig. 5). Some surviving fragments of frescoes pertaining to this phase are also visible (14). The length-wise perimetral masonry do not show any great divergences, approaching the area of the presbytery, but the surface of the façades seems to be slightly tilted, according to a custom previously studied by De Angelis, linked to motives of urban design and to the presentation of the monument or to more subtle reasons relating to the psychological aspect of its viewing (15). The perspective rapport of the nave will tend to change substantially, as we will see, with the introduction of the

choir and of a gradual gradient at the height of the walkways in the subsequent phases of the life of the monument.
The ensemble of these features shows an architectural language which is clearly influenced "by influences from Southern Italy and, in turn, not exempt from penetrations of northern tastes" (16). See, for the spatial ensemble, besides the "Benedictine" columned churches "of the end of the 11th or the beginning of the 12th century, such as San Liberatore alla Majella or San Pietro ad Oratorium in Capestrano, Santa Maria della Libera in Aquino or San Domenico in Isola Liri" (17), or other constructions which appear similar to the initial organism, such as some southern examples in Apulia (San Giovanni di Patù near Lecce) (18), Calabria and Campania, where Byzantine traces and other central-European and Ottonian influences can be found. Among these, characterised by a longitudinal development of the space, which expresses itself "in the forms of the proto-Romanesque columned basilica", the Church of San Ferrante (previously Santa Maria di Compulteria) in Alvignano, (7th, 8th or early 9th century,) the Old Cathedral of Santa Severina (1036) and the San Donato in Umbriatico (end of 11th century) (19).

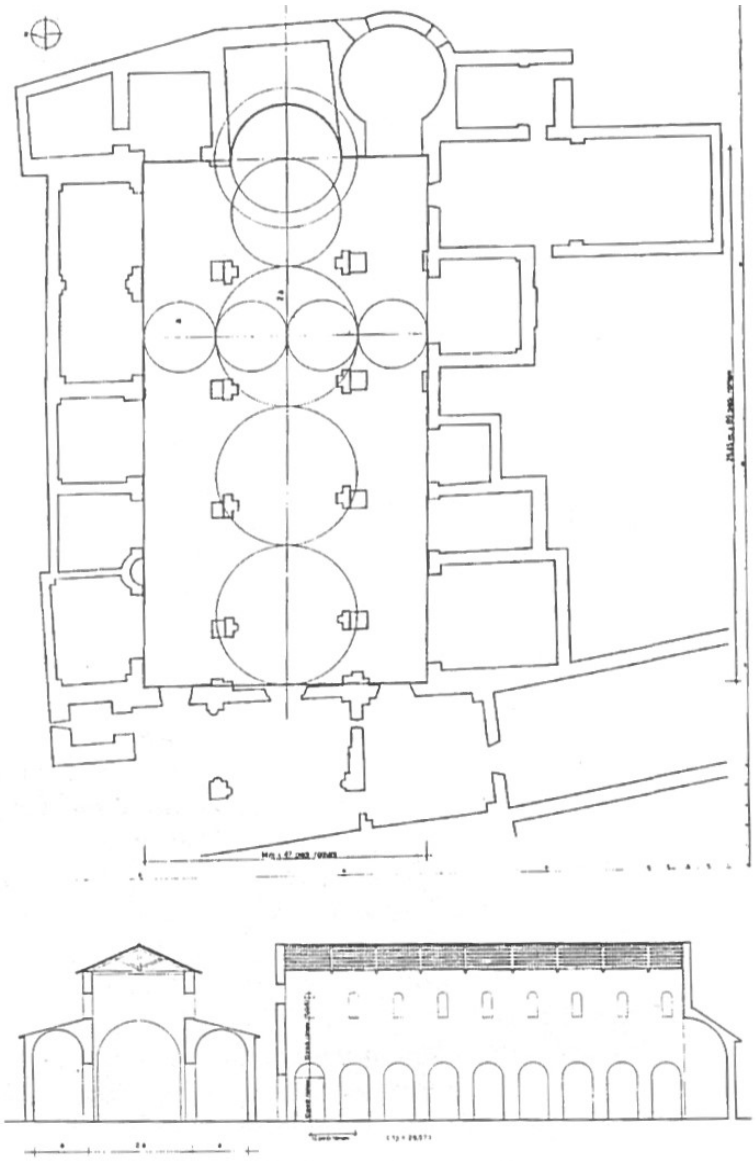


Fig. 5. Metrological-proportional analysis. Restitution of the church *ante* 1230 and metrological analysis of the church with references to the Abruzzo-Campania region.

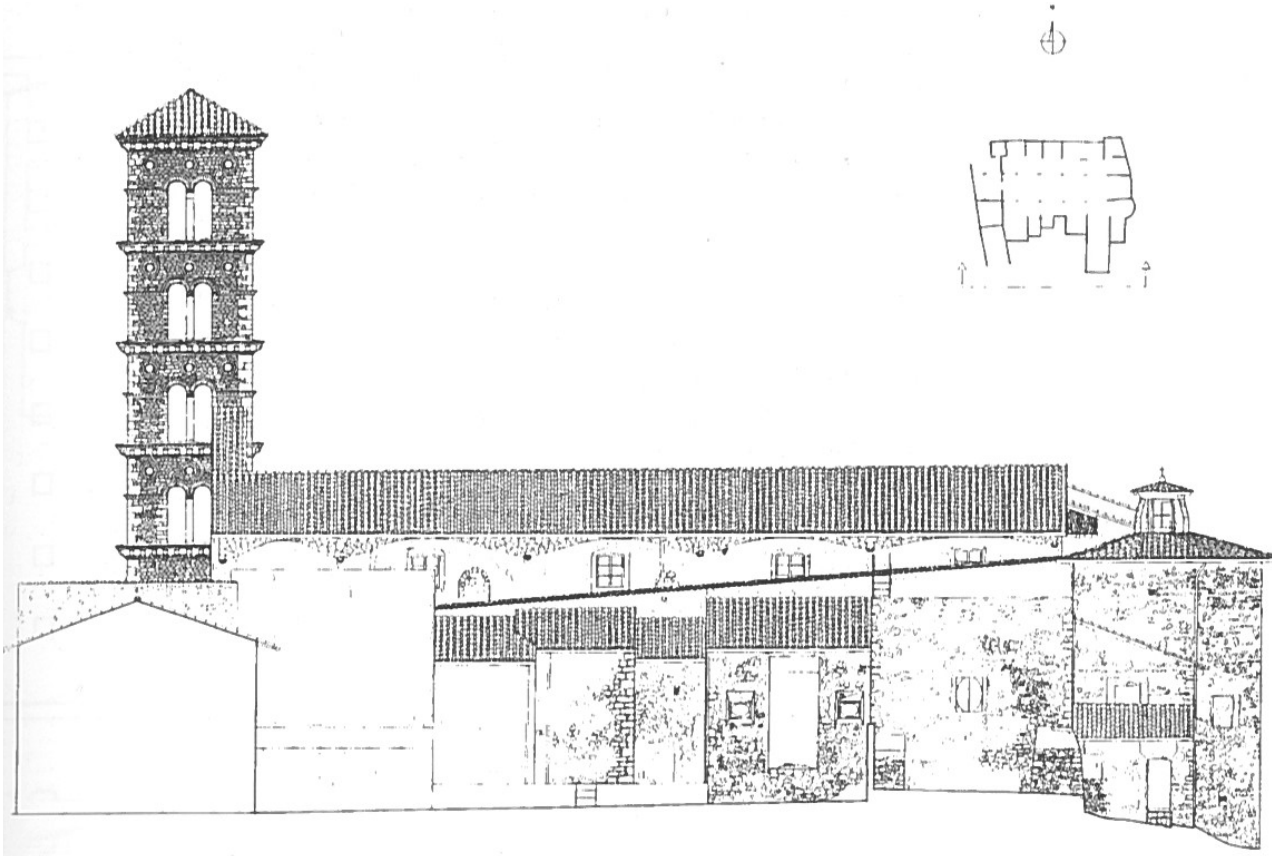


Fig. 6. Southern elevation.

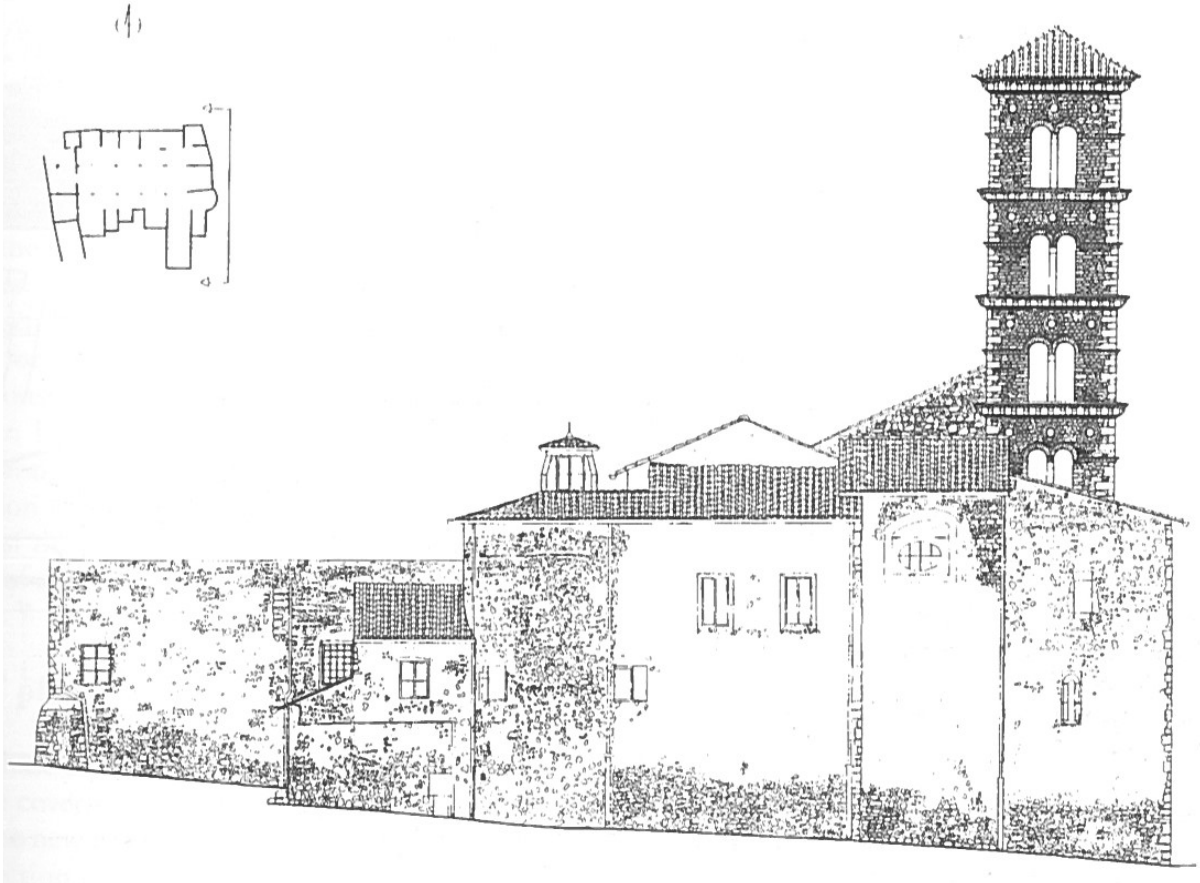


Fig. 7. Eastern elevation.

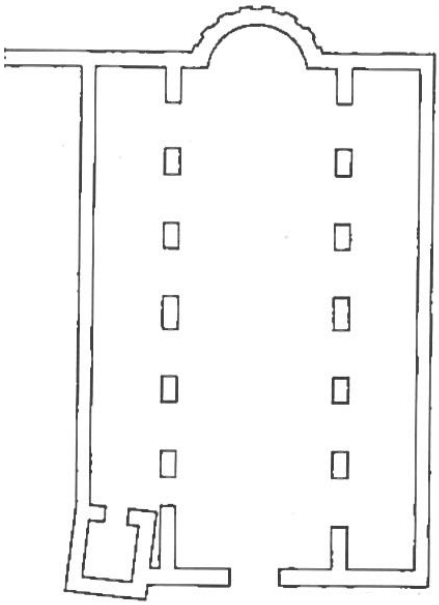


Fig. 8. Ninfa, San Pietro, 12th century. The theme of the plans.

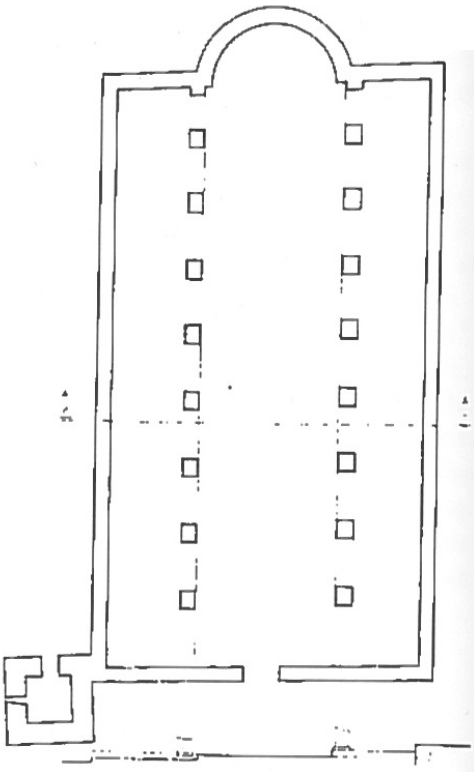


Fig. 9. Sermoneta, Santa Maria Assunta, 12th century. The theme of the plans.

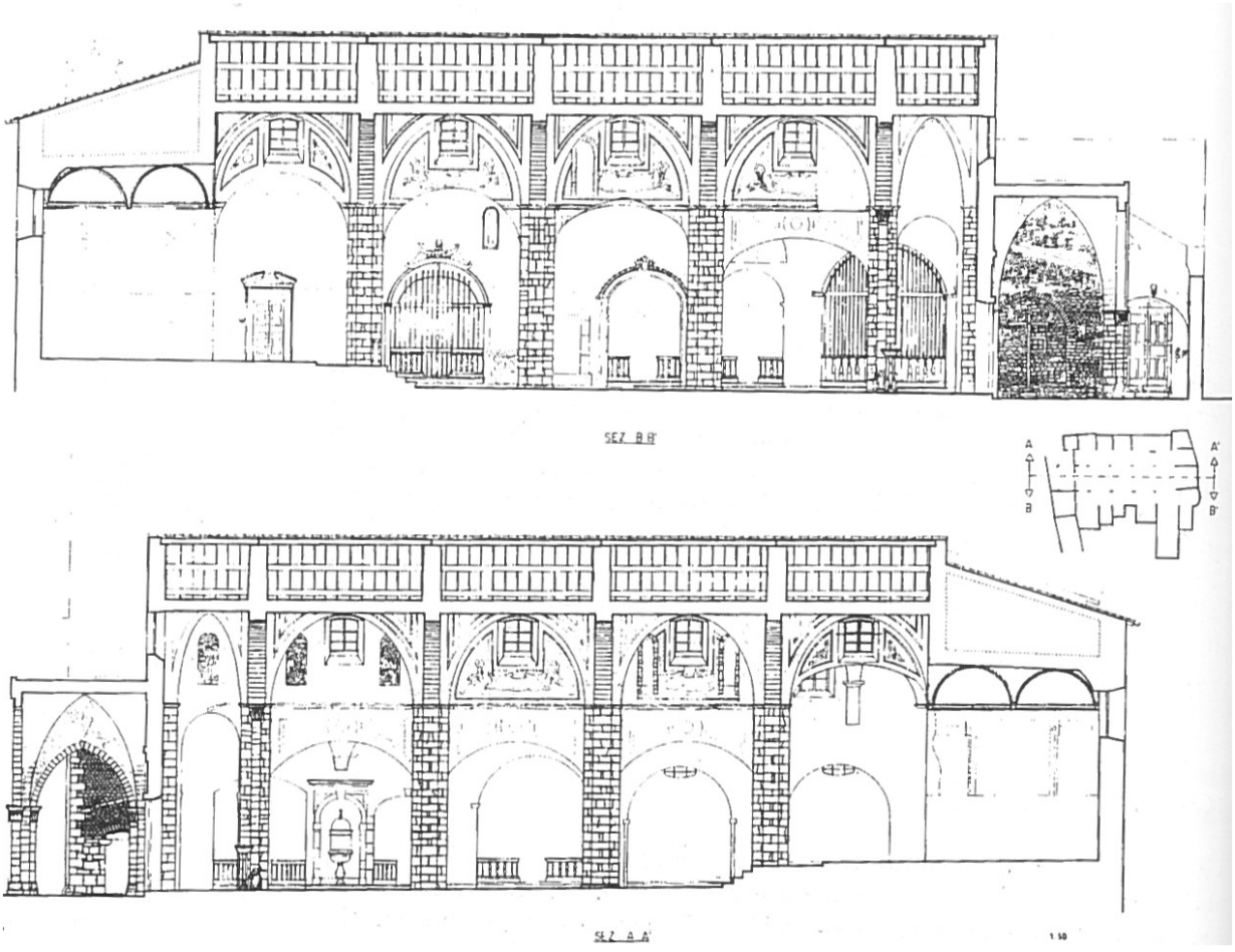


Fig. 10. Santa Maria Assunta, longitudinal sections along the central nave.

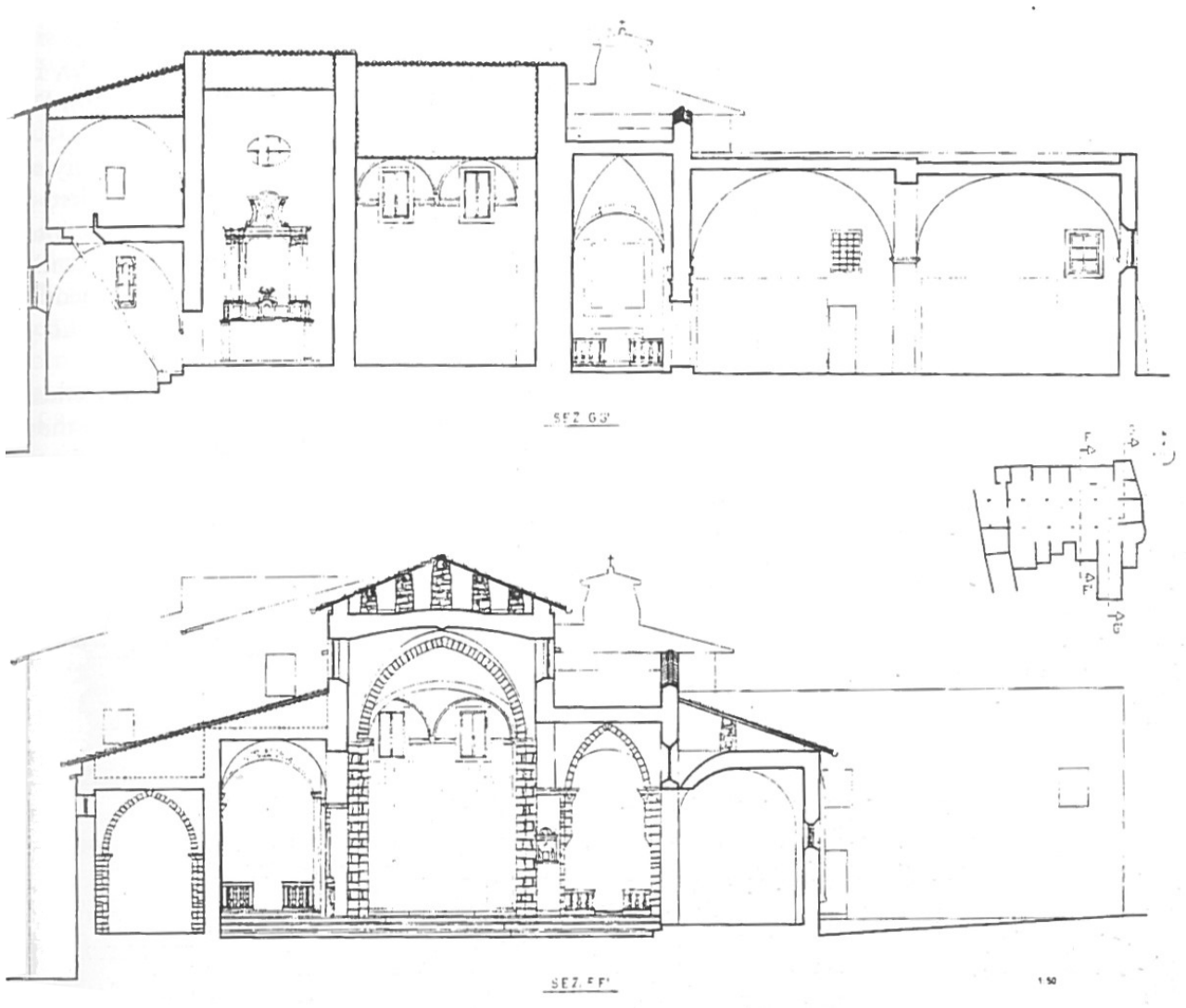


Fig. 11. Santa Maria Assunta, cross sections.

In Europe, the columned church constitutes a very widespread model, with some examples of great importance from the Carolingian and the Ottonian periods, such as the Church of the Saints Marcellinus and Peter in Seligenstadt, Basilica of Steinbach in the Odenwald (both 828-840), Cologne Cathedral, with its Carolingian features, the Cathedral of Augsburg (995-1005), the Church of St. Emmeram of Regensburg (1020-1053) and the Church of St. Gertrude in Nivelles (1046) (20). But for a direct reference, in the immediate vicinity of Sermoneta, clear stylistic and constructive similarities can be found between the Assunta and the Church of San Pietro in Ninfa (previously mentioned in the documents, ante 1237). The strong analogies are based, besides the structural features, especially on the adoption of the same metrological and proportional modules, with the constant use of the Roman foot in both the plans, in the intercolumnal spaces, in the raising of the arches and in the dimensions of the single-light windows.

“Cistercian” phase

The second phase of the construction of the Assunta is marked by the changing of the wooden covering in the vaulted structure; in relation to this decision is the adoption of the new columns, constructed attached to the existing ones but with a cruciform section to support the new structure and to “check” the new spatial -distributive system. The main dimensions of these added columns, assimilated to the existing rectangular-based parallelepiped are: A (97 cm x 67 cm), B (97 cm

x 68 cm), C (116 cm x 78 cm), D (118 cm x 79 cm), E (116 cm x 76 cm), F (116 cm x 76 cm), G (117 cm x 75 cm), H (116 cm x 78 cm) (Fig. 20).
The date of these works is presumably suggested by the documentary sources. A reconstruction process can be explicitly found from this text cited by Pantanelli: "*1235, Dopnus Gualterius, canonicus. S Mariae, iuratus et interrogatus, dicit... quod audivit dici quod, propter guerram quam domini de Sermineto olim habebant cum domino Lando Maiore de Ceccano, et propter rehedificationem ecclesie Sancte Marie, fuerunt dicta officia celebranda translata ad ecclesiam Sancti Petri*" (21).
The new taste towards a more unitary and continuous spatiality emerges from the changing of the simple rhythm of Romanesque columns, with the abolition of some of these, together with a greater verticality of the masonry mass (Fig. 12). Furthermore, the configuration of square cross vaults along the left nave is to be noted, while those along the right nave are decidedly more rectangular, suggesting a transformative process of the first Romanesque body covered as by a roof by the new "gothic" construction, in its particular Cistercian version, which was presumably carried out through project changes and second thoughts. The transformations of the Assunta (22) seem, however, to be a kind of "prototype" for the complex constructive processes of the other churches in Sermoneta, especially San Michele Arcangelo and San Nicola. The theme of the 1200s vaulted covering of the naves, originally as a roof, nonetheless is recurrent in the area examined, in examples such as those of S. Pietro and S. Maria Maggiore in Ninfa, as well as the "Cistercian" configuration of the S. Maria della Libera in Aquino (1231-1251) or the renovation of the Cathedral of Anagni (implemented around 1250) (23). Especially close to the transformations of the Assunta is the case of San Lorenzo in Amaseno (in the province of Frosinone), where one can see at least two constructive phases, with a precise date, 1291, for the works completed following the modalities of the "Fossanova School" (24).
The church has a plan of three naves with a terminal choir and two side chapels; in the central nave, the covering is composed of cross vaults over the presbytery, while it is wooden in the other bays; even the side naves maintain the wooden covering. As was previously mentioned, the "Gothic-Cistercian" phase, for the Assunta in Sermoneta, was not implemented univocally, as the direct analysis of the monument shows that the works were divided into at least two main phases, and it seems furthermore to have undergone a prolonged pause in between. This hypothesis, or at least that of an extremely slow progression of the works, finds confirmation in two testaments: "*anno 1266... pontificatus domini Clementis IIII, anno I, mense februarii, die IIII, Johannes Sapiens de Sarmineto, sanus mente et corpore, nolens intestastus decedere, de bonis suis nuncupatorium condidit testamentum, in quo testamento instituit suam heredem ecclesiam S. Mariae cujusdam institutionis: dimisit petiam majorem terrarum suarum juxta Templum, viam de Scrinariis et heredum quondam Burganelli. Item totam quam medietatem ipsarum terrarum habet mensa comuna ipsius ecclesiae et aliarum medietatem hanc mensa clericorum et sacristia pro reparatione ecclesie"* (25).
The second testament, of a certain Ricardus, dated 13 September 1289, reads: *"Item ecclesie S. Marie de Sarmineto... pro ornamentis ecclesia et edificis et luminaribus*" (26), confirming this date for the probable implementation of further completions. The difficulties of the works appear to be confirmed by the presence of only to *crochets* capitals and by the accentuation of the decorative partition only on the initial part of the nave and not, as is customary, towards the presbyterial area, suggesting a real interruption in the construction, works initiated and then left incomplete.

