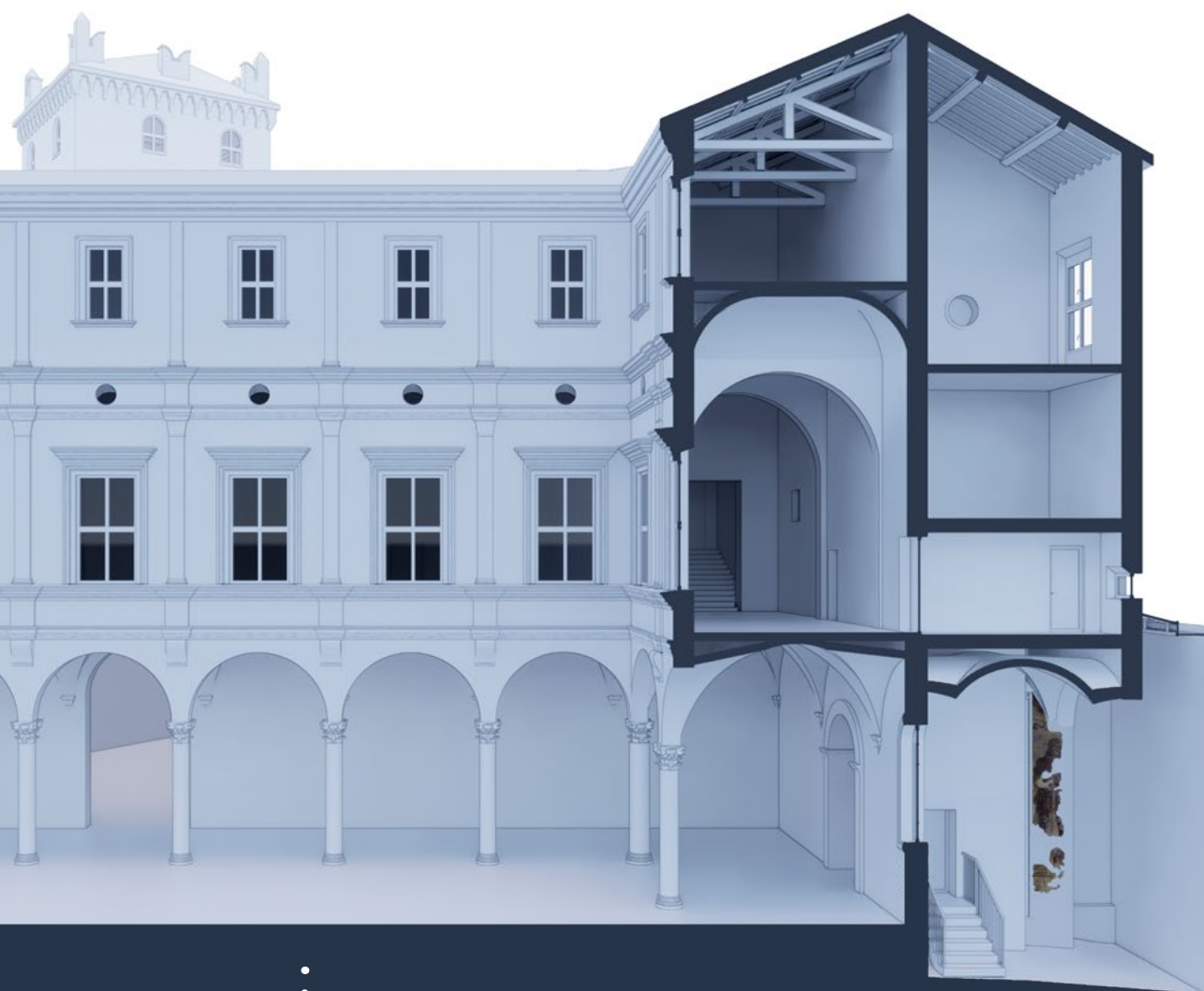


The Project Emoundergrounds

Carpi, History of the City and Digital Humanities





DIPARTIMENTO DI INGEGNERIA
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**The EMOUNDERGROUNDS project
Carpi, History of the city and digital
humanities**

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A European project for the Palazzo dei Pio

Manuela Rossi

The project

The project “Emotional technologies for the enhancement of cultural heritage in the context of transnational UNDERGROUND - EMOUNDERGROUNDS” is part of the European Territorial Cooperation Program “Interreg V-B Adriatic-Ionian” - Priority Axis 2. “SUSTAINABLE REGION”.