In fact, there is not the uniformity of the architectural language of the central nave that we can find in Sezze, Priverno and Fossanova, even though the common craftsmanship is indubitable (27). The elements of greatest formal completion are identified in the pair of half columns attached to the two first columns and made of the same stome, delimitated above by an astragal and topped by *crochets* capitals (Figs. 12, 13), clearly pertaining to a period in which the expressive language availed itself of direct "Burgundian" influences, retraceable in the Cistercian order, which are expressed in the *oeuvre* by the craftsmen of the "Fossanova School" (28). These are capitals with two orders of leaves, broad, nervate and curved (*crochets*) (29), one of which ends with a corner little heads typical of the 13th century (Figs. 14, 16). An analogous motif can be found in some capitals in Casamari, in the cathedrals of Bisceglie, Troia, and in Sermoneta in the Church of San Nicola. But the motif of the small, stylised corner little heads at the upper vertices was already present in examples of Norman and, in general, French architecture (30). Camille Enlart finds models of these in the Church of Montréal near Avallon (31).

Fig. 12. Santa Maria Assunta, interior, nave and choir.

Fig. 13. Santa Maria Assunta, interior, partial view of foreshortening on the left with the first pilaster, the half-column, the column-bearing lion and the *crochet*. The change in rhythm of the inter-columnal space can be seen, and the medieval light sources and those of the modern addition are visible.

Of note are also the bases of the same half columns. In particular, the one on the left is composed of a cubic plinth, on which a base is set which we can describe as being Attic, with angular claws or *griffes* (32), which can be found in Casamari, Fossanova and Valvisciolo. Resting against the two half columns are two column-bearing lions, unusual elements in Cistercian architecture, which remind one of those employed in examples in the Apulian area, such as the portal of the Cathedral of Trani, in the southern side of the transept of the Cathedral of Bari, that of the façade of the Church of Santa Maria in Siponto and that in the portal of the Catthedral of Bitonto, just to name a few of the numerous examples one could cite. On the basis of these analogies, one can hypothesise that the lions could have initially have been places outside, at the sides of the entrance of the more ancient organism (Fig. 18). In the lateral naves, especially that on the right, we can find evident references to the features of the local architecture, of Cistercian inspiration, from the 13th and the early 14th century. In fact, we can observe some suspended half columns (*demi piliers retombés*), ending at the bottom with a pyramidal section (Figs. 15-17).

The capitals, on the other hand, have a barely hinted-at *cavetto* and are, for the most part, lightly engraved by large squashed or spathiform leaves. As with the *crochets*, even the motif of the pillar of the small suspended column is of

Fig. 14. Santa Maria Assunta, nave, *crochet* capital.

Fig. 15. Santa Maria Assunta, nave, *crochet* capital with the corner little heads.

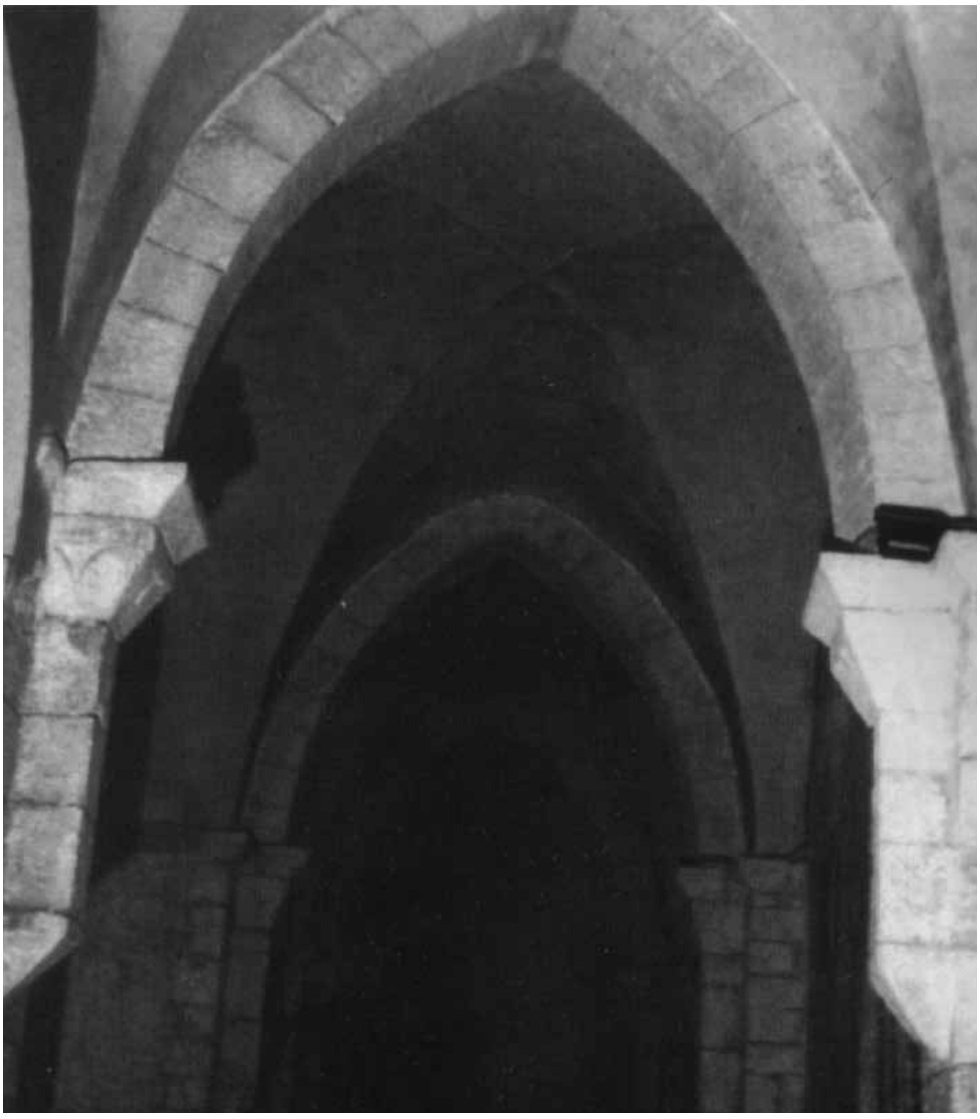


Fig. 16. Right aisle, detail of the suspended pilasters, terminating with a truncated pyramidal section.

Burgundian derivation and can be found in various realisations of the order in central Italy, for example: in Santa Maria of Arabona (Manoppello); it is employed in both the circular and the square section types in the nearby Church of S. Nicola (33). The realisation of the choir's structure can be dated back to the period between the first years and the half of the 14th century, which concludes the medieval construction works; this structure confers the definitive volumetric configuration of the church. De Angelis d'Ossat (34) interpreted the inclination of the choir with respect to the axis of the nave, which can be found in some examples in the area of Umbria and Tuscany, (more precisely in the Church of San Domenico in Cortona, in the San Domenico in Spoleto and in the San Fortunato in Todi), to be a specific visual device aimed at directing the attention of the visitor; a similar effect can be identified for the choir of the Assunta in Sermoneta, while one must exclude, in these cases, the symbolic interpretations linked to the *inclinatio capitis*, or those linked to the presence of existing elements which may have conditioned the execution.

On the outside, the portico is constituted "*d'une seule travée*" (35); it has a square plan, delimitated above by a cross vault (Fig. 20). It is open on two sides, with a large arcade on the west, while the northern side is smaller but still lancet with archivolts of carved rock. It is closed on the eastern side by the

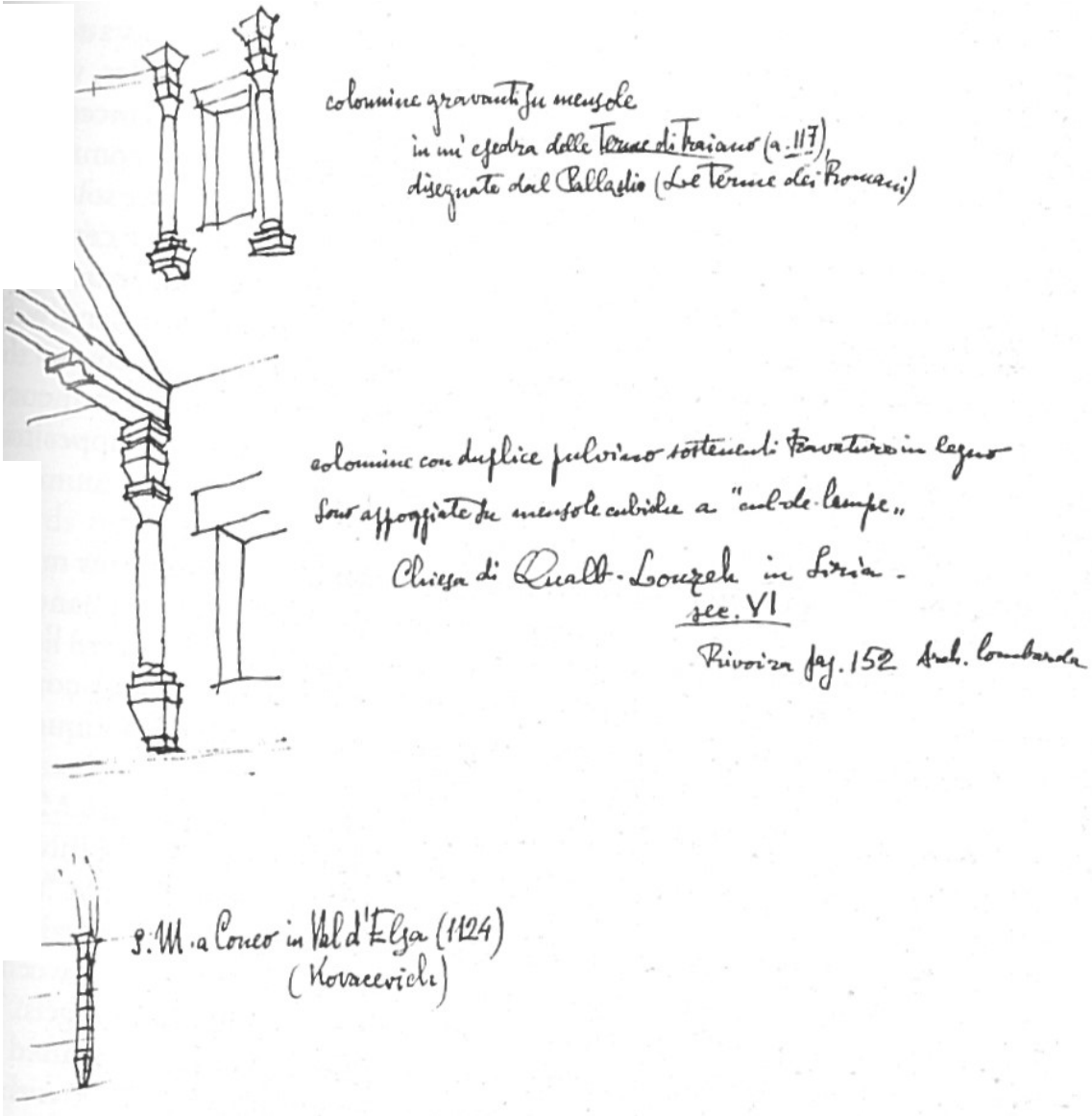


Fig. 17. Origin of the suspended half-pilasters (Drawings by Giuseppe Zander).

Fig. 18. Santa Maria Assunta, nave, detail of the column-bearing lion and the taloned base of the half-column.

wall communicating through the portal with the interior of the church, while on the southern side, after the addition of the Chapel of the Magi, (approx. mid-15th century), with a wall of the same chapel. The half-columns supporting the arcades are attached to half pillars in stone and to the angular pillar; above, they end with *crochets* capitals. The bases, some of which are barely deciphrable due to the alteration of the rock, reveal a lexicon of classical inspiration, in the sequence: socle with listel, cyma, taloned plinth, lower tore, listel, scotia and upper tore (Fig. 19).

Enlart describes the portico in detail:

"*les arcades sont en tiers-point et doublées. le bandeau supérieur, très mince, est entaillé en cavet; il repose sur de gros piliers carrés. Le second bandeau, large et sans moulure, retombe sur des colonnes engagées. celles de l'ouest ont des chapiteaux couvert de feuilles d'acanthe; Celles du nord sont couronnées de chapiteaux à feuilles cotelées avec pointes épanouies en bouquets de fleurs*" (36).

The simple rectangular portal, which is rather small, as in the nearby San Michele Arcangelo, is delimited above by a lunette, crowned in turn "*d'un archivolte à moulures*" (Fig. 21), which rests on "*consoles à fleurs sculptées*", while "*au bas côté répond une porte à linteau sur corbeaux en quart de rond*" (37). In the lunette of the central portal is a fresco depicting the Virgin with the Child between St. Peter and Epaphroditos. In the upper band is a christ among four angels. The façade continues to highlight its simple gabled configuration, but the raised section constructed to contain the system of the vaults is visible (Fig. 22); with the construction of the portico and the chapel on the right, the entrance of the corresponding minor nave was closed from the outside.

Masonry

I will now briefly summarise, with regard to the masonry structures, the observations concerning the samples examined. Among the materials employed, two types of stone can be distinguished: the first is the so-called *vetrola*, a compact and solid calcareous rock which allows obtaining the *tufelli* in the desired dimensions. This

Fig. 19. Santa Maria Assunta, portico, detail of a base.

Fig. 20. Santa Maria Assunta, detail, portico, partial view of the foreshortening from the left. In the foreground, part of the base of the bell tower and, in the background, part of the gabled façade of the church.

material shows a good resistance to physical-chemical attacks and has an off-white colour. The other is the *saponara* rock, a sandstone used for less regular blocks, spongy and of a yellowish brown colour. The mortars employed are of two types, distinguished in particular by the quality of the *pozzolana*. With the *tufelli* we find a tenacious mortar, characterised by the use of reddish *pozzolana*, of minute granulation, with some black dots, but of a general colour tending towards pink. The second type, obtained with a darker, greyish *pozzolana*, is coarser, with many black and grey granules; it is employed particularly at the base of the bell tower.

From a first mapping, we can distinguish at least eight different types of masonry configurations, present in multiple parts of the construction. Some samples are found at the base of the bell tower and reveal an *opera quadrata* masonry, in dressed local stone, framed and leveled; the length varies between 20 cm and 50 cm, the height between 12 cm and 28 cm; the mortar has a thickness varying from 1 to 2 cm and a flat finish. It has been dated to the initial nucleus of the church, around the 12th century.

Other samples can be found in the bell tower and in the more ancient chapels, such as that dedicated to St. Bartholomew (third chapel along the left nave) (Fig. 23) and the one dedicated to Mary Magdalen (along the right-hand nave). The masonry is constituted by small rectangular blocks, or *tufelli*, with lengths between 9 cm and 25 cm and heights between 5 cm and 8 cm. The mortar is between 2 and 3 cm thick, with a concave finish. The dating oscillates around the middle of the 13th century. Types 4 and 8 (Chapel of St. Peter and the walls closing the south side of the portico) show a masonry which could be described as being transitional, due to the use of rocks of more varied shapes, though tending toward the square, with mortar between 1-3 cm thick. The smoothing is deep. Units 5 and 7, classifiable as an uncertain work, as they show a cruder workmanship, can be seen on the outside of the Chapel of the Passion and the Chapel of St. Joseph. The constructive technique of the more recent masonry presents itself with an ever cruder finishing, less regular and refined; the workmanship changes and ends up being mixed. The finishings are various and there are stratigraphic unities which in some sections are covered by traces of plaster or broad patchwork (Fig. 24).

Fig. 21. Santa Maria Assunta, portico, detail of the lunette delimiting the entrance to the church.

Fig. 22. Santa Maria Assunta, Portico and façade, partial frontal view. The raising of the sides of the roofs, the *oculus* and part of the buttress towards the bell tower.

Extradossal vaults

Another characteristic feature of the Late Middle Ages (second constructive phase) is the use of extradossal vaults. In these vaults, be they taloned, cross, barrel or cloister, there is a clear reference to the Byzantine construction technique, to the Arabic techniques and to to examples which had wide diffusion between the 9th and the 13th century all over the Mediterranean (38). The traces of these extradossal vaults are still legible today along the northern and the southern façades of the Assunta, made particularly visible by the interventions carried out by the Superintendency in the 1950s and th 1960s. In the attics it is still possible to examine the first shape of the vaults and the structure of the covering. The spatial effect must have appeared of intense plasticity, exalting on the outside the articulation of the interior space. There are many references, which find significant similitudes even in the immediate vicinity. It is enough to cite the Church of the Abbey of Valvisciolo, which presented this type of configuration, but the examples multiply further towards the Marittima; in Gaeta, San Giovanni a Mare, Santa Lucia and San Domenico; in Maranola-Formia, Santa Maria; in Minturno, San Pietro Apostolo; (39) then in Capri, the San Costanzo and the Chapel of the Cross or of St. Micheal; in Anacapri the Church of Santa Maria; in Naples, San Giovanni a Mare; in Itri, San Cristoforo. The variety is also found in Apulian churches (40), and in Sardinia, in the Church of San Giovanni in Sinis (in the province of Oristano), in the San Teodoro in Congius and in the Parish Church of Monserrato in Cagliari (41).

The analysis of the materials, carried out through the taking of some samples (42) both from the Assunta and from San Pietro in Ninfa, has revealed the use of a compact and hard conglomerate, with components of fine *breccia, cocciopesto* and tufaceous material. The inert material is in high proportion with respect to the binding agent, which reveals itself to be of good quality (Figs. 25, 26).

The bell tower

To complete the reading of the medieval structures it is necessary to examine the bell tower, which was originally (12th century) separate and accessed from an entrance on the southeastern side, today occupied by the Chapel of St. Peter, built between the 14th and the 15th century. The bell tower, with a square plan, has a height of 24 m with a total of 6 floors above ground (Figs. 27, 28).

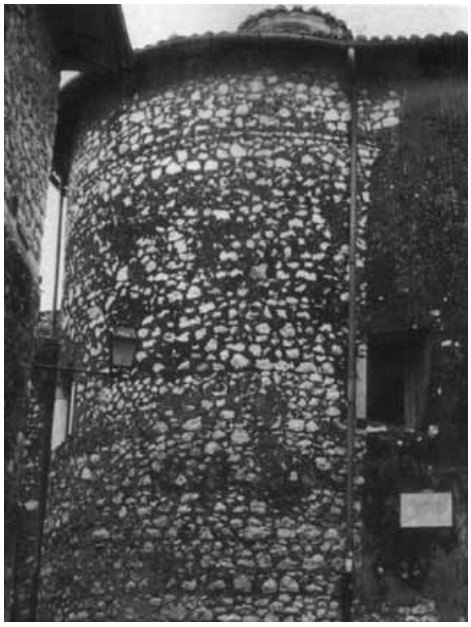


Fig. 23. Santa Maria Assunta, right aisle, chapels, detail of some masonries. In the Chapel of St. Bartholomew are the *tufelli*.

Fig. 24. Santa Maria Assunta, Chapel of the Rosary, exterior masonry.

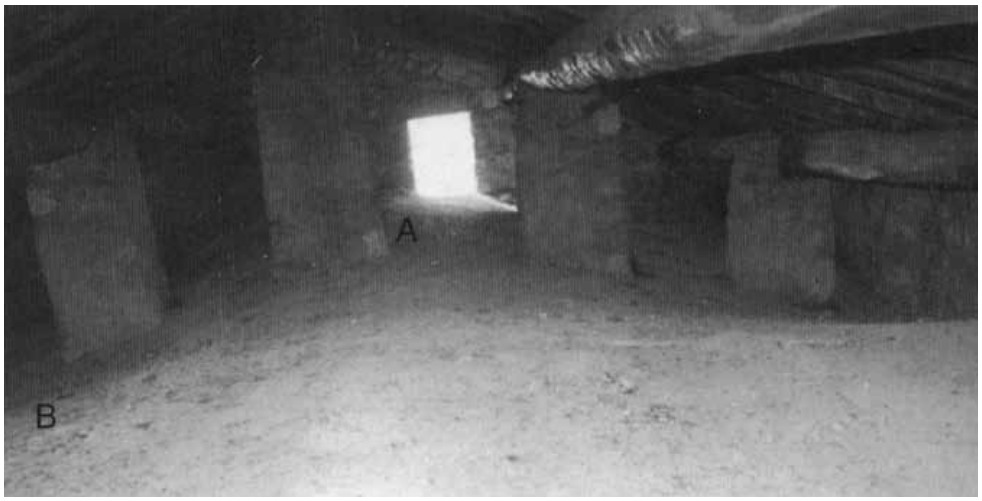


Fig. 25. Santa Maria Assunta, detail of the extradosed vault.

Fig. 26. Ninfa, San Pietro, ruins with the constructive detail of an extradosed vault.

The masonry component is essentially constituted by *tufelli* set out on regular courses. The corners are constituted of calcareous rock of larger dimensions. Pantanelli describes it as being composed of "*pietre da cento*" (43). The base block has a grade plan approximately twice as high as that of the other individual floors and is open solely by a small slit, greatly widening on the inside. The southwestern side is decorated by three crosses (44). As has already been observed, in such a base one can find different kinds of masonry types, so even without full documentary certainty, the analysis of the constructive features allows us to consider this part as that surviving from the ancient church or Pieve of Santa Maria of Sermoneta, dating back to the first couple of decades of the 12th century (45).

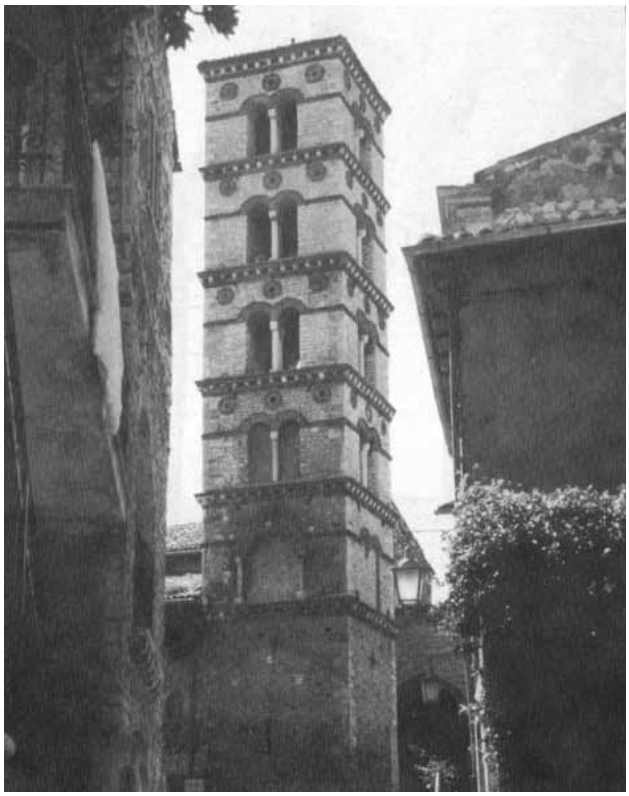


Fig. 27. Santa Maria Assunta, bell tower before Terenzio's intervention (Archive of the Superintendency for the Environmental and Architectural Properties of Rome).

Fig. 28. Santa Maria Assunta, present-day condition of bell tower.

The first, "blind" floor is also built with *tufelli*; on the northwestern side juts out an aedicula composed of two superposed arches, one acute and the other in the dead centre with traces of frescoes on the masonry. The aedicula rests one small columns set between two jutting shelves. The four upper floors are pierced by mullioned windows with small double marble columns, supported by a single base resting on the sill and delimitated above by a single bell-shaped capital. The ensemble of the mullioned window is closed off by two arcades with simple profiles and brick archivolts.

The brick archivolts unfolding horizontally take on the function of an abacus cornice jutting slightly from the actual wall surface. Furthermore, the layout of the masonry layering is articulated by the stringcourses set on jutting shelves and formed by two recesses with dentels and rows in brick. More in detail, such cornices rest on shelves, constituted by 6 or 7 rows of bricks laid out alternatingly smoothly or transversely or on shelves of calcareous stone, the profile of which is shaped by a listel and by a pronounced ogee (46).

The external surface of the four upper floors is furthermore made more precious by the presence of round coloured majolica, or *scodelle*, laid out in groups of

three. The treatment of the stringcourses, translates, with the use of a more modest material, the model of classical cornices (47); more in general, the character of the bell tower reprises the type of Roman bell towers of the second half of the 11th century with some references to lombard examples (48).
Among the Roman bell towers, those collected by Giovannoni, around the example of Santa Maria ad Pineam (49), besides the difference in the construction material, appear to be more adherent.
The internal section is composed of a single structure, with moveable intermediate lofts. Currently, the bell tower of the Assunta is lacking the terminal spire which was destroyed by lightning in 1576. A graffiti inscribed on the corner pillar of the portico recalls the episode "*lo trone dette al campanile*" (Fig. 29). The panel painting by Benozzo Gozzoli (1452) kept in the first chapel of the right nave, dedicated to the saints Joseph and Leonard, depicting the Virgin's Assumption with the town of Sermoneta on her lap, shows the bell tower still with "the pyramid in the middle, the other four small ones in the corners" (50) and a triangular tympanum placed in connection between the last order and the spire. The painting is of an extreme historical importance for the reconstruction of 15th century Sermoneta, as we can recognise, on the left, the Church of San Michele with its small bell tower, but also cuspidate.

Summary of the constructive history in the Modern age

With regard to the Post-Medieval transformations of the complex, given the impossibility of offering a detailed description within the limits of this document, I will limit myself to producing a synthetic chronology of the most important events, in relation to the constructive history of the building.
The most important modifications affected, as is usual in the Renaissance and the Baroque period, the interior space of the building, with the renovation of the masonry surfaces, the light sources and with the opening of numerous chapels, while the façades remained mostly unaltered, excepting the addition of some lateral or later constructive elements (51).
The prevailing *facies* of the building is therefore owed to the works executed in the Baroque and the late-Baroque, as far as the whole image is concerned, but one cannot neglect to mention the further 1800s transformations (pictorial decoration), as well as the effects of the "restorations" which, highlighting the "Romanesque" and "Gothic" aspects of the construction, significantly affect its appearance (Fig. 30). Hence, the most significant events may be, with respect to the current understanding of affairs, thus summarised:

Mid-15th century: the Chapel of the Magi is constructed, thus closing off both the portico on its south side and the entry to the right nave.

1452: Benozzo Gozzoli paints the panel "of the Madonna degli Angeli".

1460: the clergy of the Assunta concede the land to the Battenti for the construction of their oratorium, previously hosted in the Chapel of the Magi.

1495: the Battenti Oratorium is completed during the pontificate of Alexander VI.

1499: the Chapel of St. Peter is constructed.

1515: the sculptoreal aedicula is set up for the holy oil, between the choir and the Chapel of Saint Francis de Sales, at the back of the right nave.

1565: a lightning bolt topples the spire of the bell tower.

1603: the choir is decorated, upon the initiative of the Americi family, with frescoes depicting the Nativity, the Presentation at the Temple, the

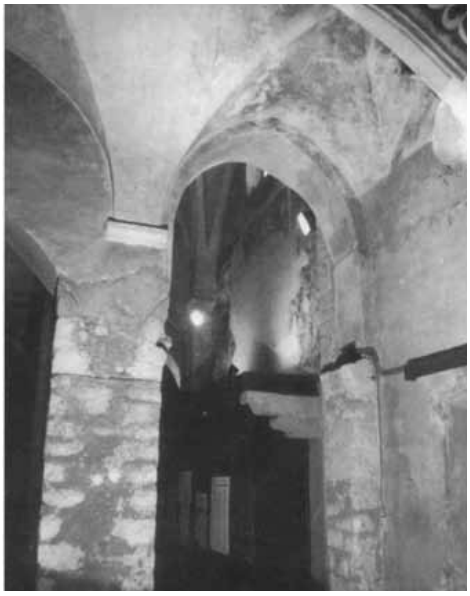


Fig. 29. Santa Maria Assunta, portico, detail of the graffiti of the corner pilaster.

Fig. 30. Santa Maria Assunta, fragments of the mural paintings found on the counter-façade; in the foreground, traces on the "Romanesque" pilasters after the "de-restoration".

Annunciation, the Visitation and the Assumption.

1606: Paul V nominates Bonifazio Caetani cardinal. The De Angelis Chapel is realised and work starts in the Chapel of St. Bartholomew.

1615: the De Marchis Chapel is realised, previously named after the Saints Joseph and Leonard.

1626: Urban VIII nominates Enrico Caetani cardinal.

1628: the Brotherhood of the Rosary is founded by Duke Francesco Caetani, who takes up office in the chapel previously dedicated to St. Francis de Sales and St. Peter in Chains.

The plan is circular, delimited above by a cupola with a small lantern.

1704: the Chapel of the Redemptor is constructed at the back of the left nave.

1715: the walls of the Chapel of the Rosary are decorated with frescoes. Furthermore, the New Sacristy is realised, with the addition of a new construction in the existing Chapel dedicated to St. Anthony facing the old cemetery.

1737: news of works to repair the left nave, no further details.

1740: the greater altar and the canopy are built.

1760: the altar is realised in the Chapel of the Redemptor.

1796: the Chapel of the Madonna of Vicotry is decorated with frescoes.

1829: news of works in the left nave.

1942 and 1943: restoration works in the bell tower and on the façade, in the care of the Superintendency for Monuments in Lazio (Terenzio).

1954: fragments of frescoes (Last Judgement) discovered on the counter-façade of the church.

1960: interventions for the dehumidification of the Chapel of the Rosary, with the "*rifacimento*" of the pavement, the balustrades and the opening of two windows.

1963-1965: various "restoration" works carried out on the interior and the coverings.

Notes

All photos are by the author except when indicated.

1. P. PANTANELLI, *Notizie storiche della terra di Sermoneta*, III, ed. Leone Caetani, Roma 1972 (orig. ed. 1908-1911), especially pp. 72-73.

2. G. MAROCCO, *Monumenti dello Stato pontificio e relazione topografica di ogni paese*, Roma 1834, pp. 84-85.

3. M. RAYMONDI-G. CORNIOLA, *Sermoneta e antichità delle terre Pontine,* Ronciglione 1893, p. 71.

4. C. ENLART, *Origines française de l'architecture gothique en Italie*, Paris 1894, pp. 9, 11, 17, 138-145, 148-149, 255, 266, 269, 273, 277 and 293.

5. A. MUÑOZ, *Momenti d'architettura gotica nel Lazio* in "Vita d'arte", September 1911, n. 45, p. 101. From the brief considerations made by Muñoz, who was at the time a young inspector, an art historian, of the Superintendency to the Monuments of Lazio, one can see how Baroque architecture did not enjoy the same appreciation in the restorations carried out, with respect to studies of the history of architecture, as the preference tended towards the medieval stylistic unity. This reflection on Muñoz was specified first by G. MIARELLI, *Monumenti nel tempo, per una storia del restauro in Abruzzo e nel Molise,* Roma 1979, p. 47. In order to better understand the figure of Antonio Muñoz, see the study by C. BELLANCA, *Antonio Muñoz, la politica di tutela dei monumenti di Roma durante il Governatorato*, Roma 2003.

6. A. SERAFINI, *Torri campanarie di Roma e del Lazio nel Medioevo*, Roma 1927, pp. 120-122.

7. A. TERENZIO, S*ermoneta, chiesa di S. Maria della Pieve, restauri al campanile*, in "Le Arti", IV, 1941-1942, pp. 299-300. Also with regard to the restoration conducted by Terenzio, who was then Superintendent to Monuments, the same considerations made with Muñoz can be applied, with the difference that, in Terenzio, the technical aspect prevails in tackling and attempting to resolve the individual issues.

8. R. WAGNER RIEGER, *Die Italienische Baukunst der Gotik. II Sud-und Mittelitalien*, Graz-Cologne 1957, p. 82.

9. G. TAMANTI, *La chiesa di Santa Maria Assunta in Sermoneta* in "Bollettino dell'Istituto di Storia e di Arte del Lazio meridionale", VIII, 1975, 2, pp. 75-92.

10. M.L. DE SANCTIS, *Insediamenti monastici nella regione di Ninfa, in Ninfa una città, un giardino*, Atti del colloquio della fondazione Camillo Caetani, Roma-Sermoneta-Ninfa, 7-9 October 1988, Roma 1990, pp. 271-272.

11. P. LONGO, F. SASSOLI, *Sermoneta*, Roma 1992, pp. 23-43.

12. R. BONELLI, *L'edilizia delle chiese cistercensi, in I Cistercensi e il Lazio,* Atti delle Giornate di Studio dell´Istituto di Storia dell´Arte dell´Università di Roma, 17-21 may 1977, Roma 1978, p. 37.

13. G. CARBONARA, *Edilizia e urbanistica di Ninfa*, in *Ninfa una città*, pp. 235-238.

14. Under the care of the ministry of Education, the Superintency to Monuments of Lazio, restoration of the church of Santa Maria Assunta, Report n. 353, dated 30/5/63. The description of the works also includes: the reordering of the currents of water, the arrangement of the coverings between the right nave and the chapels, the reordering of ashlar in the church (June 1964), signed Superintendent R. Pacini. From other documents kept in the archives of the Superintendency, dated 26 July 1970, can be read the intention of repainting the vaults and the walls of the church, "a new appearance would finally highlight its architectural simplicity in the sobriety of the style".

15. G. DE ANGELIS d'OSSAT, *Origine e diffusione dei prospetti ad andamento obliquo nelle chiese salonitane*, and ID, *Il problema delle facciate ad impianto obliquo negli edifici paleocristiani* in *Realtà dell'Architettura. Apporti alla sua storia,* 1933-1978, ed. L. MARCUCCI and D. IMPERI, Roma 1982, 1, pp. 395-403, 405-413.

16. CARBONARA, *Edilizia*, p. 236.

17. ID., *Iussu Desideri,* Rome 1979, pp. 100, 108, 110-111, 126-128, 141. on the topic of columned churches, especially those in Abruzzo, see also I. GAVINI, *Storia dell'architettura in Abruzzo*, Milano-Roma n.d. (1927-1928) and M. MORETTI, *Architettura medievale in Abruzzo*, Roma n.d., 1971, pp. 14-103.

18. A. PRANDI, *San Giovanni di Patù e altre chiese di terra d'Otranto*, in "Palladio", XI, July-December 1961, pp. 103-136.

19. C. BOZZONI, *Calabria normanna*, Roma 1974, pp. 169-203.

20. Op. cit. and CARBONARA, *Edilizia*, p. 236; specific references for Cologne can be found in M. D'ONOFRIO, *Roma e Aquisgrana,* Roma 1983, pp. 90-94; for Nivelles, H.E. KUBACH – A. VERBEEK, *Romanische Baukunst an Rhein und Maas*, II, Berlin 1976, pp. 860-868; for other references on Belgian churches (province of Namur), op. cit., I, pp. 354-355. See also R. BONELLI, C. BOZZONI, V. FRANCHETTI PARDO, *Storia dell'architettura medievale*, Roma-Bari 1997, pp. 22-23, 27.

21. PANTANELLI, *Notizie storiche*, p. 175.

22. Camille Enlart, with two definitions in line with the prevailing culture of her time in France with respect to monumental existences architecture, explains these works in the Assunta: "*Elle a été agrandie et restaurée en style gothique, puis en style baroque*", p. 138.

23. CARBONARA, *Iussu*, pp. 122, 124, 144-145.

24. ENLART, *Origines*, pp. 111-116.

25. Ibidem, pp. 139-140.

26. Ibidem, p. 140.

27. With regard to the reading of common general features of Cistercian architecture, see the writings of Anselme

Dimier, Camille Enlart, Marcel Aubert, Alberto Serafini, Renate Wagner Rieger, Wolfgang Kronig, Hanno Hahn, Angiola Maria Romanini, as well as Pietro Toesca, Emilio Lavagnino and one of the last texts by Giuseppe Zander.

28. ENLART, *Origines*, p. 142. This concept was reprised expansively at the convention for study *I Cistercensi e il Lazio* and continuously dealt with by the studies of Angiola Maria Romanini; it can be found, with continuous in-depth treatment, on "Arte medievale" and in the recent Enciclopedia dell'Arte Medievale.

29. The use of these capitals with rampant leaves or flames, called *crochet*, also classified in Italian with the terms *rampino, gancio, uncino*, spread in the 13th century, but they are still of Burgundian derivation. Cf. E. VIOLLET LE DUC, *Dictionnaire raisonné de l'architecture française du 'XIe au 'XVIe siecle*, IV, Paris 1859, pp. 400-418. Cf. ENLART, *Origines*, p. 141. Some more recent considerations on their diffusion can be found in P. PUGLISI, *Capitelli dell'Abbazia di San Galgano,* in *I Cistercensi e il Lazio*, p. 177; G. CARBONARA, *Considerazioni su alcuni impieghi del crochet e della contre-courbe nell'Italia centrale*, in *Saggi in onore di Guglielmo De Angelis d'Ossat,* Quaderni dell'Istituto di Storia dell'Architettura, 1983- 1987, Roma 1987, p. 95 and in A. PERONI, item *Capitello*, pp. 195-196 and C. GHISALBERTI, item *Cistercensi,* in *Enciclopedia dell'Arte Medievale*, IV, Roma 1993, p. 839.

30. PERONI, *Capitello*, p. 196.

31. ENLART, *Origines*, p. 141.

32. For these architectural details, Cf. VIOLLET LE DUC, *Dictionnaire...,* Paris 1863, pp. 47-52 and ENLART, *Origines...,* pp. 279-280.

33. With regard to the origins of the suspended half columns, some examples can be found in the "small suspended columns with which were adorned some rooms of the Baths of Titus, reconstructed by Trajan in Rome and in the nave of the Basilica of Qalb Loze in Syria". These latter little columns present a two-fold pulvino supported by wooden beams and are paired up on "cul-de-lampe" cubic shelves (6th century). G.T. RIVOIRA, *Le origini della architettura Lombarda,* I, Rome 1901, p. 152. It seems significant to cite a sketch by Giuseppe Zander, found among the pages of a book by Rivoira which accepts these origins for the suspended columns. I would like to thank the Zander family for allowing the publication of the drawing (fig. 17). With regard to the "*demi piliers retombé*", cf. ENLART, *Origines,* pp. 144-145, 269.

34. G. DE ANGELIS d'OSSAT, *Proporzioni e accorgimenti visuali negli interni*, in AA.VV., *Francesco d'Assisi, chiese e conventi*, Milano 1982, pp. 150-162.

35. ENLART, *Origines,* p. 140.

36. Ibidem, p. 142.

37. Ibidem, p. 142.

38. In most of these constructions, there is a clear prevailing of the extradossal barrel vault. The procedure followed for the external covering of the vault, made in ordinary masonry, is described to us by Roberto Pane: "it consists in putting down a layer of 15 or 20cm of volcanic lapilli soaked in milk of lime. A team of workers proceeds to its beating for three days, using a mazzoccola (a wooden spatula) with the lower side level and the sides shaped at an acute angle". In R. PANE, *Capri mura e volte*, Napoli 1965, p. 24. See also G. FIENGO, *Gaeta, monumenti e storia urbanistica*, Napoli 1971, especially pp. 59-72 and A. VENDITTI, *Architettura bizantina nell'Italia meridionale,* Napoli 1967.

39. G. ZANDER, *Precisazioni sulla chiesa di San Pietro di Minturno,* in "Bollettino del Centro di studi per la storia dell'architettura", 24, 1976, pp. 19-27.

40. For a first approach to Apulian vaults beyond the aforementioned Venditti, see the Atti del IX Congresso Nazionale di Storia dell'Architettura (National Congress of the History of Architecture) (Bari 10-16 October, 1955), Rome 1959, especially the contributions of Berucci, Chierici and Simoncini.

41. For a synthetic reference to medieval vaults in Sardinia see the Atti del XIII Congresso di Storia dell'Architettura (Congress of the History of Architecture), Cagliari 6-12 April 1963.

42. The analysis carried out in the restoration laboratory set up in the Department of the History of Architecture, Restoration and Conservation of Architectural Heritage of the Sapienza University of Rome availed itself of data gathered with reflected light, print magnification proportion between 12 x 4. The type of film used was Kodak EPY 64 ASA, on a stereoscopic Zeiss S.V.8 microscope, upon the preparation of individual samples of approx. 1cm, dry polished and laid out on an elastic support.

43. PANTANELLI, *Notizie*, p. 78.

44. SERAFINI, *Torri,* p. 121.

45. PANTANELLI, *Notizie,* p. 78.

46. G. GIOVANNONI, *L'architettura dei monasteri sublacensi*, Roma 1904, p. 45.

47. ID., *Campanili medievali romani,* in "Atti del IV Convegno nazionale di storia dell'architettura, Milano 18-25 Giugno 1939, p. 10 of the extract.

48. GIOVANNONI, *L'architettura,* p. 49.

49. ID., *Campanili,* p. 11 of the extract.

50. PANTANELLI, *Notizie*, p. 78.

51. With regard to the significance of the interventions on existing architecture before modern restoration, see: G. DE ANGELIS d'OSSAT, *Restauro: architettura sulle preesistenze, diversamente valutate nel tempo,* in "Palladio", XXVIII, 1978, 2, pp. 51-68; G. MIARELLI MARIANI, *Monumenti nel tempo*, Roma 1979, especially pages 81-108; S. BENEDETTI, *L'architettura dell'epoca barocca in Abruzzo,* Atti del XIX Congresso Nazionale di Storia dell'Architettura, (National Congress of the History of Architecture), l'Aquila 15-21 September 1975,

Roma 1980, pp. 275-312; G. CARBONARA, *Trasformazioni posteriori,* in A.A.V.V., *Francesco d'Assisi, chiese e conventi*, Milano 1982, pp. 162-177; L. BARTOLINI SALIMBENI, *Su alcuni "restauri" di antiche chiese romane, in Esperienze di storia dell'architettura e di restauro,* edited by Gianfranco Spagnesi, Atti del XXI Congresso Nazionale di Storia dell'Architettura, (National Congress of the History of Architecture, Rome 1983), Roma 1987, pp. 275-285. I would also like to cite the more recent texts of M.P. SETTE, *Profilo storico* in *Trattato di restauro architettonico,* edited by G. CARBONARA, Torino 1996, I, pp. 109-299, particularly pp. 109-144, and G. CARBONARA, *Avvicinamento al restauro. Teoria, storia, monumenti,* Napoli 1997, especially the second part, *Note di storia del restauro.*

Bibliographic Updating

E. BORSELLINO, *Sermoneta 1603. Gli affreschi del coro di Santa Maria Assunta* in *Sermoneta e i Caetani. Dinamiche politiche, sociali e culturali di un territorio tra medioevo ed età moderna,* Atti del Convegno della Fondazione Camillo Caetani, Roma-Sermoneta, 16-19 June 1993, edited by Luigi Fiorani, pp. 349-361.

A. DI BELLO, *Sermoneta, Cattedrale di Santa Maria, Giudizio Universale (XV secolo), L´arte e i luoghi dell´Aldilà nel Lazio*, in *I percorsi dell'aldilà nel Lazio*, edited by Benedetto Coccia, Roma 2007, pp. 298-307.

F. BILANCIA, *Gli stalli del coro di S. Maria Assunta a Sermoneta,* in A.A.V.V., "Latium: rivista di studi storici", 30/31 (2013/2014), Istituto di storia e di arte del Lazio meridionale, Roma 2015, pp. 255-266.

4. Rome, the Bastion of the Colonnella, historical and conservation notes (Antonio da Sangallo il Giovane)

Calogero Bellanca

Fig. 1. General view of the bastion in its enviroment. Photo by C.B. 1986.

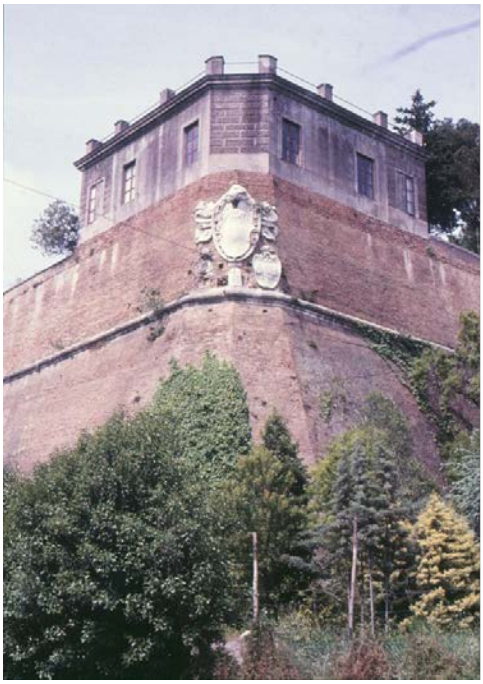
The fortifications built by Antonio da Sangallo for Paolo III in Rome, highlight one of the most significant moments for military architecture. From 1534 to 1537, after some pirate raids, it was urgent to "reinforce" the city walls, in fact, Fichard visiting the city in 1535 had denounced the high state of degradation of the mura Aureliane, collapsed in some points (1) (Figs. 1-4).

Paolo III entrusts Antonio il Giovane with a letter on 14th January 1538: "*Dilecto filio Antonio de Sangallo laico Florentino Architecto nostro,... fabricae, murorum almae urbis ad nostrum beneplacitum tibi assegnamus…"* (2).

Works had started some months before, in autumn 1537, in three points: in Porta Ardeatina, in colle di S. Saba and in front of Porta S. Paolo, in the locality called la Colonnella (3). Sangallo considered the unique conditions of the soil for doing the intervention with the appropriate works to adapt the fortifications of the "new system" (4), as Giovannoni wrote "*studiare minutamente gli elementi come i pezzi di una macchina*" (5).

Across the payment mandates for the works of the fortifications in Rome, kept in the Archivio di Stato (6) and in part published by Rocchi (7), it is possible to reconstruct the events for the construction and the interruption of the Bastion of the Colonnella.

A first mandate, dated the 7th October 1537, is assigned to *maestro Francesco de Philippo del Manzino fiorentino et compagni a fare il baluardo della Colonnella.*



Figs. 2, 3. General view from the corner of Sangallo il Giovane's bastion. Photo by C.B. 1985.

A Francesco fiorentino muratore qual lavora alle fort. Scuti 4 a bon conto sopra detto lavoro. 7 ottobre 1537.
A.M. Francesco… convenuto a fare un nuovo baluardo sul monte di S. Sabina scuti 15, saranno a bon conto sopra sua mercede di quello ha da lavorare alla d. fabrica. 17 novembre 1537.