The thematic objective of the call, included in the 2018 program call, is “Preserving and protecting the environment and promoting resource efficiency”, expressed through a specific objective (2.1) “Promoting sustainable enhancement and conservation of natural assets and cultural assets as growth assets in the Adriatic-Ionian area”. The duration of the project, expected in 30 months from January 1, 2020 to June 30, 2022 in the proposal phase in 30 months from January 1, 2020 to June 30, 2022, has been extended by six months, until December 31, 2022, due to the limitations to the activities that were caused by the pandemic situation.

The project aims at systemizing a set of interventions for the promotion, enhancement and better use of cultural heritage (castles, fortresses and other cultural buildings with undergrounds) and consequently, at strengthening, in a sustainable way, the attractiveness and competitiveness of Adriatic-Ionic tourist destinations involved through the use of advanced information and communication technologies (ICT) - New Media and Emotional Technologies - and innovative marketing tools. The project intends to enhance tourism development and sustainable, intelligent and inclusive growth of the areas concerned, improving the quality of tourism and promoting new market-oriented cultural-creative tourism products. To achieve this goal, the project plans to imple-

ment an integrated set of actions to jointly manage and promote, in a sustainable and innovative way, the identified cross-border cultural sites, integrating the offer of existing tourist services and improving their quality.

More specifically, the planned activities include networking actions, studies and analysis of target sites, development of ICT and New Media tools, pilot actions for the design and development of innovative accessible cultural routes and itineraries, specific actions for institutional information, awareness raising, training, institutional capacity in terms of construction and cross-border governance.

The project was implemented by a network of ten project partners and five associated partners from Italy, Greece, Croatia, Slovenia, Albania, Montenegro, Bosnia and Herzegovina, who are:

1. Municipality of NARDÒ - Apulia - Italy;
2. Municipality of CARPI - Emilia-Romagna - Italy;
3. Municipality of ANDRAVIDA – KYLLINI - Western Greece Region - Greece;
4. Rijeka Development Agency PORIN - Croatia;
5. Public Cultural Institution Fortress of Culture ŠIBENIK - Croatia;
6. Regional Development Center KOPER (RDC Koper) - Slovenia;
7. Municipality of IVANČNA GORICA - Slovenia;
8. Municipality of KUKES - Albania;
9. Tourism organization of municipality of BAR - Montenegro;
10. Agency for the Development of Small and Medium Enterprises of Trebinje - Bosnia-Herzegovina.

The associated partners are:

1. Superintendence of Archeology, Fine Arts and Landscape for the Provinces of Brindisi, Lecce and Taranto - Italy - Associated with the Leader Partner (Municipality of Nardò);
2. FORTE MARGHERA Foundation - Veneto Region - Italy - Associated with the Municipality of Carpi;
3. Tourist Board RIJEKA (manager of the Gradina castle in Rijeka) - Croatia - Associated with the Rijeka Development Agency PORIN - Croatia;
4. Municipality of KOMEN (owner of the castle in Koper) - Slovenia - Associated with the Regional Development Center KOPER (RDC Koper) - Slovenia;

5. Center of culture of BAR - Montenegro - Associated with the Tourism organization of municipality of BAR - Montenegro.

The project is structured in six work packages, three of which are aimed at the preparation and management of the project from an organizational, administrative and communication point of view:

1. WPP: Preparation costs
2. WPM: Project Management
3. WPC Communication

The other three work packages, on the other hand, concern the thematic action lines (tasks) of the project, aimed at the creation of tourist networks through meetings, drafting of policies and memoranda of understanding, the construction of the multimedia immersive path and the contamination activities of the project on territories, both through training and through events:

1. WPT1 - Animation of the public-private aggregate system to manage the cross-border cultural tourism product
2. WPT2 - Design and development of innovative joint emotional paths that cross the transnational cultural undergrounds
3. WPT3 - Capacity building, education and intercultural contamination events

Design and development of innovative emotional joint paths that cross the transnational cultural undergrounds

WPT2 is one of the two pilot actions of the Emoundergroups project. The plan includes six areas of intervention, in which the historical research phases are integrated, together with phases of a technical nature, up to the completion of the installation. Specifically, the following interventions are defined:

- Analysis and study of the undergrounds of cultural attractors;
- Public procurement procedures for the purchase of equipment for cultural sites;
- Survey campaigns, 3D survey campaigns, photogrammetric and photographic campaigns of the undergrounds of cultural attractors;
- Production of virtual, digital and multimedia contents;
- Design and development of technological, multimedia, interactive and accessible installations for the use and enhancement of cultural heritage;
- Wireless Monitoring System and Audio Assistant.

For the city of Carpi, the Palazzo dei Pio represents the key character of the local context. In particular, at first, the areas of the Warrior and the Torrione di

Galasso (whose restoration is underway) were identified, as both placed for part of the surface, under the current floor. It deals with a symbolic choice that combines the Warrior's environment - ancient gateway to the 15th-century fortress of the Pio - with the Torrione di Galasso, "door" to the future of both the Palace and the beauties of the city, as a strategic hub for activities and access to the cultural services of the territory. However, due to the delays in the restoration of the Torrione, the former post office room, headquarters of InCarpi, a tourist promotion and information office, has been identified to set the first part of the multimedia installation.

The Municipality of Carpi has entrusted this work to the Department of Cultural Heritage (in collaboration with the Department of Civil, Construction and Environmental Engineering) of the University of Padua, which for over ten years has been a partner of the Museums of the Palazzo dei Pio in the implementation of research projects on the architectural and urban heritage of Carpi, aimed at accessing, enhancing and using the assets of the city. Since 2011, the research and representation team has produced a considerable amount of materials, increasingly refined, and an integrated approach that respond to what is envisaged by the European project.

By applying the same methodology and the same approach, the 3D installations and the new paths able to tell the historical, architectural and functional value of the Palazzo dei Pio were designed and built, both for a new idea of usability of the site, and as a point of access to the system of cultural sites (and not only) of the territory.

History of the city and digital humanities: urban heritage and research in Carpi from 2000 to today

Elena Svalduz

In 1882, Hans Semper's book was published in Dresden, *Carpi. Ein Fürstensitz der Renaissance*, which marked Carpi as one of the most interesting urban creations of the Renaissance period. There is no doubt that the Italian translation of the text, published in 1999, marked a real revival of studies on the city, directing the attention of historians to the main architectural sites¹. Along with Pienza, Vigevano, Sabbioneta and other small towns of the Peninsula, thanks to Semper's reflections, Carpi joined the list of "ideal cities" of the Renaissance, shaped by the joint action of a prince and an architect. The partnership between Alberto Pio, an ambitious feudal lord, and Baldassare Peruzzi, an architect capable of translating the ideas of the prince into drawings and giving a stylistic unity to the transformed city, first offered relevant insights for the redefinition of urban history (described in a very precious *Atlante* edited by Francesca Bocchi)², then for the history of architectural patronage between the first and second decade of the sixteenth century³. In the period of Alberto Pio's government, the city is characterized by a rapid process of urban redesign that profoundly changed its image and structure. In taking a central role in this transformative process, the prince of Carpi established a very close working relationship with the architect who designs almost all the interventions after 1512: the Palazzo dei Pio, the Sagra, the Duomo, the church of San Nicolò, and finally the renovation of the church of San Francesco⁴.

¹ H. Semper, F. O. Schulze F. O., W. Barth, *Carpi una sede principesca del Rinascimento*, traduzione di A. D'Amelio, A.E. Werdehausen, edited by L. Giordano, Pisa 1999 (ed. orig. Dresden 1882).