Other mandates were signed on 24th November, and in the month of December. On 21st December it was stipulated the public act with the contractors *"Conctructio Beluardi Magni, Die XXI mensis Decembris 1537, li magnifici Pietro de Maximi et Bernardino Caffarello Deputati a la fabrica de la fortificazione di Roma con la presentia et auctorita di monsignore Philippo Archinto governatore de questa alma cita de Roma,… videlicet prout in Capitulis alterius beluardi della Colonnella sub die tertia huius factis et che se intenda tanto del muro facto per insino adesso quanto farsi"* (8).
A.M. Lorenzo, Florentine sculptor, "*depositario, ecc. pagante a M. Lorenzo*

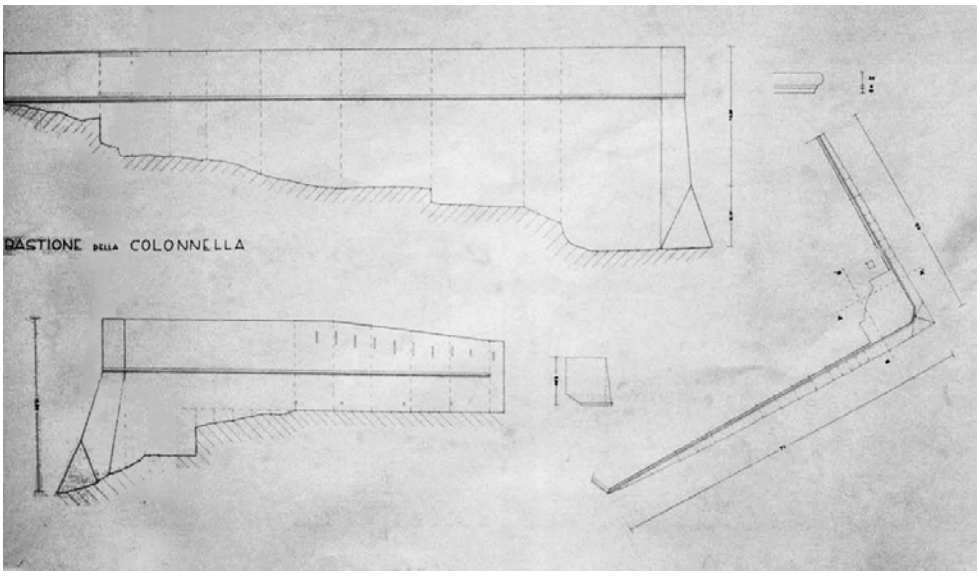


Fig. 4. Drawing with heights and dimensions (geometrical analysis), 1:100, by C.B. 1985.

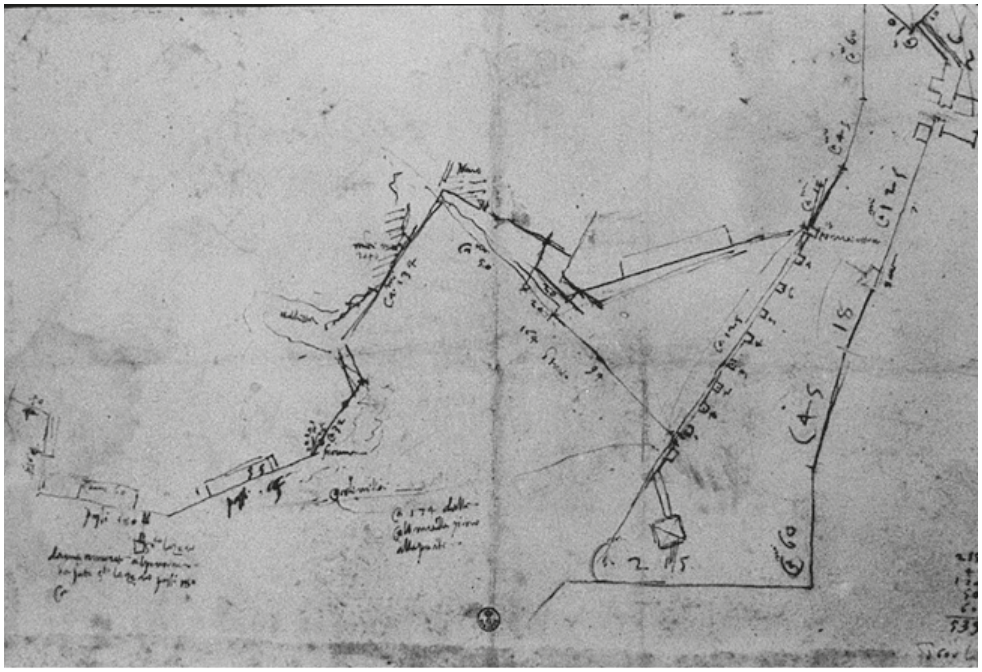


Fig. 5. Gabinetto Disegni e Stampa degli Uffizi, drawing n. 1019A.

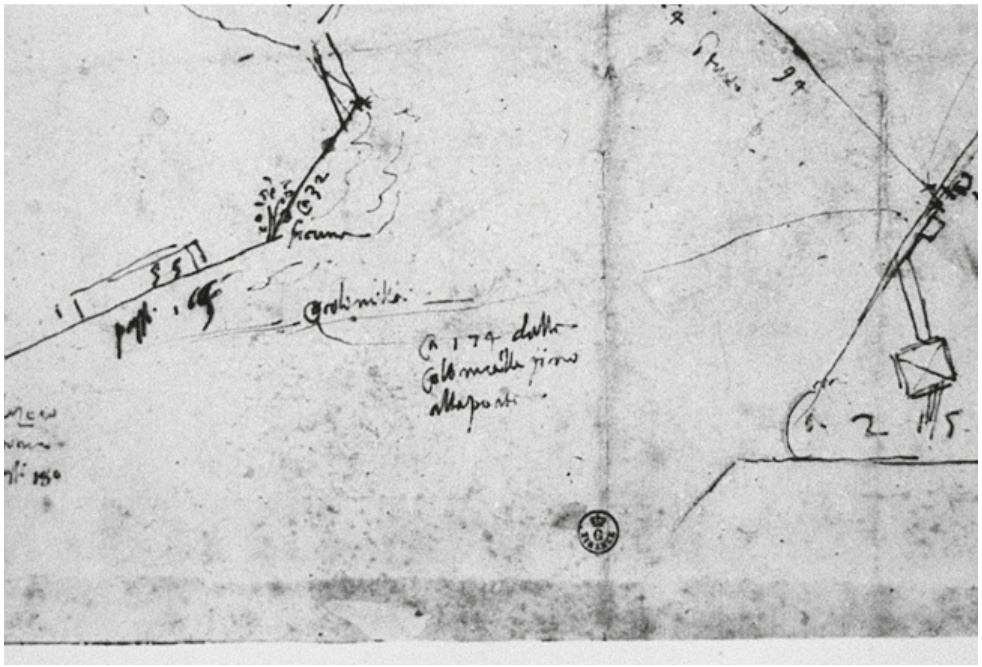


Fig. 6. Gabinetto Disegni e Stampa degli Uffizi, drawing n. 1015A.

scultor fiorentino scudi 50 et saranno a bon conto per lavorare l'arme de la S.ta di N.Sre et del populo romano; quali se ne hanno da mettere al beluardo de la Colonella" 6 giugno 1538 (9).

The payment mandates show that works for construction of the bastion were interrupted in September 1539. Paolo III because of the high expense, decided to limit the fortifications for the Borgo, getting back to the plan of Niccolò V (10).

In fact, from 1537 only for the Colonnella and Ardeatino bastions were spent "*440.000 ducati forniti da un'imposta sul grano*" (11).

In the Corpus of drawings preserved at the Gabinetto dei Disegni e Stampe degli Uffizi, the studies about fortifications on the left shore of the Tevere are numerous.

Drawings n. 1019A, n. 1015A, n. 938A, show among other topics the Bastion of the Colonnella. The n. 1019 A (Fig. 5) as Rocchi writes is "*il rilievo di campagna*

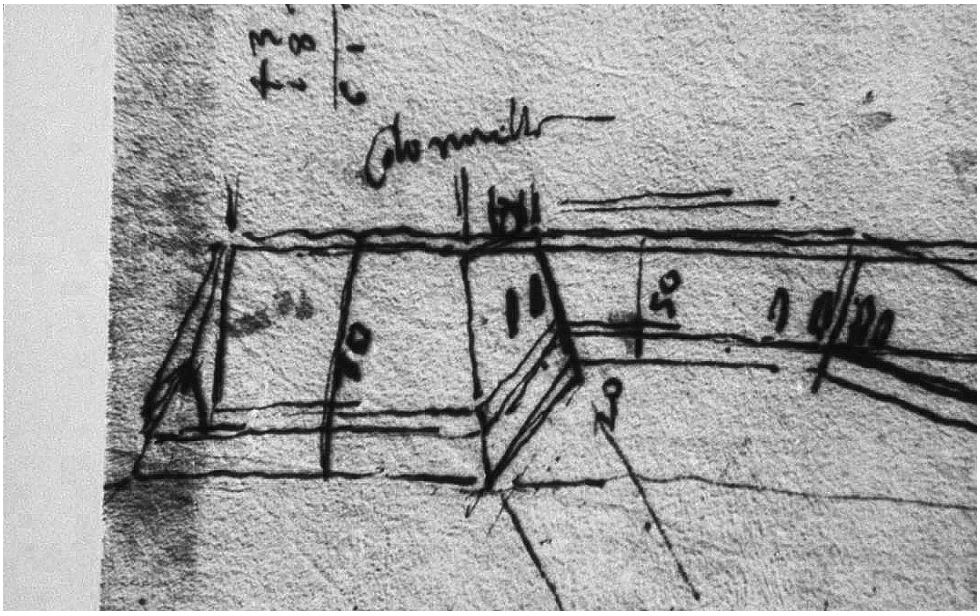


Fig. 7. Some of Sangallo´s sketches, with the different heights of the bastion, Firenze, Gabinetto Disegno e Stampa degli Uffizi, drawing n. 938A.

senza esattezza geometrica della regione compresa tra l'angolo sud-occidentale dell'Aventino presso Santa Maria del Priorato; la porta Ostiense e le mura Aureliane ad oriente di detta porta fino alla Torre ottava" (12).

The drawing is illustrated with accurate indications *"Santo Lazero – da Marmorata al pontone, passato Santo Lorenzo, passi 180 canne"* – 174 from the Colonnella to the porta (corresponding to the junction of Via di S. Sabina, today Via Porto Lavernale), then eighth tower – Valletta-Monte murato – wall. The drawing contributes to define the distances from Porta S. Paolo and from the left side of the Colonnella.

Drawing n. 1015 (drawn from a dusting) is a geometrical drawing (Fig. 6) includes the study of the new city walls with the bastions, from the occidental limit of Aventino to S. Saba. The scheme of the defensive lines traced in this sheet of paper is very interesting for the urban history of the city, in fact the limit of the "*regione meridionale*" (13) is deduced and it demonstrates the program of Sangallo on applying the bastion shapes in a particular orographic territory.
In the south-occidental limit it was expected a fortress named del Priorato di Malta with a projection through the river (never done), while the Colonnella, as a fulcrum between the two fronts, is located on the left side with a projection through occident. The importance of the drawing 1015 is reflected on the "reinforcing" project of Camillo Orsini, made between 1556 and 1557, reproducing the Sangallo's trace and presented in the plan of Beatrizet. The indications for the drawing, already described by Rocchi and recovered by Giovannoni, provide an accurate reference of the place and they illustrate the characteristics of the time.

"... Piano di Testaccio – Monte Testaccio, canne 30 – colonna, Monte Aventino di scogli di tevertino (travertino) canne 120 marmorata – muro canto al fiume...".
"*La pianta del Testaccio, in mezzo alla quale il monticello è disegnato in forma di cuore, risulta completamente abbandonata*" (14). In this context it is appropriate to reiterate the importance of this drawing, because it anticipates the development of the bastions in the elevation profile compared to the projects of Vauban (15) or other events of the military architecture in the East-Central Europe. The drawing n. 938A is the most significant of the Colonnella drawings.

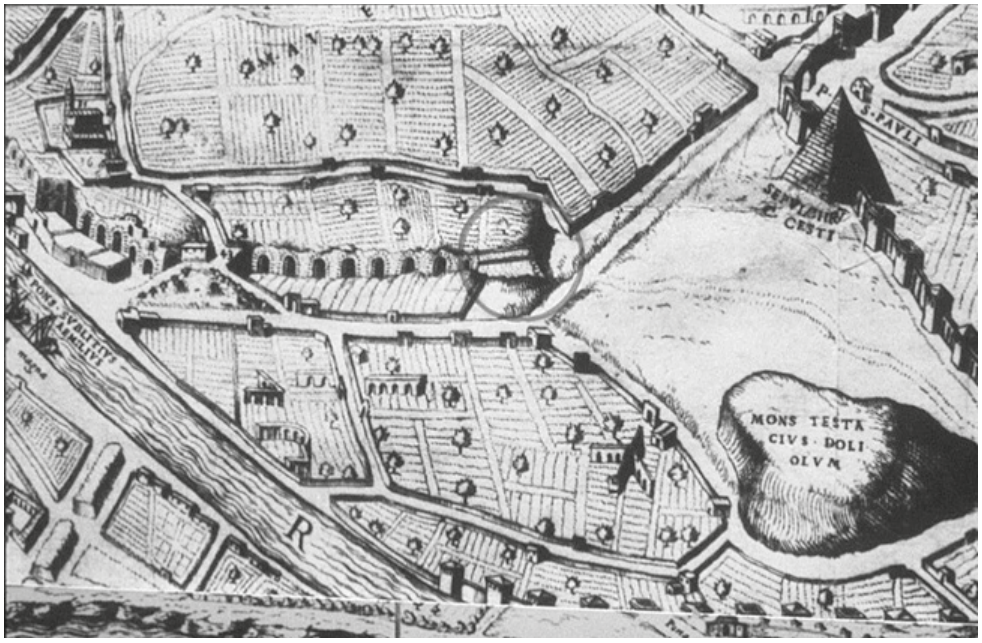


Fig. 8. Historical map, by Mario Cartaro, with the location of the bastion, in A. Frutaz, *Le piante di Roma e del Lazio*, Roma 1972, Vol.1.

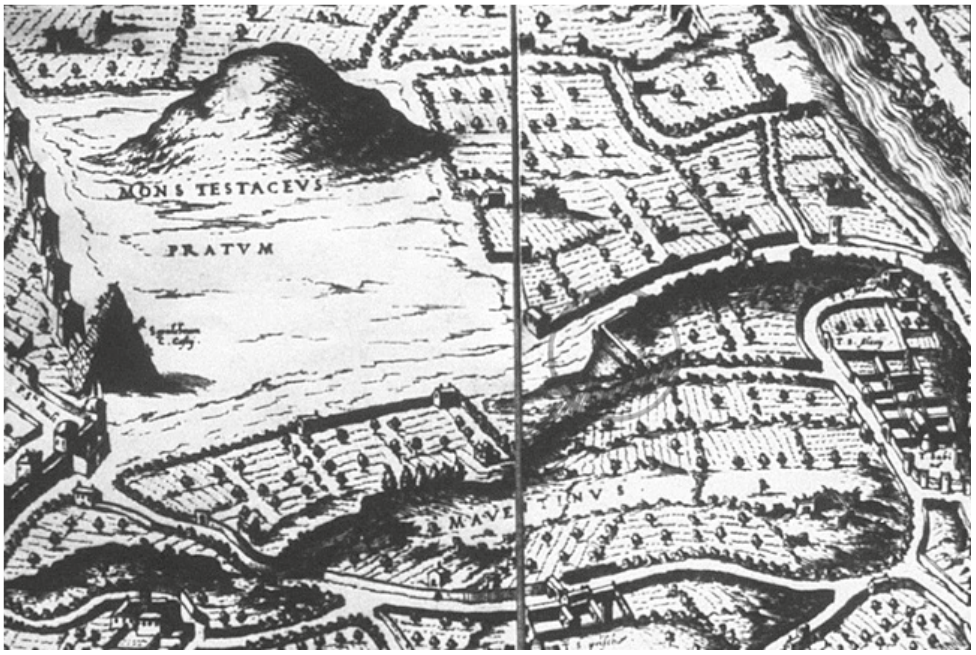


Fig. 9. Historical map, by E. Duperac, with the location of the bastion, in A. Frutaz, *Le piante di Roma e del Lazio*, Roma 1972, Vol.1.

It shows a prospective sketch made with pen on a white sheet of paper, with an accurate description of the Ardeatino and the Colonnella Fortress. On the left side of the drawing a pyramidal element is recognized on the base of the projecting area (Fig. 7).

This is a characteristic sign of the language of military architecture, for that is enough to see the pages of the treatise of Francesco di Giorgio (16), while the "*scarpa*" and the "*toro*" are not well highlighted.

"Lo piano de sopra del baluardo Antoniano cioè el piano de sopra, alto palmi 50 sopra al piano dello scarpone e batte in la vignia del signor Noferi Santa Croce alto palmi 4 in circa segniato una stella in un cerchio grosso e al baluardo in sulla muraglia che va a S. Pagolo batte sopra al piano del terreno p. 65, come apare una crocetta nel muro di mattoni dal canto di dentro quale è più basa ch'el di sopra del cordone pal 50; e da ditta croce in terra di fuori si è pal. 15. El piano de lo scarpone de la Colonnella si è più basso ch'el muro di marcantonio,

Fig. 10. Historical map, by G.B. Nolli, 1748, with the location of the bastion, in A. Frutaz, *Le piante di Roma e del Lazio*, Roma 1972, Vol.1.

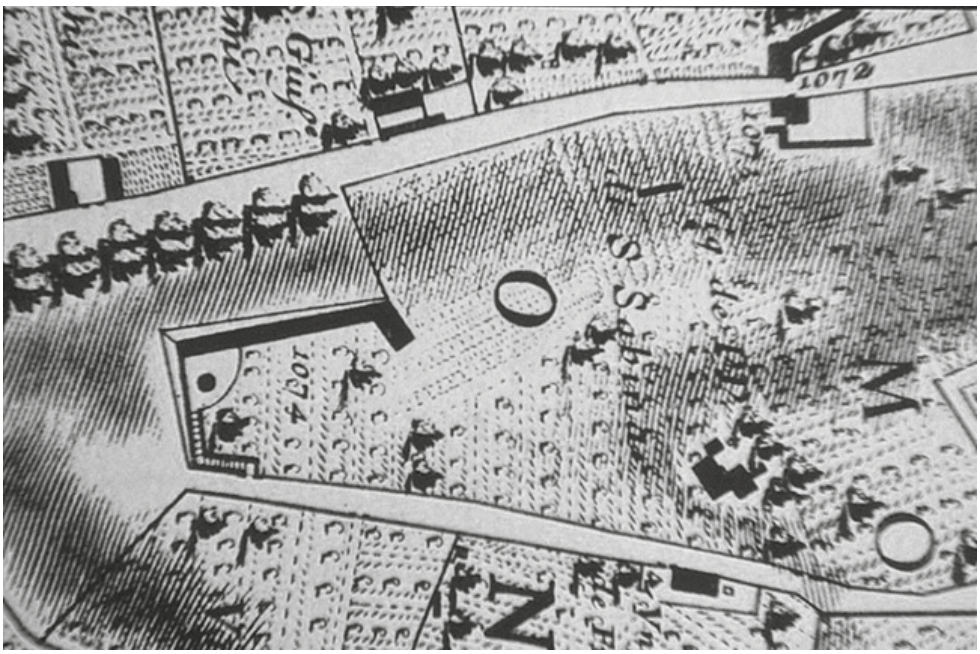


Fig. 11. Historical map, by G.B. Falda, with the location of the bastion, in A. Frutaz, *Le piante di Roma e del Lazio*, Roma 1972, Vol.1.

dove a essere la porta pal. 8; el piano di sopra del cordone della Colonnella metendolo alto pal. 50. Veria alla porta alto 42" (17).

Additional contributions for the identification of the bastion are provided by the historical cartography.
A first description is provided by Leonardo Bufalini in a plan of 1551. The Fortress of the Colonnella "*è rimasto isolato tra I dirupi e primo anello nell'ordine di posizione della catena dei capisaldi della cinta divisata dall'ingegnere fiorentino a partire dal Tevere*" (18).

The big plan of Mario Cartaro, 1576 (Fig. 8) shows on the left shore a perspective of the fortress. A strange *bugnato* is recognized on the projection element, while it highlights other recurrent details in the fortification of 16th century, as the "*toro*" and the emblem.

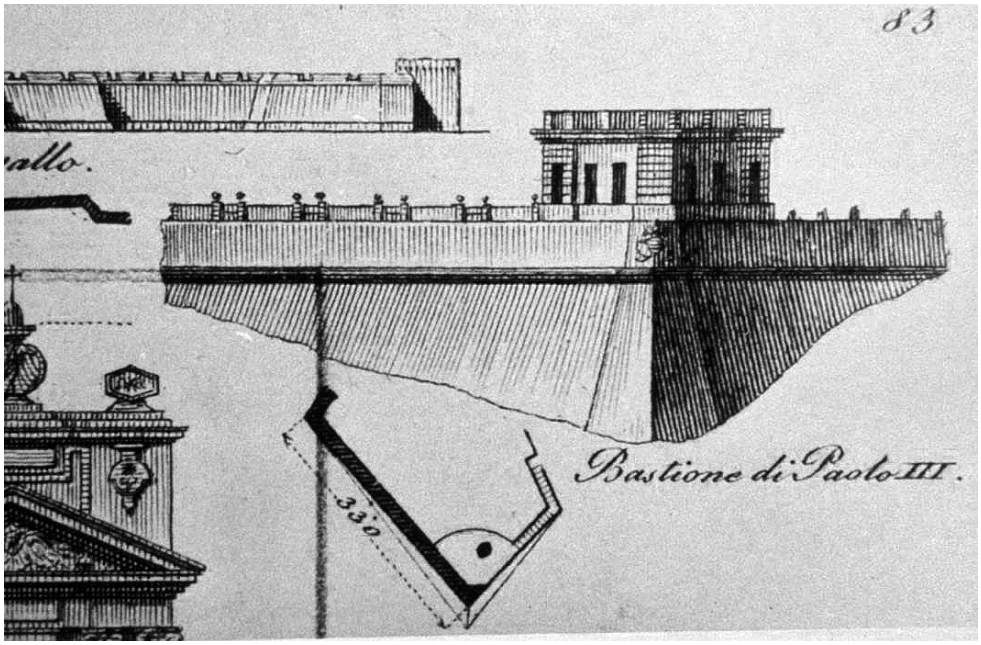


Fig. 12. G.B. Cipriani, *Itinerario figurato di Roma*, Roma 1835, pp. 243-244, tav. 83.

I agree with the affirmation of Enrico Rocchi on identifying the higher interest of the cartographic representation of the bastion on the adherence with the mura Serviane or better, on the continuity of the construction in reference to the preexistence, diversifying through the executive technique.
In the successive letter of Ètienne Duperac (Fig. 9), "*la Colonnella è disegnata come un forte chiuso*" (19). In reference to the plan of Cartaro, the last one fits more to reality because it respects proportions.

On the 18th century, the plan of Giambattista Nolli (1748) represents the bastion geometrically above the avenue that drives to Porta S. Paolo and it is possible to read "*Vigna dei Padri di Santa Sabina*" (20) (Figs. 10, 11).
In this plan, besides of specifying the denomination of the place, it shows the communication trench, which on that time was still readable to reach from the parade ground to the gallery of scarpa, that is, to the "*camere di contrammina*".

In the last century the Pontifical Cadaster, highlights the bastion on its geometric essence with land above designated to a vineyard.
The "monument in time" (21) continues to live with its usual additions and stratifications, in fact in the particle 535 there are some indications of a "*Casina delle Delizie*" (22) belonging to the house with courtyard and water well for it use by the vineyard of Padri Domenicani di S. Sabina.
Giovanni Battista Cipriani (23), in 1835, among the architectural monuments of the Aventino includes the bastion of Paolo III, the plan proposes again the Nolli's one, while the elevation is clearly different; the "*toro*" that separates the "*scarpa*" from the top curtain, the Farnese emblem, not easily readable, the "*Casina delle Delizie*" and a balustrade complete the presentation (Fig. 12).

It is significant to report the description of the bastion, made by Alberto Guglielmotti, "Casanatense" theologian, on his history about fortifications in the roman beach.

"Il sagliente tra I dirupi s'appoggia a largo sperone, la muraglia sale su fino al dorso del monte, un cordone semplice e grandioso lo cinge nel mezzo, ed al posto di onore si vede lo stemma di Paolo III (24)*. Finalmente sulla piazza*

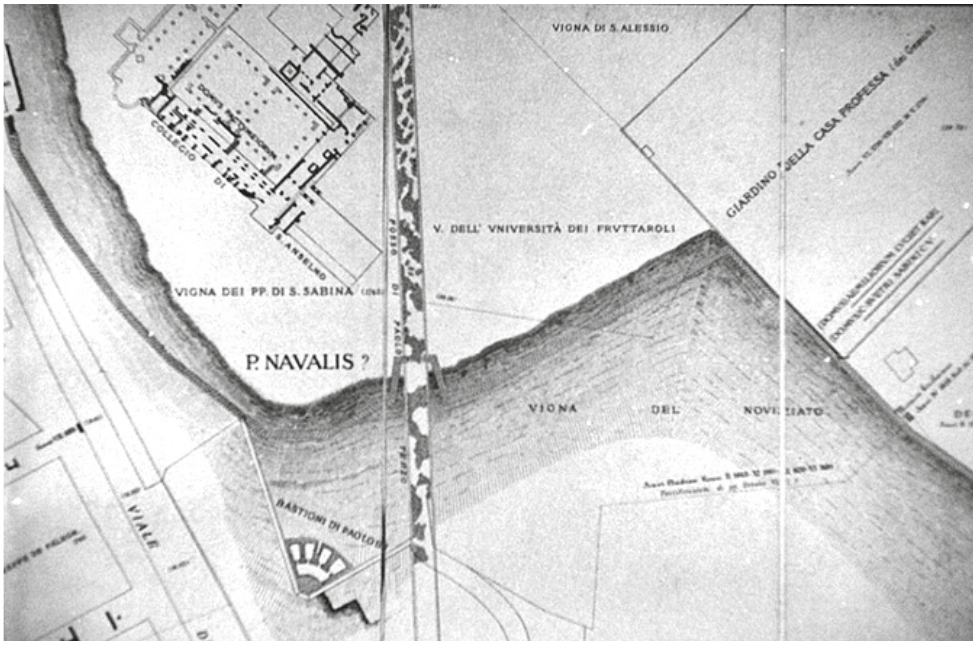


Fig. 13. Historical maps with the location of the bastion, in Archivio Primaziale S. Anselmo.

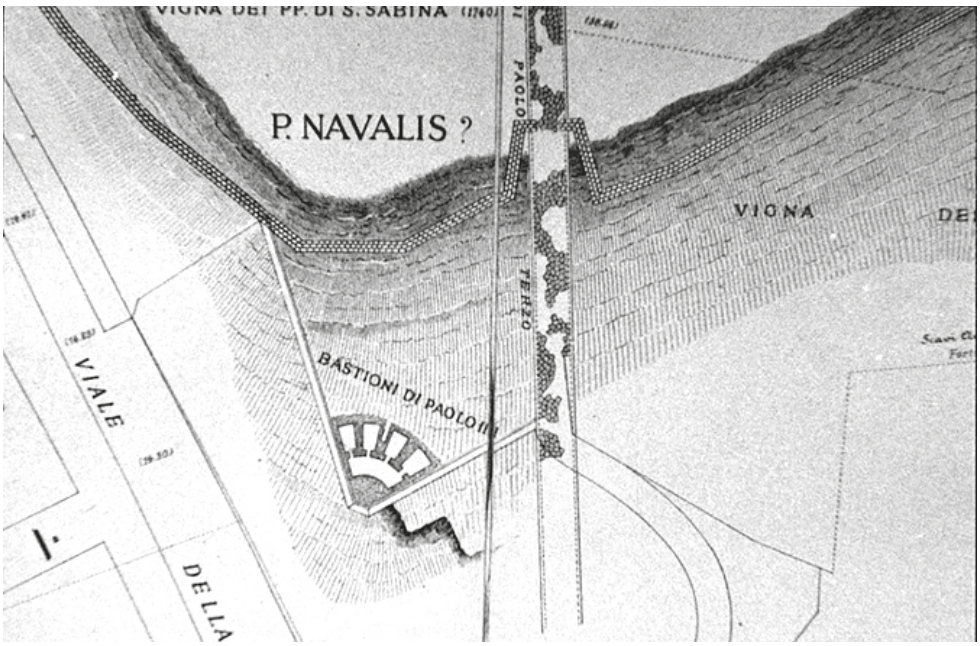


Fig. 14. R. Lanciani, *Forma Urbis Romae consilio et autoriatate Regiae Academiae Lyncaeorum formam dimensus est ad modulam 1:1000*, Milano 1893-1901.

suprema ritrovi piccolo e gentil casino, ai nostri giorni fabbricato da un vecchio cavaliere romano, che vi si era ridotto a solitudine, opera laterizia, ornati e spigoli di travertino: stile, costruzione, solidità, e tutto alla maniera sangallese, e alla similitudine dell'altro baluardo… mantiene le due facce mentre delle due troniere a tromba semplice ad apertura interna di metri due e mezzo, non c'è più nessuna traccia. Nel corpo del baluardo sotto la piazza apronsi quattro casematte a voltoni massicci: una sola delle quali verso il sagliente, arroge nel fondo ampia camera circolare di contrammina" (25).

Rodolfo Lanciani in his *Forma Urbis*… highlights the bastion delimited by the Marmorata on the left and by the Fosso di Paolo III (Via di S. Sabina) on the right side, while he provides a different lecture of the internal element, compared to the one given by Guglielmotti, no more circular rooms but quadrangular ones (26) (Figs. 13-16).

The Bastion of the Colonnella together with the Ardeatino, is one of the most interesting fortifications' works of the first part of the 16th century because

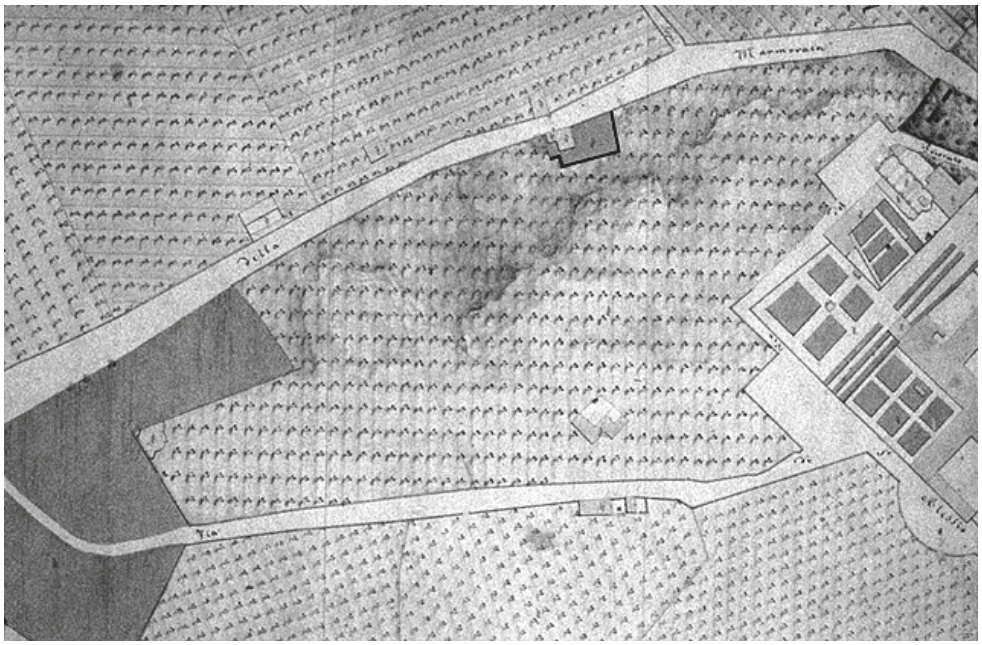


Fig. 15. Historical maps with the site of the bastion, in Archivio Primaziale S. Anselmo.

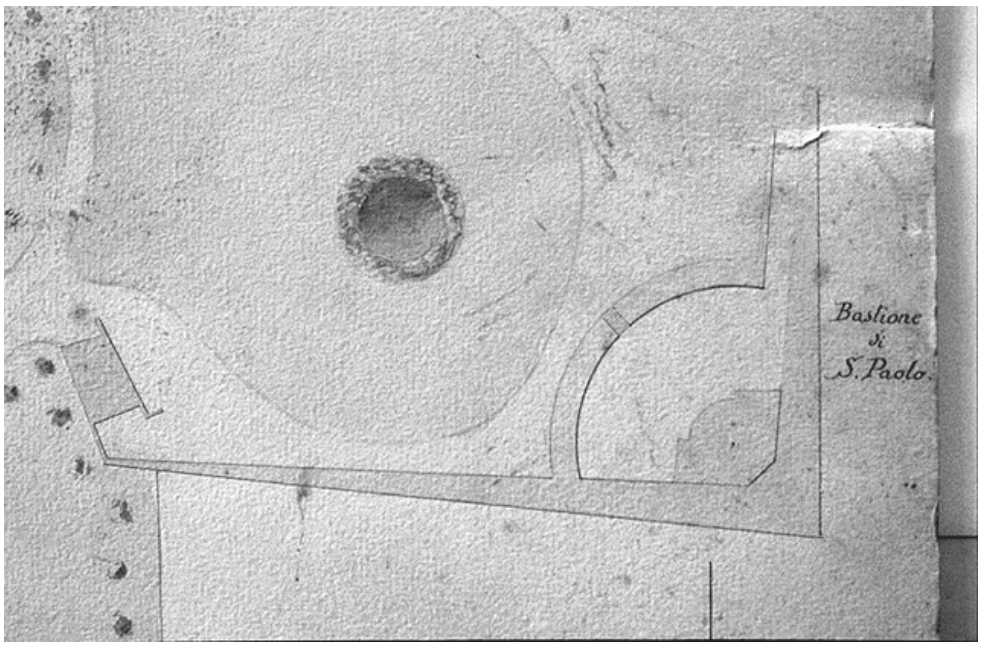


Fig. 16. Historical maps with the site of the bastion, in Archivio Primaziale S. Anselmo.

it contains some technical principles in addition to the substantial structural innovations (27).
The geometrical shape and the structural stability stand out from the whole complex. This structure uses the precedent elaborations of the bastioned front of Antonio il Vecchio (Fortezza Vecchia di Livorno) (28).

An example is evident in the *scarpa*, "*quell triangolo scaleno, o prima addossato alle mura, e il capitano Frate da Modena ne fissa tra l'altro l'altezza per soli due terzi del muro*" (29).

As observed by Francesco Paolo Fiore, "*i Sangallo adottano una forma canonica nelle architetture militari, mentre la tensione creativa è riservata nei particolari e nelle giunzioni dei materiali e superfici ad andamento geometrico diverso, nel toro ma anche nelle ammorsature d'angolo, nelle troniere, nei coronamenti*" (30), here in the Colonnella also in the pyramidal element on the basis of the projection part (Figs.1-3, 20, 21).

Figs. 17, 18. Detail of the Pope Paul III shield and the salient cut. Photo by C.B. 1985.

Fig. 19. Detail of the bastion´s masonry, made of brick with the *toro*. Photo by C.B. 1985.

The aim of this contribute is the direct recognition and the elevation of the construction that I have done also to read some of these characters (31).

The meridional front along Via Marmorata is 71 metres, with a variable height from 20.30 m to 5.30 m; while the oriental front has a development of 42 metres with a total height between 7.50 and 18.50 m (32).

The constructive character highlights a defensive wall with a *scarpa*, covered by a brick wall, marked with a *toro* of 26 cm. higher side. Along the oriental front, the curtain has some "*fuciliere*" located according to an almost regular distance of 1.80 m with an opening of 15/20 cm (Figs. 17-25).

Fig. 20. General view of the masonry, highlighting the *toro* and the loopholes. Photo by C.B. 1985.

Fig. 21. Detail of the *toro* and the loopholes. Photo by C.B. 1985.

Fig. 22. Detail of a loophole of the Bastion of la Colonnella. Photo by C.B. 1985.

The bastion shows in the projection element the remains of the Paolo III's emblem, with in both of the smaller sides and also mutilated, those of the *popolo romano*, on the left and the Camerlengo Guido Ascanio Sforza, on the right (33).

Today the bastion can be use internally only in one circular *camera di contrammina*. The room is accessible through a helicoidal ramp that assimilates the gap of 8.20 m. The circular element has a diameter of 6.60 m and a height of 8.20 m; the vault is at 5.10 m from the impost to the skylight (Figs. 26-31).

The environment is characterized by a shapeless masonry in the lower part, while the top is delimited by a dome of rotation according to the "*spinapesce*" pattern. The "*spinapesce*" is formed by bricks of 26-12-3,5 cm with mortar of 1 or 2 cm. The way of construction of the vault is typical of the constructive technique of the Tuscan Quattrocento and "*rivela nell'autore un interesse per le opera di Brunellesco*" (34) e "*verso l'architettura romana antica*" (35).

Even if more accurate drawings of the bastion have not being found, the reference with the drawing 900 A of the Uffizi is certain (36).

The spherical vault, "*unica tra tutte non richiede armature poiché essa non è fatta soltanto d'archi, ma anche di anelli sovrapposti… e una volta che siano costruiti gli anelli uno sull'altro anche facendo l'ipotesi che la costruzione voglia crollare non si vede da che parte potrebbe cominciare*" (37).

This constructive scheme *"delle spirali di mattoni a spina di pesce si riscontra in tutte le cupole brunelleschiane"* (38).

Fig. 23. Photo of the fortress area, completely covered by the snow. Photo by C.B. 1985.

Fig. 24. Photo of the "trap door" that allows the entrance from the top of the vault, discovered after the melting of the snow. Photo by C.B. 1985.

An interpretation of the *spinapesce* is given by P. Sanpaolesi in his essay about the technical knowledge of Brunelleschi; "*esse sono le spalle entro le quali si incastra una porzione di filare. Messi a forza i mattoni piani fra queste spalle come tante piattabande minori essi non scivolano più*" (39).

I think is appropriate to conclude to point out the current conditions of the monument. The external brick curtain shows a remarkable degradation state due to a pronounced bulging of the bricks with partial collapse. The wall is attacked by vegetation in addition to water infiltrations, especially in the *camera di contrammina*.

Fig. 25. Detail of the helicoidal ramp. Photo by C.B. 1985.

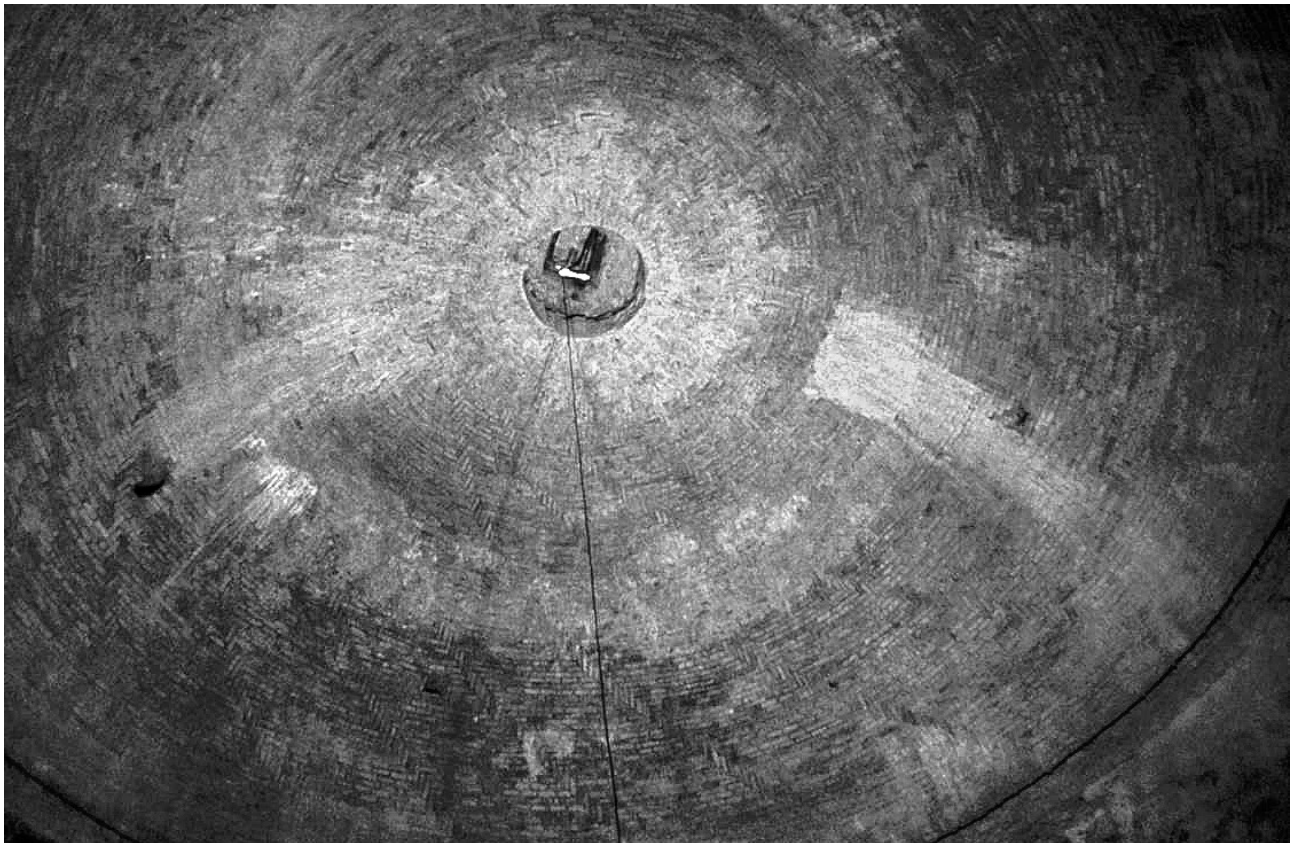


Fig. 26. Detail of the calotte made with a "*spina di pesce*" pattern. Photo by C.B. 1985.

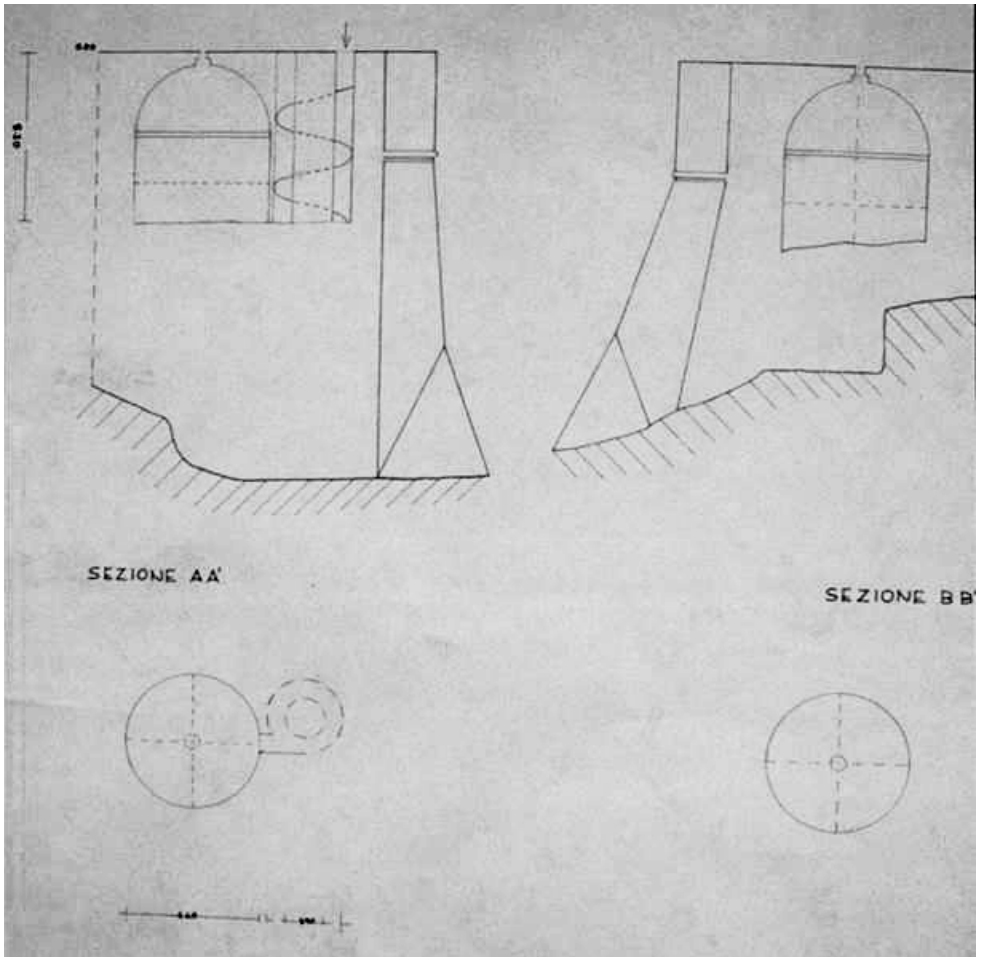


Fig. 27. Sections and plan of the bastion 1:100, by C.B. 1985.

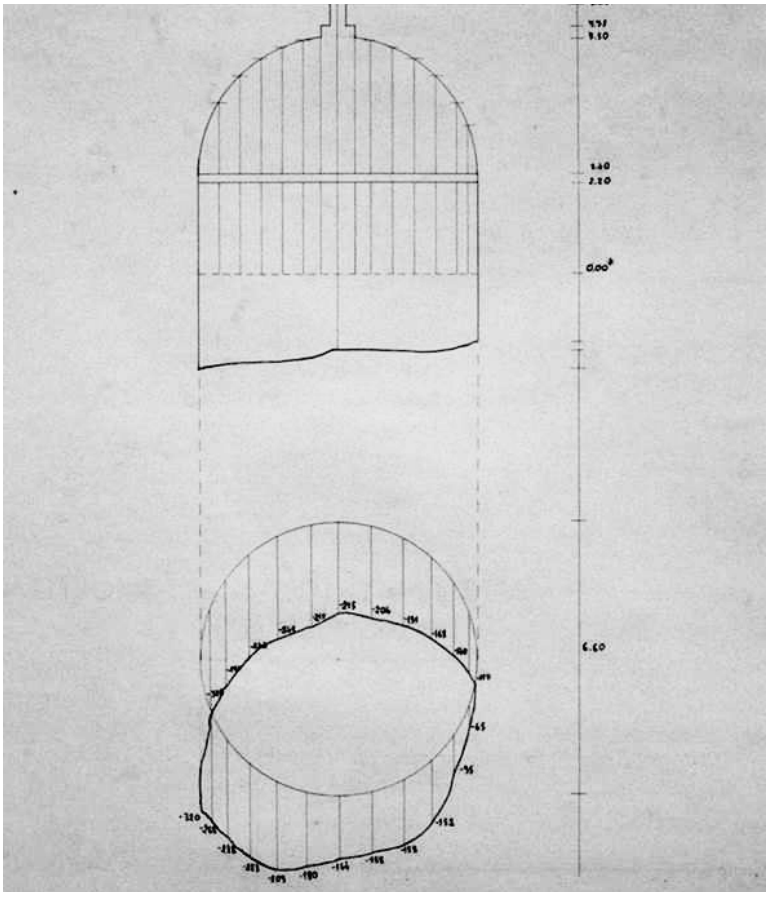


Fig. 28. Geometric and dimensional survey of the cupola, 1:50, by C.B. 1985.

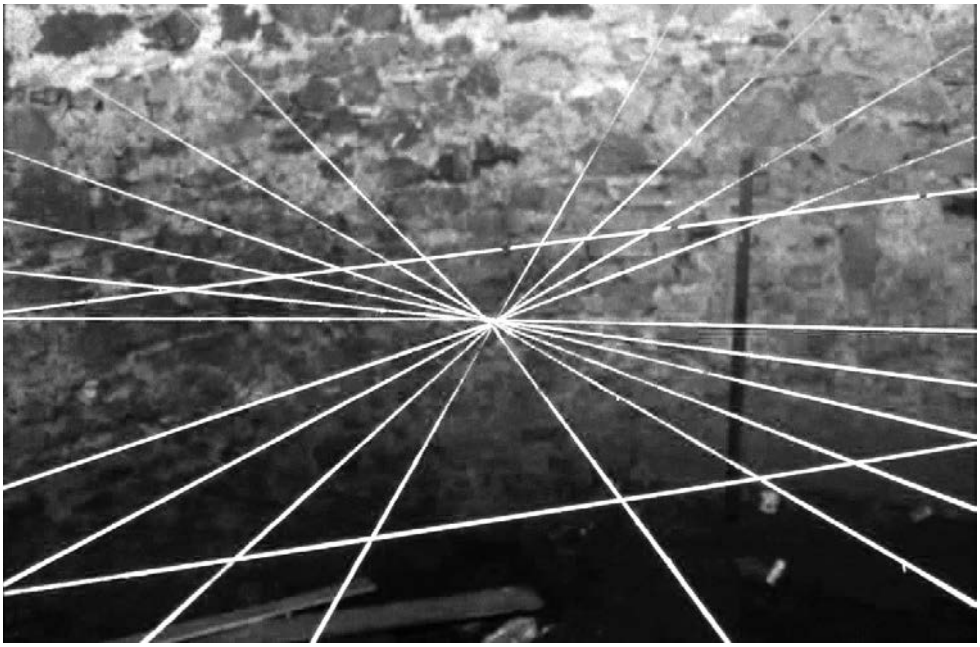


Fig. 29. Traditional survey, according to the Renaissance system used by Antonio da Sangallo il Giovane. Photo by C.B. 1985.

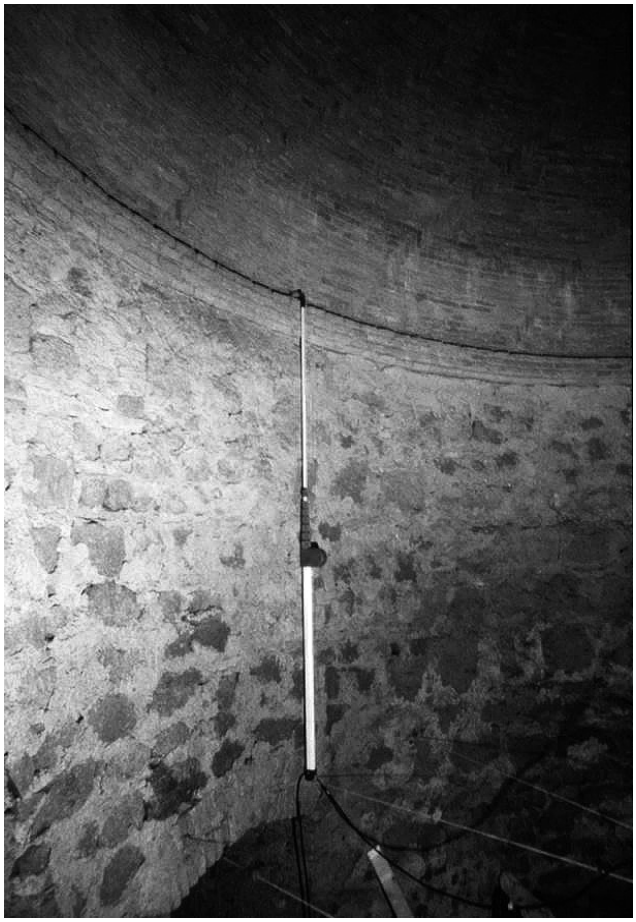


Fig. 30. Traditional survey, according to the Renaissance system used by Antonio da Sangallo il Giovane. Photo by C.B. 1985.

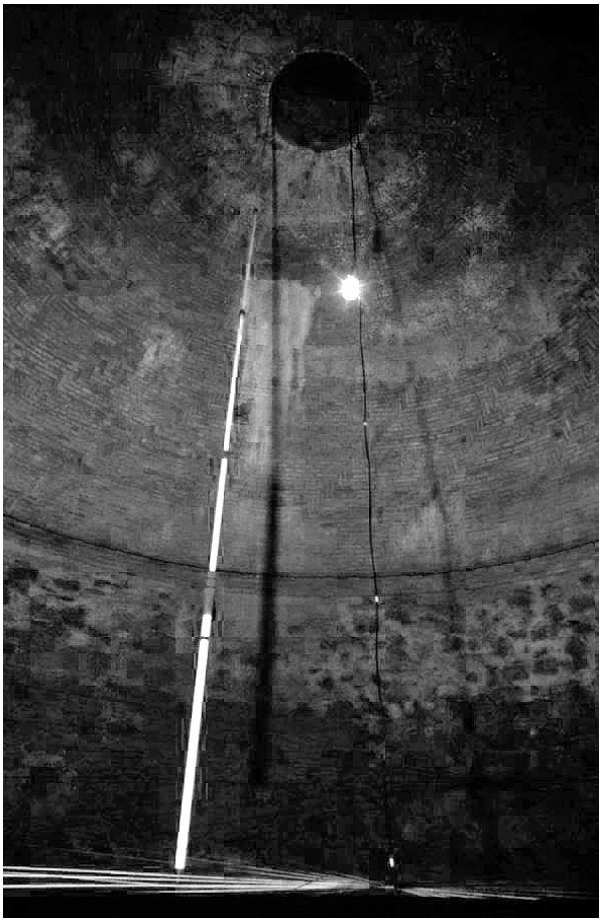


Fig. 31. Inside of the *camera di contrammina*. Traditional survey, according to the Renaissance system used by Antonio da Sangallo il Giovane. Photo by C.B. 1985.

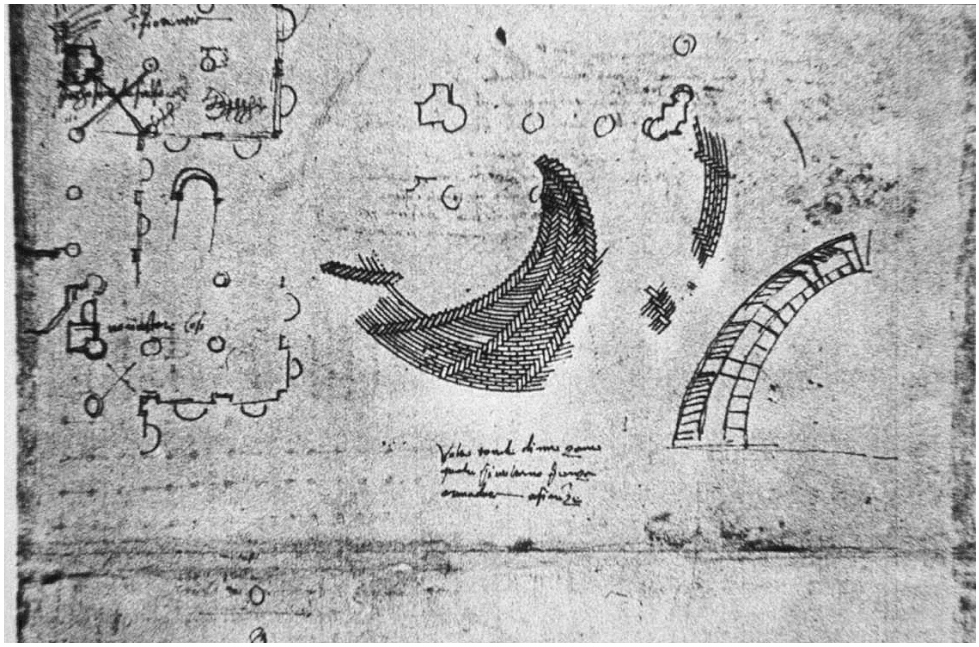


Fig. 32. Detail of the "*spina di pesce*" pattern, by Antonio da Sangallo il Giovane, in Firenze, Uffizi Gabinetto Disegno Stampe, drawing n. 900A.

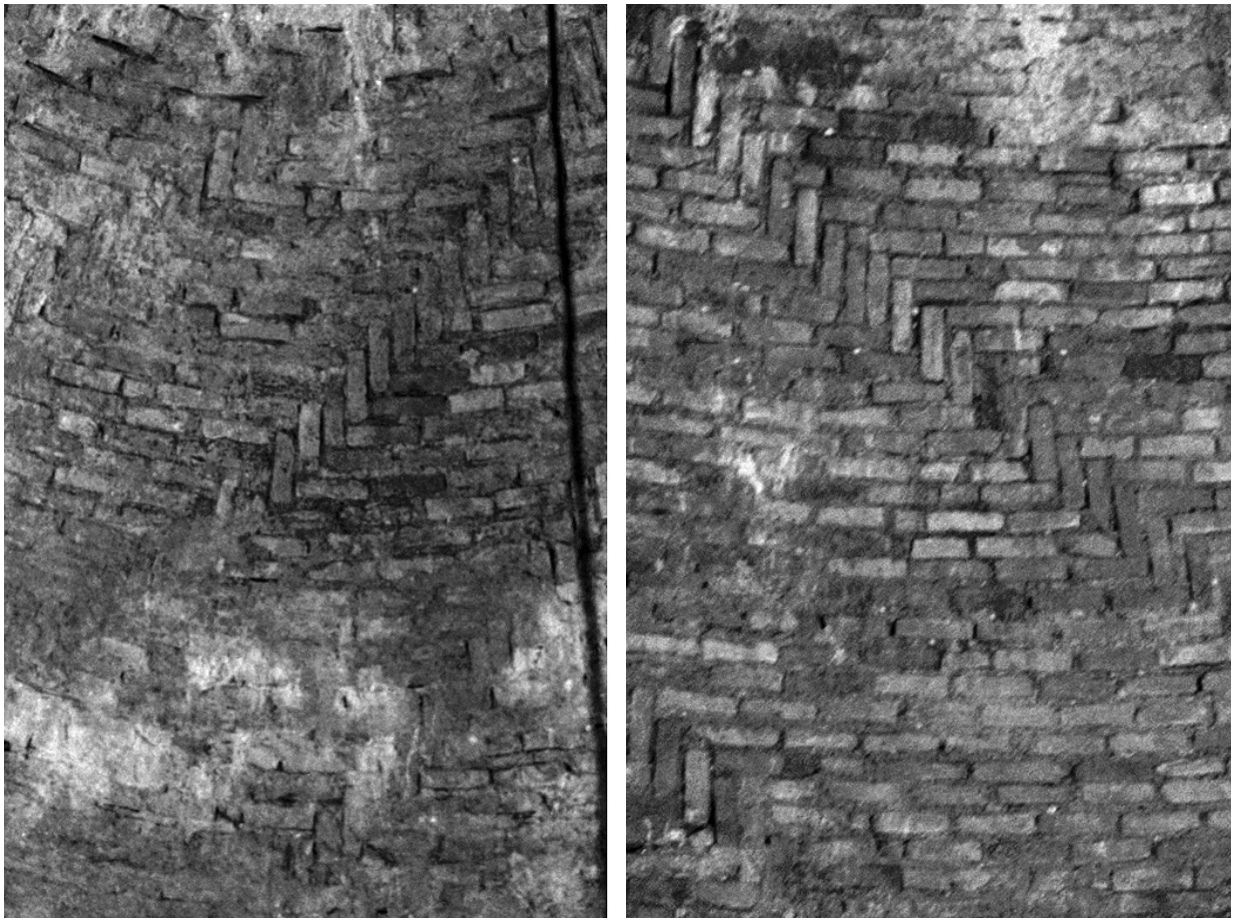


Fig. 33. Details of the "*spina di pesce*". Photo by C.B. 1985.

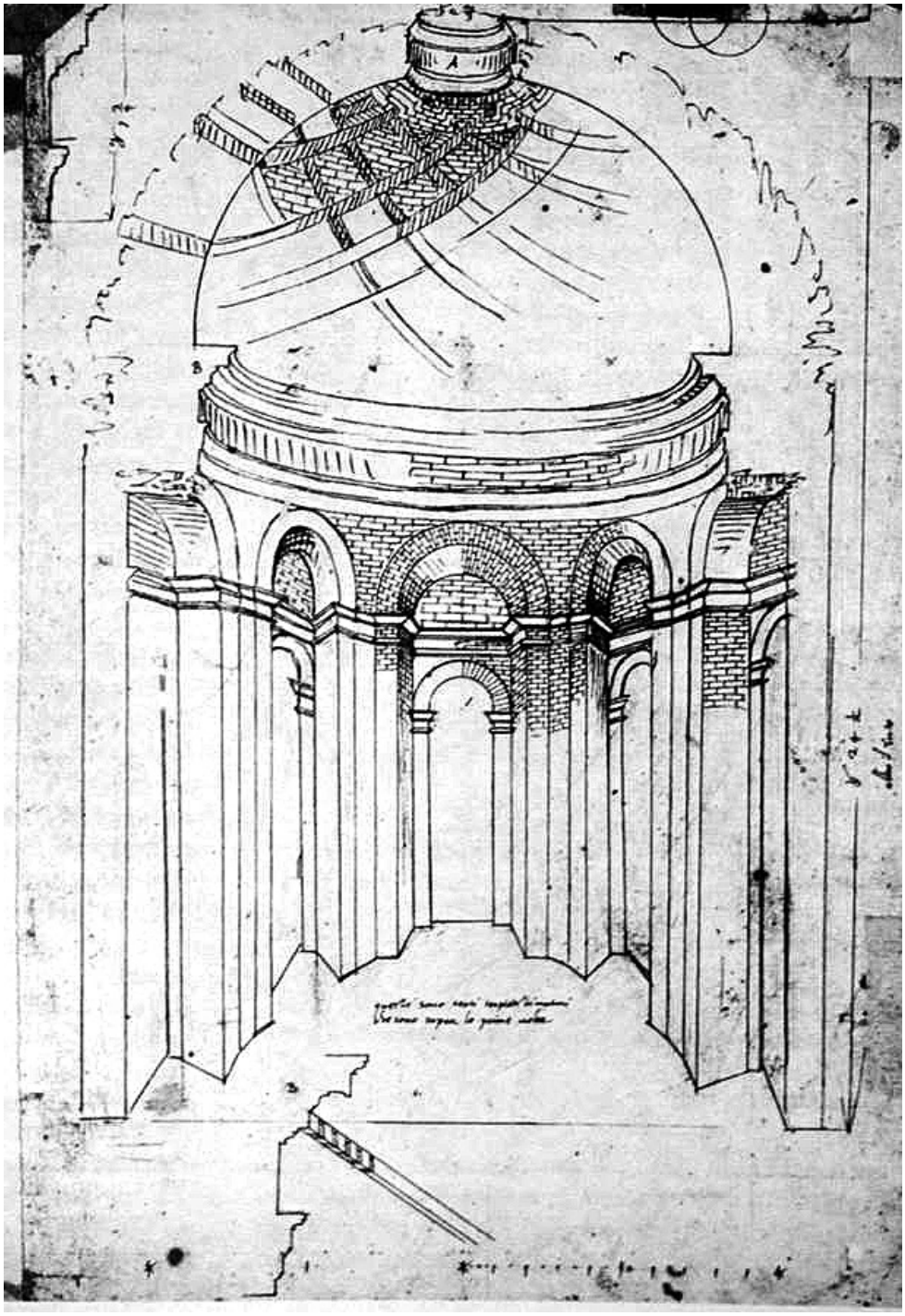
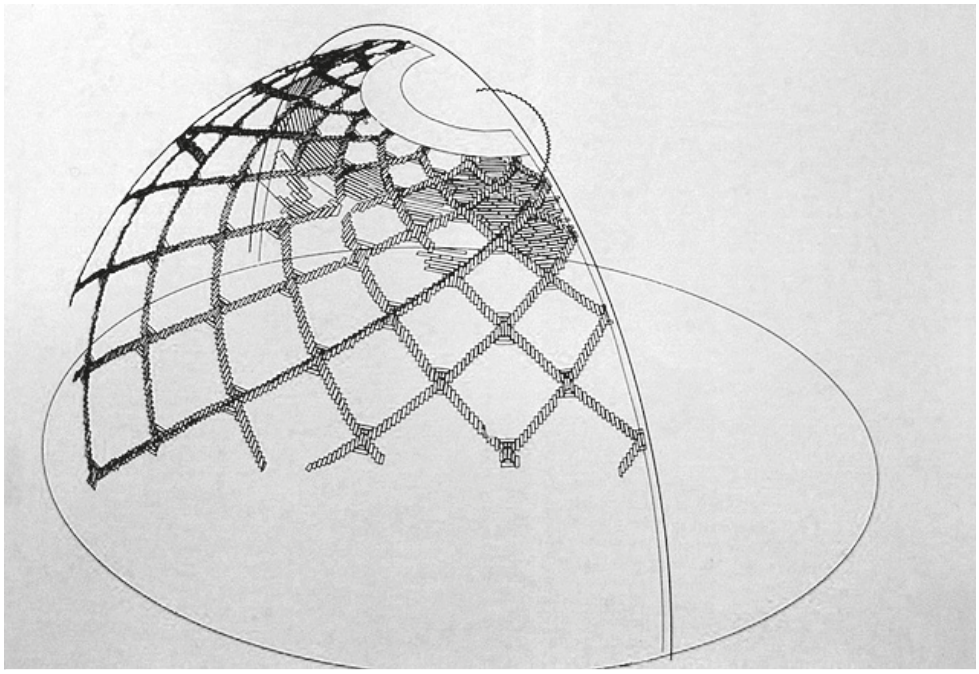
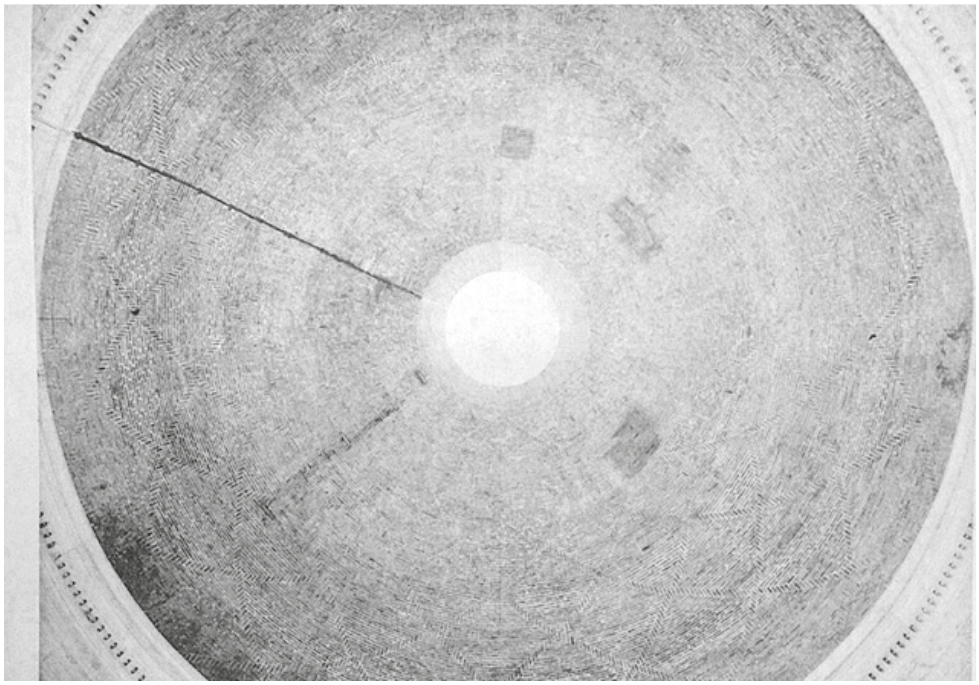


Fig. 34. Ottagono di San Pietro, by Antonio da Sangallo il Giovane, in G. Zander, *Gli ottagoni di San Pietro riconosciuti nel Dis. Arch. Uff. n. 1330*, in "Palladio" 1, giugno 1988, pp. 67-82. Particularly see p. 69.





Figs. 35, 36. Detail of the double spiral of the Ottagono di San Pietro, photogrammetric restitution by Mario Docci, 1990; In M. Docci, R. Migliari, *La costruzione della spinapesce nella copertura della Sala Ottagona di Simon Mago nella fabbrica di S. Pietro*, in "Palladio" n.3, gennaio-giugno 1989, pp. 61-72.

Notes

I would like to thank the Benedictine Fathers from the Abbazia Primaziale di Sant´Anselmo for allowing me to examine the monument and for helping me concretely during the research.

1. L. PASTOR, *Geschichte der Papste*, Freiburg 1886 translation to Italian *Storia dei Papi*, Vol. V, Paolo III, Roma 1914, p. 706.

2. Published letter from E. MÜNTZ, *Le monuments antiques de Rome a l´epoque de la Renaissance*, nouvelles recherches, *Les murs et les portes*, in "Revue Archeologique, Antiquite e Moyen Age", Troisienne Seire, Tome VII, Paris 1886, p. 329; from G. CLAUSSE, *Les Sangallo,* Paris 1900-2. Vol. II, (Rome fortifications 1537), pp. 340-341; and from E. ROCCHI, *Le piante Iconografiche e prospettiche di Roma del secolo XVI, colla riproduzione degli studi originali autografi di Antonio da Sangallo il Giovane per le fortificazioni*, Torino-Roma 1902, pp. 230-231.

3. I mention synthetically some of the authors that address the issue of the bastion in their studies; A. GUGLIELMOTTI, *Storia delle fortificazioni nella spiaggia romana, risarcite e accresciute dal 1560 al 1570*, Roma 1880; E. ROCCHI, *Le piante*, op. cit,; L. PASTOR, op. cit.; G. GIOVANNONI, *Antonio da Sangallo il Giovane*, Roma 1959; G. MIARELLI MARIANI, Sangallo in "Dizionario Enciclopedico di Architettura e Urbanistica", Roma 1969 Vol. V, p. 395; A. BRUSCHI, *A. Cordini* in "Dizionario Biografico degli Italiani", vol. 29, Roma 1983, p. 14.

4. F. DI GIORGIO MARTINI, *Trattato di Architettura Civile e Militare*, edited by C. Saluzzo, Torino 1849.

5. G. GIOVANNONI, op. cit. p. 80.

6. Archivio di Stato di Roma, Rubrica Soldatesche e Galere, indicating envelopes "Mura e Fortificazioni di Roma, per la Colonnella", busta 15.

7. E. ROCCHI, *Le piante*, op. cit., parte terza, I Mandati di Pagamento delle fortificazioni di Roma pp. 225-257.

8. E. ROCCHI, op. cit. pp. 239-40.

9. The Roman Governor and the providers for the reparation of the public manufactures entrusted to the Mastro Lorenzo fiorentino to make four arms of Paolo III in travertine with other two smaller… in F. GORI, *Archivio Storico Artistico Archeologico e Letterario della città e provinciale di Roma*, vol. III, Spoleto 1878-79, p. 223.

10. L. PASTOR, op. cit., p. 709.

11. L. PASTOR, op. cit., p. 709.

12. Gabinetto Disegni e Stampe degli Uffizi, drawing n. 1019 A, sanguine pen in white paper, described by ROCCHI, op. cit. p. 180.

13. Gabinetto Disegni e Stampe degli Uffizi, drawing n. 1015 A, sanguine pen in white paper with punctures made by a pinpoint, described by ROCCHI, op. cit. p. 182.

14. G. GIOVANNONI, op. cit., p. 361.

15. E. ROCCHI, op. cit., pp. 182-183.

16. P. MARCONI, F.P. FIORE, G. MURATORE, E. VALERIANI, *I Castelli, Architettura a difesa del territorio tra Medioevo e Rinascimento*, Novara 1978.

17. Gabinetto Disegni e Stampe degli Uffizi, drawing n. 938 A, ROCCHI op. cit., p. 185.

18. E. ROCCHI, op. cit., p. 42.

19. G. GIOVANNONI, op. cit., p. 359.

20. G.B. NOLLI, map of Rome, Roma 1748, Bastion of Paolo III, particle n. 1074.

21. G. MIARELLI MARIANI, *Monumenti nel tempo, per una storia del Restauro in Abruzzo e nel Molise*, Roma 1979.

22. Archivio di Stato di Roma, Pontifical cadaster, Region XII.

23. G.B. CIPRIANI, *Itinerario figurato di Roma*, Roma 1835, pp. 243-244, tav. 83.

24. The surviving emblems have been abraded and rendered almost shapeless by the chiseling during the French occupation of 1799. R. BATTAGLIA, *L´Aventino nella rinascita e nel barocco attraverso I documenti iconografici*, Roma 1942.

Other probable damages were suffered in 1848 as the General VAILLANT writes in *Giornale delle operazioni dell´artiglieria e del genio dell´assedio di Roma*, Paris 1851, already mentioned by ROCCHI p. 65.

25. A. GUGLIELMOTTI, op. cit., p. 324 .

26. R. LANCIANI, *Forma Urbis Romae consilio et auctoriatate Regiae Academiae Lyncaeorum fromam dimensus est ad modulam 1:1000*, Milano 1893-1901.

27. F.P. FIORE, *Città e macchine del Quattrocento nei disegni di F. Di Giorgio Martini*, in Accademia Toscana di Scienze Lettere e Arti, la Colombara, studi XLIX, Firenze 1978.

28. G. PIANCASTELLI POLITI, *La fortezza Vecchia in Livorno, progetto e storia di una città*, catalogue of the exposition in Fortezza Vecchia e nei Bottini dell´olio, Pisa 1980.

29. F. DI GIORGIO, op. cit., p. 247.

30. F.P. FIORE, *Città e…* op. cit., p. 60.

31. M. DOCCI, D. MAESTRI, *Il rilevamento Architettonico Storia Metodi e disegno*, Roma – Bari 1984.

32. The height variations in both of the fronts are due to the alterations of the bastion´s underlying terrain along the years.

33. G. GIOVANNONI, op. cit., ill. 384; I think is necessary to specify that the master fell into in a typographic oversight, the illustration in the second volume should refer to the bastion of the Belvedere and not to the Colonnella one.

34. P. SANPAOLESI, *Le cupole e gli edifici a cupola del Brunelleschi e la loro derivazione da edifici romani*, in Atti del I Congresso di Storia dell´Architettura, Roma 1936 pp. 37-41.

35. But where Brunellesco copies the romans is on the use of constructive expedients that he used constantly, as always he used the same light vaults as romans, and it was from them that he learnt how to build quickly, P. SANPAOLESI, Atti… op. cit.; the opening that we can find in the vault refers to the skylights that were made in the top of the vaults. It was the easiest point, constructively and geometrically speaking, to make the light penetrate inside of the buildings, in G. DE ANGELIS d´OSSAT, *La forma e la costruzione delle cupole nell´Architettura Romana*, Atti del III Congresso di Storia della Architettura, Roma 9-13 october 1938, Roma 1940, p. 231.

36. "*Volte tonde di Mezzane, quali si voltano senza armature a Firenze*". The drawing 900A of Antonio, with some notes of the plan of S. Spirito on the left and an example of a spinapesce spiraling vault on the right, is similar to the one in the Fortezza da Basso, C.L. RAGGHIANTI, *F. Brunelleschi un uomo un universe*, Firenze 1977.

37. F.P. FIORE, op. cit., pp. 44-48, mentions L. B. ALBERTI, *De Re Aedificatoria,* cop. IX.

38. P. SANPAOLESI, op. cit., Atti Congr. 36 and also about the technical knowledge of Brunelleschi, *F. Brunelleschi la sua opera e il suo tempo*, Atti del convegno internazionale di studi, VI centenario (Firenze, October 1977), Florence 1980; P. A. ROSSI, *Le cupole del Brunelleschi, capire per conservare*, Bologna 1982.

39. P. SANPAOLESI, Atti Brunelleschi, op. cit., p. 156.

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B. GILLE, *Les ingénieurs de la renaissance*, Paris 1964.

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F.P. FIORE, *Francesco di Giorgio e il rivellino "acuto" di Costacciaro*, in Quaderni dell´Istituto di Storia dell´Architettura, Saggi in onore di Guglielmo de Angelis d´Ossat n.s.I-I0, 1987, pp. 197-208.

G. ZANDER, *Gli ottagoni di San Pietro riconosciuti nel dis. Arch. Uff. n. 1330*, in "Palladio", I/1, 1988, pp. 67-82.

G. ZANDER*, Geometry and structure of the Domus of Eight Octagonal Rooms in the Basilica di San Pietro in the Vatican*, in *International Symposium on Domes from Antiquity to the present*, Istanbul, 30th May – 3rd June 1988.

B. ADORNI, *Le fortificazioni di Parma e Piacenza nel Cinquecento. Architettura militare, espropri e disagi*, in C. DE SETA and J. LE GOFF, eds., *La città e le mura, Roma* 1989, pp. 128-165.

M. DOCCI, R. MIGLIARI, *La costruzione della spinapesce nella copertura della Sala Ottagona di Simon Mago nella fabbrica di S. Pietro*, in Palladio n.3, gennaio-giugno 1989, pp. 61-72.

C.L. FROMMEL, N.ADAMS, T*he architectural drawings of Antonio da Sangallo the Younger and his circle*, in C. JOBST (a cura di), *Fortifications, Machines, and Festival Architecture*, Volume I, MIT Press Cambridge Massachusetts, and London, England 1994, p. 170: U 938A recto, Antonio da Sangallo the younger; Rome, elevation of the fortifications on the Aventine hill and the Colonnella bastion at the new Porta San Paolo, 1537.

Dimensions: 180x219 mm

Paper: Yellowed on the edges, trimmed except on the right side.

Technique: Pen and brown ink.

Drawing Scale: Roman palmi.

INSCRIPTION: *Lo piano di sopra del cordone del baluardo antoniano cioe el piano di sopra / alto palmo 50 sopra alpiano dello scarpone e batte in lavignia del S[igno]re noferi / Santa Croce alto palmi 4 in circha segniato*

una stella in uno cerchio grosso / e al baluardo in sulla muraglia cheva asanpagolo batte sopra alpiano del / terreno p[almi] 65 come apare una crocetta nelmuro di mattoni dalcanto di / dentro quale e piu basa cheldi sopra delcordone p [almi] 50 e da ditta croce atterra / di fuora sie p[almi] 15 / E piano de lo scarpone della Colonnella sii e piu basso chelmuro di marcant[oni]o dove / assere laporta p[almi] 8 elpiano di sopra delcordone della Colonnella mettendolo / alto p[almi] 50 verria alla porta alto 42; Colonnella.

This is the only elevation of the walls planned by Antonio il Giovane for the left bank of the Tiber. The walls vary in height from 50 *palmi* for the curtain (slightly more than 11 metres) to 65-70 *palmi* (from 14.5 to 15.5 metres) for the bastions; these measurements correspond precisely to those for the Colonnella bastion. Antonio´s comments reveal how preoccupied he was with the vertical connection of the various parts, starting with the Colonnella up to the "antoniano", that is, the Ardeatine bastion (not shown). While both Rocchi (1902) and Giovannoni (1959) identified the drawing as a preparation for the Ardeatine bastion, the design, in fact, shows the Colonnella bastion. The Colonnella bastion is readily identifiable by the blunt angle with a spur at its base, as is clearly shown in the design and still recognizable today on site. Such specific detail suggests that this sheet represents the definitive solution for the plan which is characterized by the placement of a bastion corresponding to the small Aventine hill and just before the new recessed Porta San Paolo. The gate is characterized by an arch and indications of a double architectural order on one side. Beyond the gate the battered angle of another bastion may be glimpsed, probably similar to the variation of U 143IA. See also U 1019A, 1514A, 1015A, 1431A r. and v.

M.C. PIERDOMINICI, *Il bastione del Sangallo: note di restauro,* in Bollettino d'Arte, 6, Ministero per i Beni e le Attività Culturali, Direzione Generale per il Patrimonio Storico, Artistico e Demoetnoantropologico, Firenze 1998, pp. 141-158.

M. EICHBERG, *Il bastione Ardeatino, in* "Palladio", Roma 2000, pp. 5-22.

L. BIANCHI, *L´antico bastione sul Gianicolo di Antonio da Sangallo il Giovane: mura conteste ma poi dimenticate,* I*,* in *Lazio ieri e oggi,* Roma 2001, pp. 84-86.

L. BIANCHI, *L´antico bastione sul Gianicolo di Antonio da Sangallo il Giovane: mura conteste ma poi dimenticate,* II*,* in *Lazio ieri e oggi,* Roma 2001, pp. 108-110.

V. DI GIOIA, *L'Aventino: un colle classico tra antico e moderno,* Roma 2004, p. 113, p. 222.

V. VICHI, *La grande storia dell'architettura militare: dall'antichità ai nostri giorni : città murate, acropoli, torri, rocche, castelli, cittadelle, cremlini, cinte bastionate, campi trincerati, linee fortificate*, Torino 2006, pp. 231-232.

A.A.V.V., *Roma: le trasformazioni urbane nel Cinquecento,* Volume 1, *Topografia e urbanistica da Giulio II a Clemente VIII*, edited by Giorgio Simoncini, Firenze 2008, p. 115.

M. ANTONUCCI, *Le porte di Roma nei progetti di Antonio da Sangallo il Giovane,* in "Roma moderna e contemporanea: Entrare in città, le porte di Roma", Anno XXII, 2014, fasc.1, January-June, edited by Giuseppe Bonaccorso and Claudia Conforti, Roma 2015, pp. 17-35.

M. ANTONUCCI, *Leone X e Antonio da Sangallo il Giovane nella Roma medicea,* V.2, Roma 2016.

F.P. FIORE, *Architettura e arte militare. Mura e bastioni nella cultura del Rinascimento*, Roma 2017, particularly see: *Episodi salienti e fasi dell'architettura militare di Antonio da Sangallo il Giovane* pp. 139-156; *Rilievo topografico e architettura a grande scala nei disegni di Antonio da Sangallo il Giovane per le fortificazioni di Roma al tempo di papa Paolo III* pp. 171-180; *Le porte doriche di Antonio da Sangallo il Giovane per le fortificazioni di Roma* pp. 181-190, e le illustrazioni dalla 97-99.

5. Rome, the façade of Palazzo dei Conservatori

Calogero Bellanca

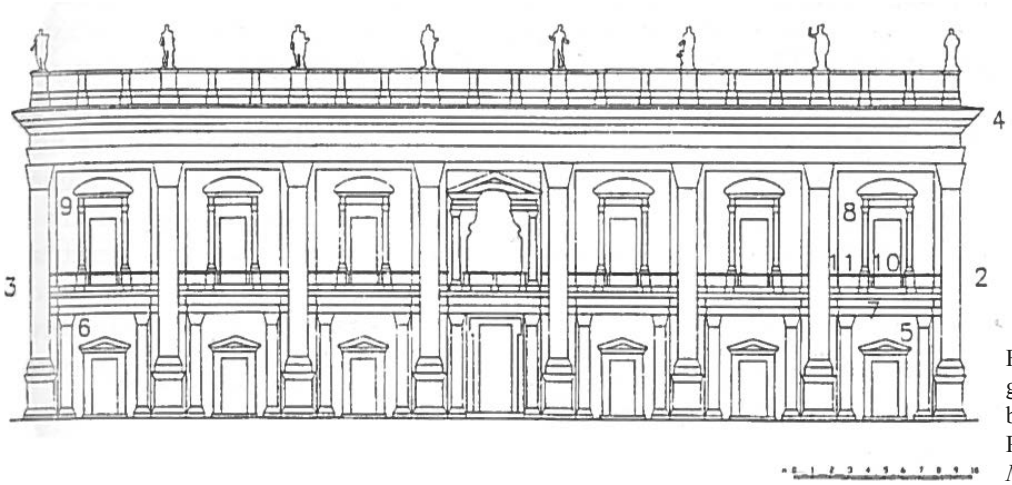


Fig. 1. Palazzo dei Conservatori, geometric-dimensional diagram by G. De Angelis d'Ossat, C. Pietrangeli, *Il Campidoglio di Michelangelo*, 1965, p. 487.

The attention, predominantly focussed on the parts being examined, has permitted the observing of significant differences and analogies between the parts (Fig. 1). The contribution, therefore, tends to highlight the architectural reality of the façade through some graphical restitutions of the architectural orders and of other parts characterising it.

Nonetheless, some brief mention would seem opportune of scholars who initiated their reflections on Michelangelo's order and helped orient and guide subsequent research.

Thus, in 1961, James Ackerman specified that: "in Palazzo dei Conservatori, the architectural order was used simultaneously for structural and for decorative ends, giving us the chance to clarify relation and expression in Michelangelo's architecture" (1); after him, Guglielmo De Angelis d'Ossat noted, in 1965, that "the architectural thus draws colossal load-bearing elements suitable for the new noble poetics, which also plays on the exact cadence of the architraves, masterfully constructed with stone blocks", and again "in this regard, the accent must be placed more decisively on a linguistic affinity with St. Peter's, which is usually focussed on the common configuration of the giant order and the comparison of the not dissimilar windows" (2).

Lastly, in 1979, Arnaldo Bruschi provides a broader and more detailed reflection on the adoption of the giant order, tracing a profile which, from Antiquity, passes through Bramante and arrives at Michelangelo, via some "experiments" by Brunelleschi, Alberti, Filarete and Antonio da Sangallo il Giovane.

"The Roman schema of the Imperial Fora had already been Bramante's inspiration for the organisation of the piazza... Michelangelo, too – not an ahistorical, isolated "genius", but a man of his time – reprises this, in his fashion, greatly personalising and adapting it to the constraints of the location and the existences, the type of spatial plan...".

He points out: “that the Palazzo dei Conservatori should have a *portico* on the ground floor... was certainly decided by the example of the old 1400s palazzo. But that the lateral *palazzi* should be porticoed was also indicated by Vitruvius and by the fora constructed in Antiquity...”.
“Besides, the solution is conceptually quite similar to that... adopted for the façade of the Conservatori, with an order, as tall as the wall, located to frame a span divided into two floors, of which the lower has a small order – it had previously appeared among Michelangelo’s studies (e.g., in a sketch -89 A v. Casa Buonarroti...). The author proceeds by relating the constructive histories of the orders of the two *palazzi*, Senatorio and Conservatori, to one another; of the latter, it is asserted that the order is “free in the lower part among the openings of the portico and bearing the concentrated weight of the second floor”. In conclusion, it is observed that, “... regrettably, the surviving graphical documentation is uncertain, nor are we aided by drawings by Michelangelo that could be said to refer unambiguously to the Capitoline complex”. However, drawing n. 333 of the Ashmoleam Museum in Oxford, depicting the façade of a *palazzo* with a giant order embracing a ground floor with arches and a windowed upper floor, although it cannot be said to refer without doubt to the Capitoline *palazzi*, dates probably to between 1540 and 1550 and... no further than 1549-50, certifying that Michelangelo was cogitating on the theme of the giant order at this time (3).

The Corinthian Order (Figs. 2, 3)

Base and capital
This Corinthian **base** (Fig. 2) presents the characteristic of the double astragal and the singularity of the moulding adjoining the upper torus, the listel and the shaft. In this regard, it may be noted that similar bases with double astragals can be traced back in design “from Antiquity”, as well as in surveys which may refer to St. Peter’s Basilica (f. 62R of the Codex Coner and f. 7 “base profiles”). Nonetheless, more immediate references are possible, especially, with some of Michelangelo’s drawings.
Of particular note are those relating to the profiles of bases kept at Casa Buonarroti, Arch: 62r, 64 and 65, as well as 89v, with various sketches of base profiles. With regard to the double astragal, see also drawing n. 59A of Casa Buonarroti.
The Corinthian **capital** presents, in its layout, two leaves at the first level; at the same height there are three “middle” leaves, which define half of its height.
The cauliculus of the third level leaves is situated just a few centimetres below the margins of the second leaves; then from these cauliculi blossom both the third leaves and the two couples of volutes, of which the angular ones are linked with the abacus by means of a little palm. The whole ends with an abacus defined at its extremities by a *cavetto*, above which is an inclined listel and an echinus.
The “eye” of the volute ends with a suspended “curl”, almost a minuscule spiral. Furthermore, among the cavities of the two volutes can be distinguished an internal linking “cartouche” on the axis of the “eye”. With regard to the flower of the abacus itself, it is developed over the whole terminal body, constituted by the abacus and the echinus.
At present, after the cleaning interventions, we can identify particular modes of execution. For example, we can see in the body of the capital two blocks of sculpted travertine: the one below up the the height of the cauliculus and the upper one from the cauliculus to the abacus.

Close examination allows us to see that the two central *cauliculi* are worked with great care, almost "chiselled", in fact, the appear as if made of marble, and with a final polish. Even the leaves of the three levels present accentuatedly naturalistic veins, with traces of stuccowork in the flora.

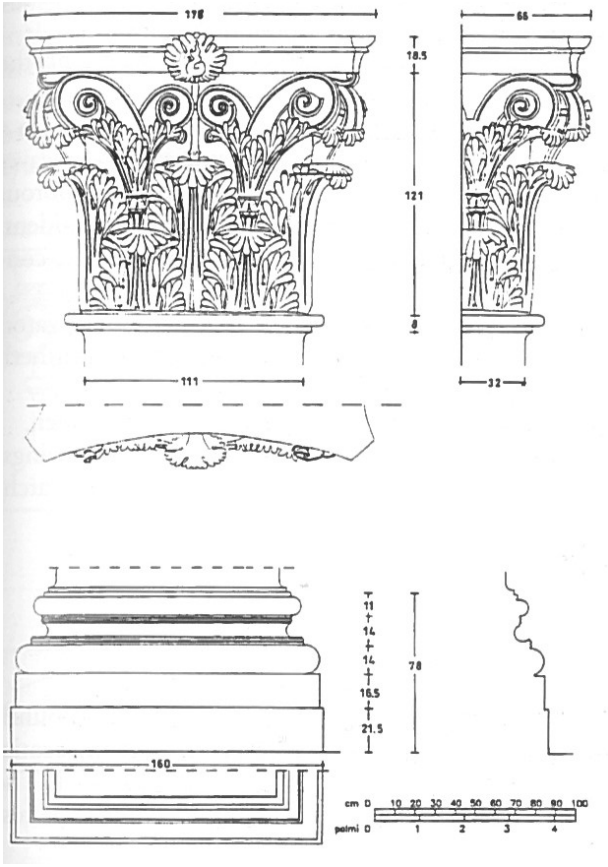


Fig. 2. Corinthian capital and base, first span (Michelangelo).

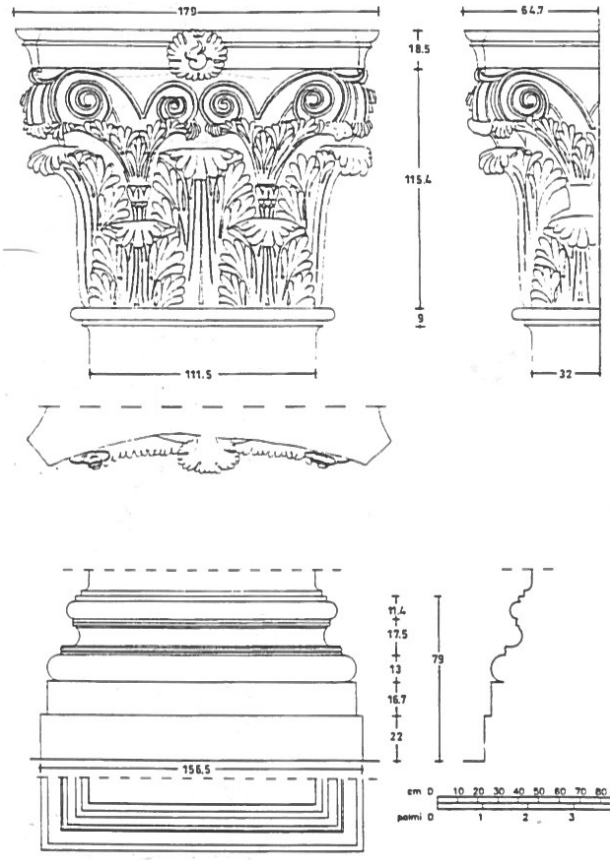


Fig. 3. Corinthian capital and base, last span.

Furthermore, one can detect some slight executive differences between the leaves and the "unfinishedness" is noticeable in the left leaf of the second order which has not been sculpted, but seems still to be enclosed in the travertine block.

As for the work techniques, many scalpel traces can be read in the external surfaces of the volutes, with the mark at 60 degrees, while on the interior there are signs of a toothed chisel.

Lastly, the so-called "*campana*" of the capital appears to have been bush hammered.

From these first observations we can derive some references to the sculptoreal techniques of Michelangelo: in fact, in such "chiselling" we can see how the profiles were being defined and modelled "with an extraordinary network of sculpted lines" (4). Nevertheless, there are also variations determined by the modes of execution; in fact, in the third capital from right to left (Fig. 3) we can see a difference in height of 6 cm. This appears to have been an error or perhaps evidence, in this as in other details (e.g., the finishing curtain and the working of the stuccowork into the vaults of the portico), of the reprise of works after their interruption due first to the passing away of Michelangelo and then to that of Guidetto (5). In fact, the "lack" of connection between the capital with the pilaster is resolved using stuccowork.

Still on the third capital, proceeding from the cordonata towards the Palazzo Senatorio, we can see a less careful working and the use of materials not of prime quality, perhaps originating from a different quarry than those of the first two capitals.
The base of the last span is presented with the same parts, but the double astragals are more "full", while the upper taurus appears oversized. On the whole, the base bears moulding that is more dilated in height. This denotes an alternation of the workforce and, especially, the multiplicity of work phases.
The relief of the last capital of the façade towards Palazzo Senatorio highlights the absence of the stem for the flower of the abacus.
The cauliculi are less refined and the flora appears to have been realised with a lesser degree of definition in the individual details. At the same time, the leaves appear to be flatter, less voluminous and articulated; the material is more porous and less compact. In addition, the signs of the stone working tools is less evident. In conclusion, the block was left more rough in the angular volutes, in the connections and in the less visible parts.
Basically, one can say that the Corinthian capital of Palazzo dei Conservatori finds an anticipation of itself in Michelangelo's work in the central and southern apse of St. Peter's.
After all, Michelangelo also drew from Antiquity and from the Codex Coner. With regard to this issue, see drawing f. 24V and, among the Uffizi drawings, especially arch. 630, arch. 632v. and 633v., by Baldassare Peruzzi and also arch. 913v., by Antonio il Giovane.

The Ionic order (Figs. 4, 5)

Base and capital
The base of the Ionic order of the first span (Fig. 4) presents itself with a plinth and a subplinth upon which is situated a taurus; two listels delimit the scotia, ended above by a taurus which ends with an astragal and another listel. The column shaft, 20.5 palms high and with a diameter at the imoscapus of 3 palms, has a slight entasis.
With regard to the capital, the echinus constituted by ovoli and three arrows, is singularly characterised by arrows of the same amplitude as the ovals. The volutes with inclined sides do not appear suspended, but rather generated "by the eye". An ulterior, significant peculiarity is that determined by the Corinthian-style abacus with mascarons, which substitute the usual Ionic abacus with the ogee moulding and the listel. The typical presence of the festoon taut between the two eyes of the volutes should also be noted.
The whole is dominated by the sculptoreal plasticity of the volutes, which seem to be entirely re-invented with respect to those with "flat" fronts of the types usually adhered to in many Roman Renaissance realisations. The eye itself is sculpted in relief, as are the curls of the volutes of the Corinthian capital of the great order and all the parts follow this plastic orientation of the volute, up to the grooves which lead to the eye. Even the side of the capital bears Corinthian elements fused with Ionic ones. A small vine branch joined the two members of the volute. Also singular is "the *campana ductus* with enlarged volute cartouches, the elegant profile of the ring connecting and stopping them", the mascaron different to that of the façade, with a "moustache" which comes out of the abacus and inserts itself on the cartouches.
What should be brought to attention, however, are the peculiarities of execution which define every single element. These are distinctions which are already

delineated in the first four capitals of the two spans from right to left. The same is true in the festoons, the first presents four vine branches in both directions, while the second bears three leaves in strong relief and a 1.5 cm upper listel connecting to the architrave. The same volutes of the first and the second capital are differentiated in the cartouches; meanwhile, in the third, the leaves are more squashed and the eye of the volute emerges. Also, besides presenting more jutting volutes, the fourth capital bears a slightly inflected collar, while in the first three it is straight. Lastly, in the latter (Fig. 5), there are two insertions: the first, of 2.2 cm, between the lower fascia of the architrave and the capital; the other, of 2.5 cm, between the column shaft and the body of the capital. In the corner span, facing the city, the first capital presents another inflected collar, while the volutes have three complete turns, the eye becomes a curl and the laurel leaves of the festoons are three in number.

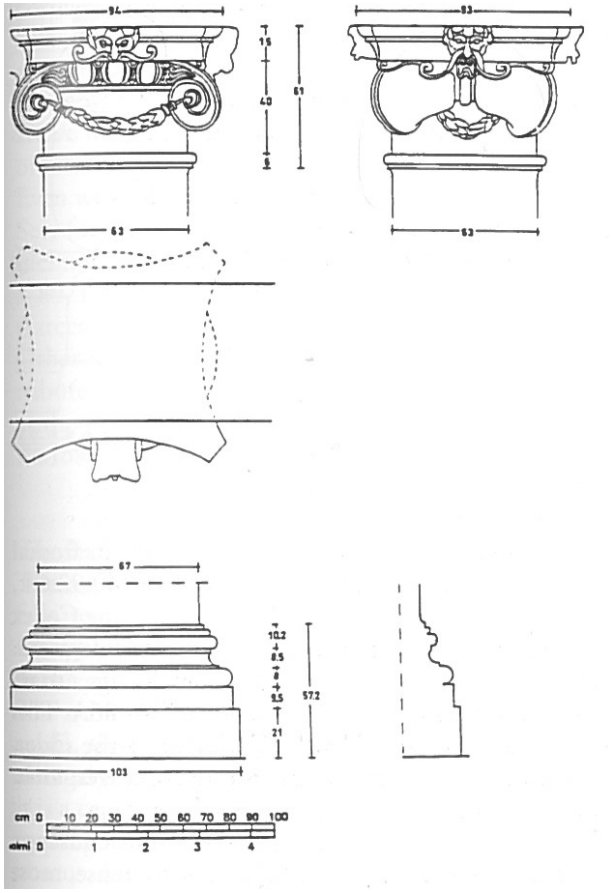


Fig. 4. Ionic capital and base, first span (Michelangelo).

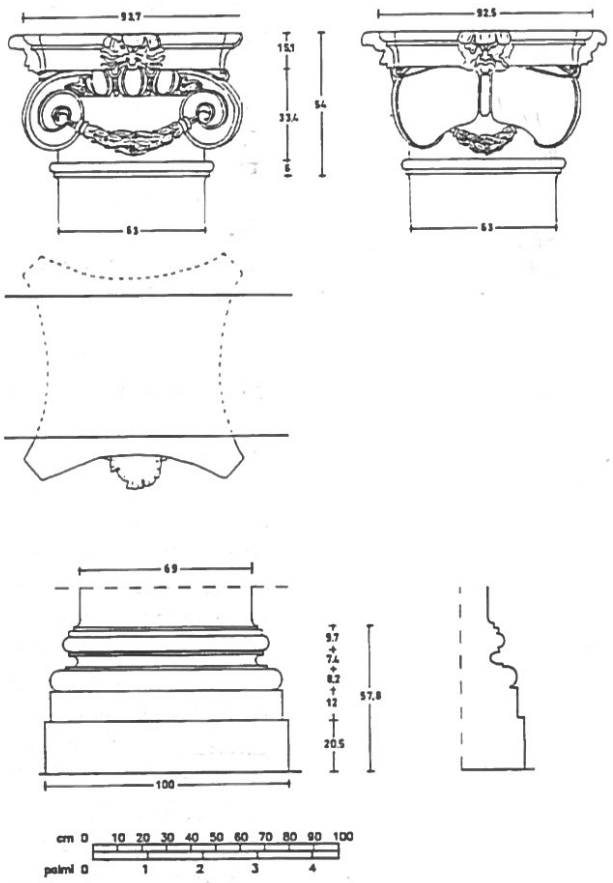


Fig. 5. Ionic capital and base, last span.

This lexical innovation of the transformation of the eye into a curl is comparable to the same detail in the Corinthian capital.

Analogously to what was found for the Corinthian pilasters, also the Ionic columns have similarities or differences between them. Among the many are those found in the final span, towards Palazzo Senatorio, where the scotia of the base is more pronounced and, above the listel, a subtle but anomalous moulding.

The Ionic capital, which we have taken as a point of reference, appears on the whole less graceful in its figurativity.

Unlike that of the first span, the festoon has berries among the laurel leaves, the volutes are "fuller" but with a flatter eye.

The ovoli, along with the cusps of the arrows, are more elongated. The connecting palms between the volutes and the abacus are dilated.

Also in its side, the body of this capital is reduced in its plasticity, the cartouches are more dilated, while the palms intersect with the surface of the cartouche and the mascaron has no "moustache".
With regard to these artefacts, it is impossible not to make reference can be made to any 1500s drawings, kept at the Metropolitan Museum of Art, mentioned in 1965 by Guglielmo De Angelis d'Ossat.

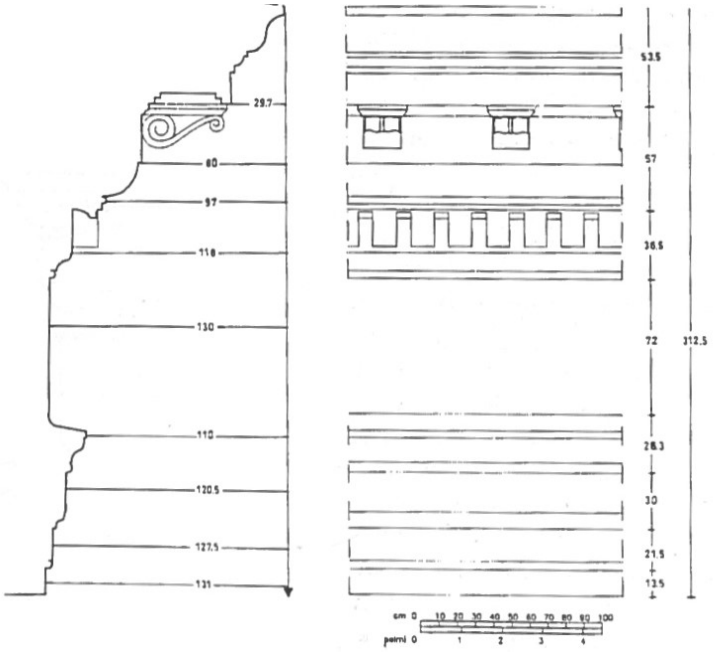


Fig. 6. Crowning trabeation.

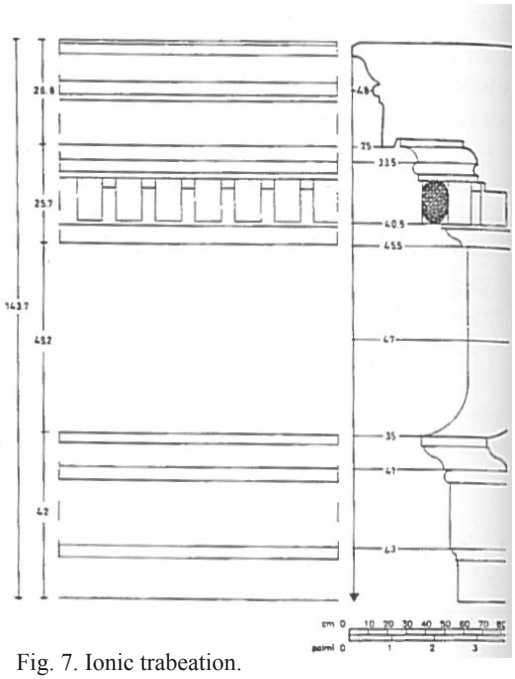


Fig. 7. Ionic trabeation.

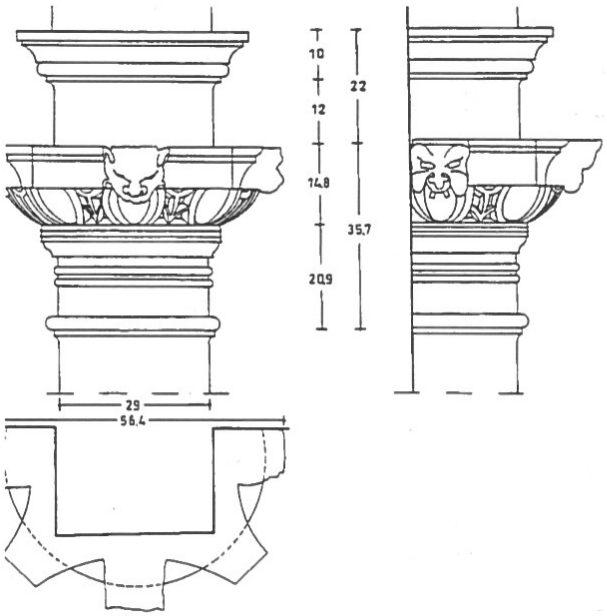
Specifically, one can see the detailed and measured study of this capital in its frontal and its lateral elevations. In particular, reference is made to drawing n. 49.92.64., of the Janos Scholz and Mrs. Anne Bigelow Scholz fund, 1949. See also the Codex Coner "series of 4 Ionic capitals", f.n. 148, even though the flat volutes are depicted. Furthermore, it may be useful to look at some of Michelangelo's drawings, "studies for Ionic capitals", Florence, Casa Buonarroti, nn. 55A, 56A, 82A, 86A. This theme can also be found in some drawings by Antonio da Sangallo il Vecchio, Florence, Uffizi, arch. 1598 and arch. 2036 and by Antonio il Giovane, arch. 1214 and 1231.
Another pre-Michelangelo capital appears to be that discovered by Giuseppe Zander inside the "Sala dei Gobelins" in the Palazzo Pontificio Lateranense, most probably "from the sepulchral monument of Pope Paul II, ... erected by hand of sculptor-architects Mino da Fiesole and Giovanni Dalmata, who sign it, ... previously in the ancient Constantinian and Medieval Basilica of St. Peter's" (6).

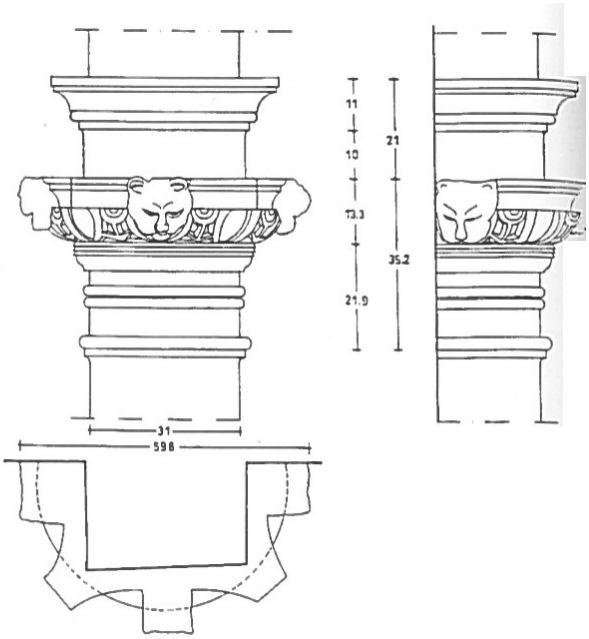
Trabeation (Fig. 6)
Through the direct observation of the crowning trabeation (Fig. 6), it has been possible to ascertain a "slight" difference with regard to the wall-cornice of Palazzo Farnese (cf. Study by P. Letarouilly), with a pronounced subcornice with dentils, ovoli and modillons.
The trabeation of the Conservatori, on the other hand, has an architrave composed of two faciae, a frieze of 72 cm, a slightly inclined dripstone, the absence of the ovoli and similar modillons in the subcornice.
For more detailed references see a series of drawings of the Codex Coner, especially f. 65r, f. 65v, f. 67r, f. 67v and f. 68r, St. Peter's in the Vatican.

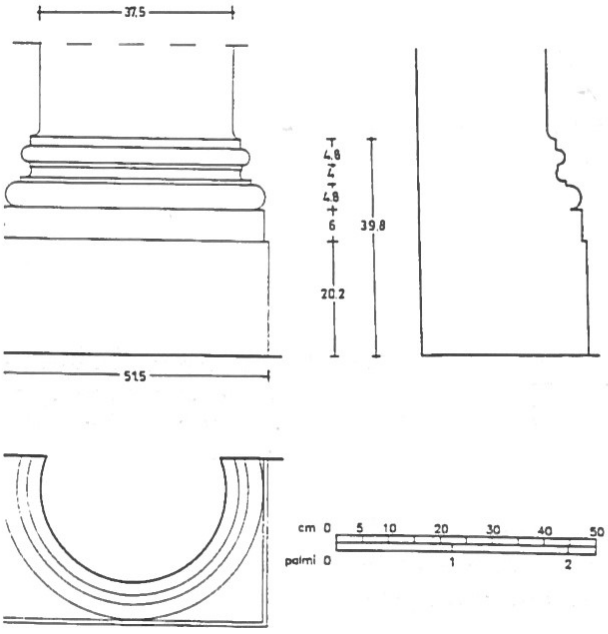
Also suggested is the drawing in the Uffizi arch. 1181r, "Remembrances of the Temple of Castor and Pollux".

Ionic trabeation (Fig. 7)
The Ionic trabeation (Fig. 7) is composed of an architrave with two faciae (instead of the more "canonical" three found in Ionic or Corinthian orders); between these is an ogee and, above the second fascia, a baguette with another gorge and a crowning listel. The frieze, set on a pronounced cavetto, joins the architrave to the upper cornice, which exhibits a rich compositional sequence in the sub-cornice (ogee, "internal" dentil, interdentil and true dentil. Next come another listel, astragal and gorge which links to the dripstone including an intradossal groove with an inclined section). The ensemble is concluded with the cymatium, composed of three mouldings: an astragal, a cyma recta and a thicker listel cut above with a trapezoid section inclined toward the exterior to ease the downflow of rainwater.
Even with the trabeation, the more immediate comparisons take us to Antiquity. See, for example, the Codex Coner, where examples can be found of the three inclined fasciae of the architrave: f. 65r, from the Campo Vaccino, 77r and also f. 89, f. 58r, f. 72, f. 84. Also on the same codex, f. 8lv, referring to S. Nicola in Carcere and f. 109 *apud colum Troiane*, attributed to Bernardo Della Volpaia.
Other references can be found in the Uffizi drawing arch. 1542v (previously attributed to Fra Giocondo "measured memory of cornice... by Herodes Atticus at the third mile of the Appia Antica in the territory of Capo di Bove..." cf. A. Bartoli).

The "tabernacles" of the pediments
The order defining these architectural elements approaches the Doric. The base falls under those called "Attic" and the capital (Fig. 8) crowning the half columns, though its general features could be defined as being "Doric", appears Corinthian in the curved abacus.
The echinus has a broader and more extended arrow, of the same width as the ovolo. Once more there is the recurring theme of the baguette and the double astragal that is dear to Michelangelo, in addition to the inclined anuli; essentially, it is a capital which is articulated with broader elements and a collar, enriched by two regular astragals and an ogee, ended by three anuli. On the Corinthian-style abacus, Michelangelo introduces a mascaron instead of the more usual flower.
The capitals of the other spans (Fig. 9) keep to the same langauge, but 'lose' in part the harmony and the proportions. In fact, they all seem more dilated with, for example, two thicker astragals and more accentuated curves in the arrows of the abacus. The same mascaron is less graceful, with an excess of bulges.
The analogous base of the last span is presented with a plinth dilated by 2cm, with a more ample and less refined scotia and with two more pronounced delimiting listels.
Again, in the collections of the Metropolitan Museum of Art is the 1500s drawing 49.92.69r "view of the front window of Palazzo dei Conservatori" which depicts one of the big windows. To Alessandro Specchi is owed a representation of "another window of the façade of Palazzo dei Conservatori on the Capitol Hill", inserted within the work of Giovanni Antonio De Rossi, 1702, in which the "tabernacles" are visible.
On the other hand, a direct reference can still be identified in the central apse of St. Peter's; here, in fact, the windows have capitals similar to those reproposed for the Conservatori.







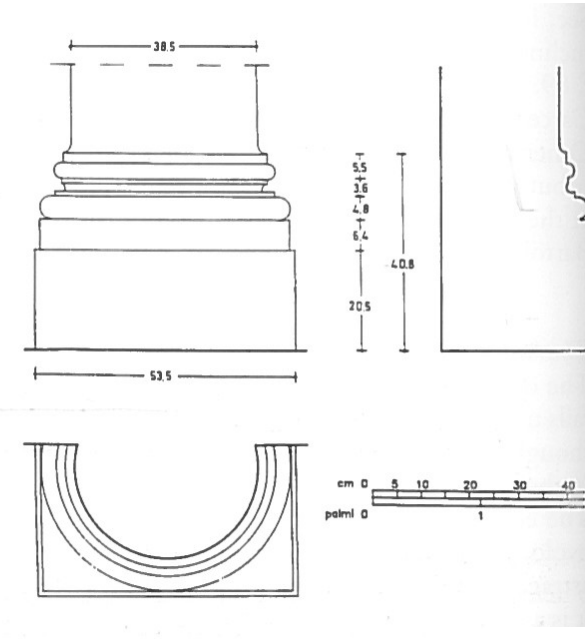


Fig. 8. Capital and base of the finestrone, first span (Michelangelo).

Fig. 9. Capital and base of the finestrone, last span.

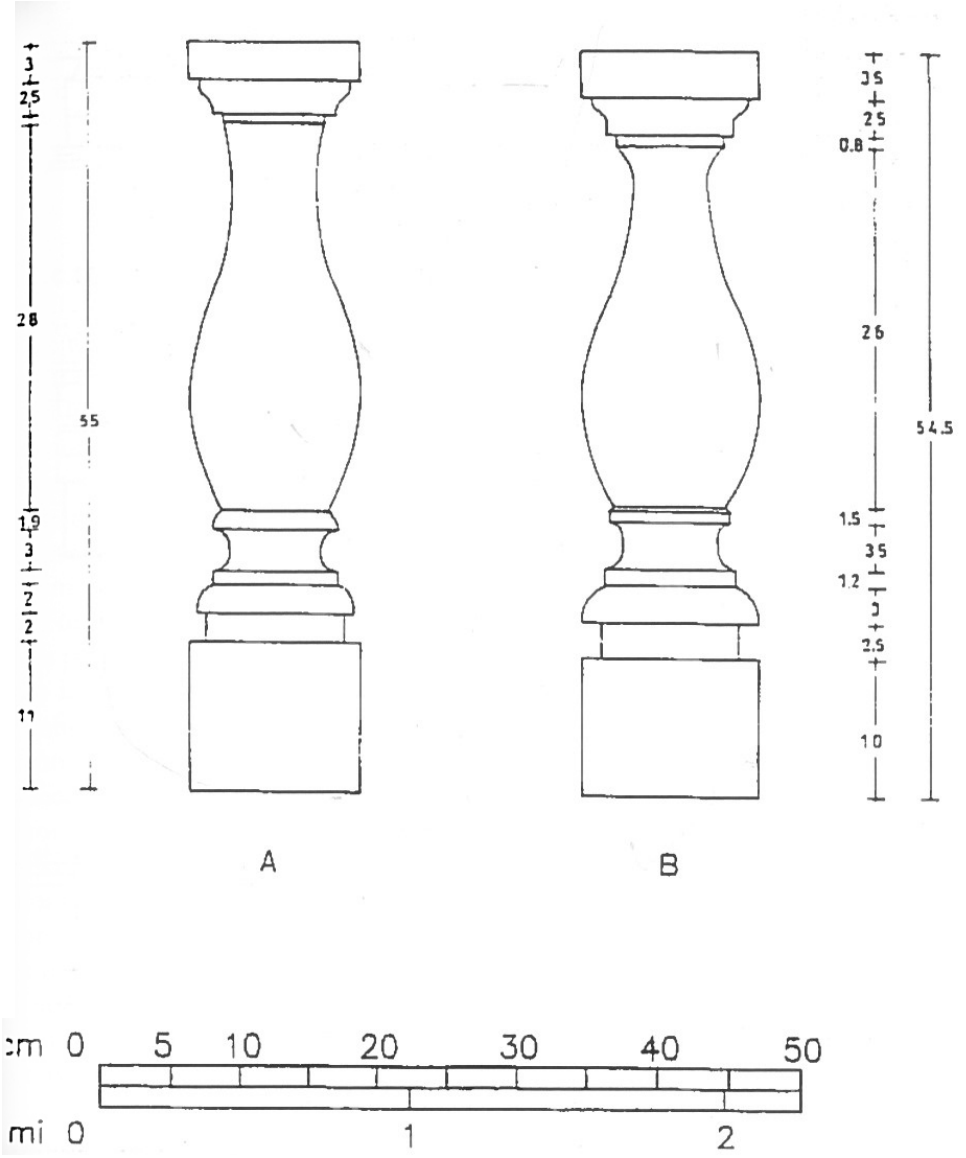


Fig. 10. Balusters. A) baluster of the balcony of the first span; B) baluster of the balcony of the last span.

Balustrades (Fig. 10)
Michelangelo inserts here the typical "bottle-shaped" balustrade, applying that which he had experimented in Florence (Laurentian Library, stairs of the vestibule) (Fig. 10).
Among the balustrades of the first span and those of the last emerge some difference in execution. There is a more dilated hawksbeak moulding, as well as the scotia and the insertion of a joining listel.

String course (Fig. 11)
The ensemble exhibits a series of mouldings like those found in the base of the window orders. A certain reference can be found in f. 49.92.48v, in the Janos Scholz... fund of the Metropolitan Museum of Art (Fig. 11).

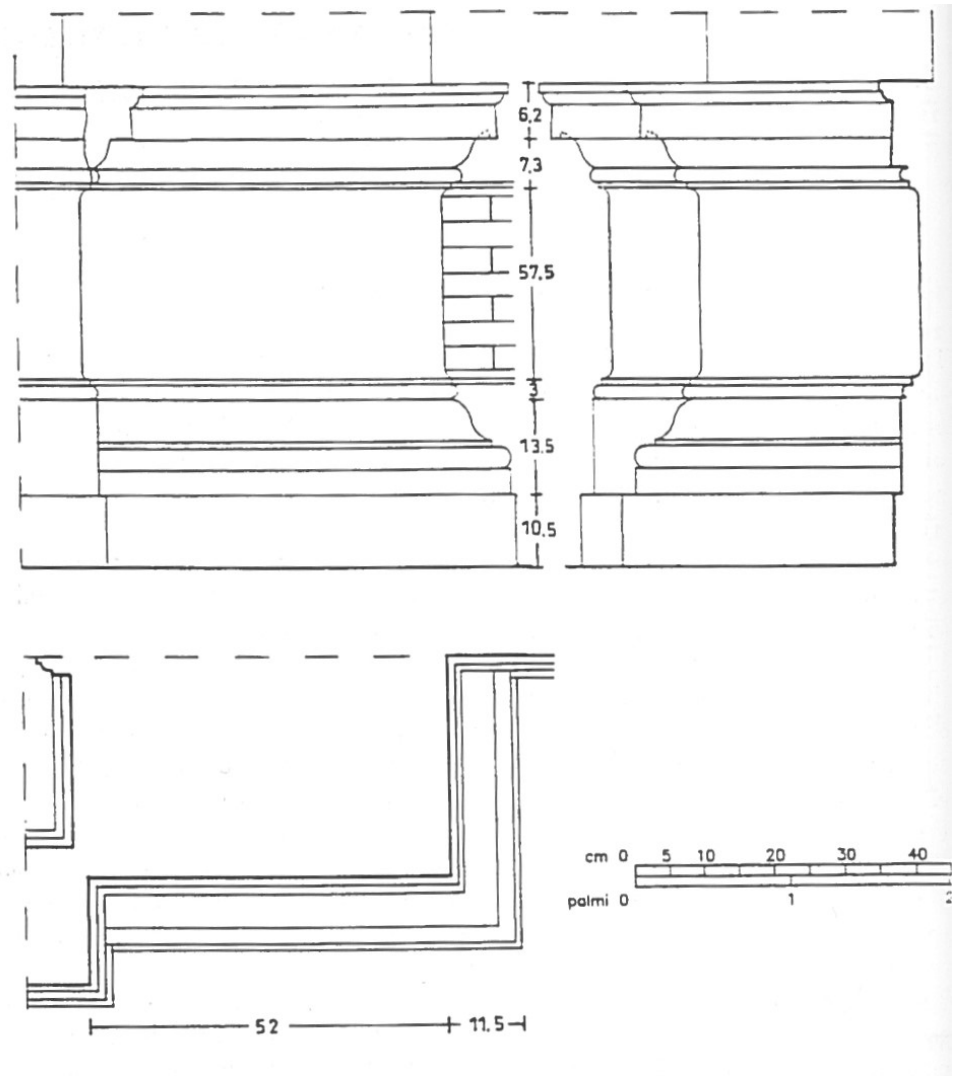


Fig. 11. String course, detail of the base at the first span.

Notes

1. J.S. ACKERMAN, *L'architettura di Michelangelo*, Italian ed. Torino 1988, p. 69.

2. G. DE ANGELIS d'OSSAT, *L'architettura del Palazzo dei Conservatori,* in G. DE ANGELIS d'OSSAT, C. PIETRANGELI, *Il Campidoglio di Michelangelo*, Milano 1965, pp. 103, 105.

3. A. BRUSCHI, *Michelangelo in Campidoglio e l'invenzione dell'ordine gigante*, in "Storia Architettura", IV, 1, 1979, pp. 13-23. On the topic of the giant order, see also L. PUPPI, *Prospetto di Palazzo e ordine gigante nell'esperienza architettonica, appunti e riflessioni*, in "Storia dell'Arte", n. 38-40, 1980, pp. 267-275.

4. *La scultura raccontata da R. Wittkower dall'antichità al novecento*, ed. M. Wittkower, Italian ed. Torino 1993, p. 134.

5. For a summary of the constructive history, see: Prospero. Boccapaduli, *Fabrica di Campidoglio 1555...*, ms, Arch. Capitolino. Arm. II, n. II, K. Von Tolnai, 1932, P. Pecchiai 1950, A. Morrogh, 1994.

6. G. ZANDER, *Un singolare capitello pre-michelangiolesco riferibile al pontificato di Sisto IV (1471-1484)*, in "Palladio", 2, December 1988, pp. 137, 140, 142.

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