² Centro "Gina Fasoli" - *Atlante di Carpi* (unibo.it).

³ E. Svalduz, *Da castello a "città". Carpi e Alberto Pio (1472-1530)*, Roma 2001; L. Giordano, *Alberto Pio e l'edificare per magnificenza*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, edited by M. Rossi, E. Svalduz, Venezia 2008, pp. 117-121.

⁴ E. Svalduz, "Bellissime investigazioni": su alcuni progetti di Baldassarre Peruzzi per Alberto Pio da

Since the early years of the 21st century, with the new museum management, the City of Carpi has given ample space not only to the protection and enhancement of its historical architectural heritage, but also to research carried out in the academic sphere, through a series of cultural initiatives such as exhibitions, books and conferences. In 2008 the city museum was set up, one of the first in Italy, curated by Manuela Rossi and designed by Adolfo Natalini with Guicciardini and Magni Architetti⁵. The underlying purpose of this series of initiatives was to present the “ideal city”, not as a work of art resulting from a homogeneous and unitary creation of a planning will, but as the result of decisions taken at different times, which gave rise to several construction sites, highlighting the fundamental intertwining between historical reality and the ideal model that presides over urban transformations. The value of the series of experiences that we intend to summarise here by telling the specific history of the city of Carpi, seems to us to have been that it has provoked broader reflections on the protection of urban heritage, a highly topical issue after the 2012 earthquake.

In recent years, considering the relationships between humanities and new digital technologies, the collaboration between the city and the university has taken on a new perspective regarding the methods of communication of research in the field of cultural heritage. In 2012, with the exhibition *In mezzo a un dialogo. La piazza di Carpi dal Rinascimento a oggi*⁶, suspended due to the earthquake in May of the same year, the group of researchers involved from the early stages of the exhibition program had the opportunity to reflect on the theme of narration and representation of the city’s history through multimedia tools. Initially conceived as a traditional exhibition of drawings, paintings and objects that could tell the story of a piece of city that became a square starting from the early sixteenth century, relating it to other similar urban cases, the exhibition was then revised in its structure and expanded with a section dedicated to the representation of urban transformations: a new multimedia path has therefore been defined. Starting from these assumptions, a discussion was then launched with experiments gradually presented to the interdisciplinary working table, which was extended from the area of the history of architecture to that of design and representation. With the exhibition on the square of Carpi it was therefore possible to experiment with a new way of representing and com-

Carpi, in Baldassarre Peruzzi (1481-1536), atti del convegno, edited by A. Bruschi, H. Burns, F.P. Fiore, P. N. Pagliara, Venezia 2005, pp. 181-197.

⁵ MUSEO CIVICO, Palazzo dei Pio, Carpi, Modena, Italia, Guicciardini&Magni Architetti - studio associato (guicciardinimagni.it).

⁶ *In mezzo a un dialogo. La piazza di Carpi dal Rinascimento a oggi*, edited by A. Giordano, M. Rossi, E. Svalduz, Carpi 2012.

municating research, the result of an individual and collective work gradually implemented: a work always based on the traditional tools of “making history”, from archive research to the analysis of literary and iconographic texts, from cartography to the analysis of buildings in space and time. With this in mind, even the 3D models, conceived for the reproduction of a single prototyped object, and for the first time used on an urban scale, have become test fields for a series of hypotheses. In reconstructing the history of the different construction sites, the dialogue between different disciplines has always been exercised on concrete problems, trying to solve specific issues or leaving them unsolved, where necessary, with a slight abstraction (through soft boundaries) in the parts not directly connected to certain documentation.

This first exhibition experience found a further development, three years later, in the exhibition on the Cathedral of Carpi; then in the one dedicated to the Torrione (2019)⁷ and more recently in the one on the church of San Nicolò (2022)⁸.

We can therefore state that the EMOUNDERGROUNDS project, WPT2 - Design and Development of Innovative Emotional Paths in the Underground of the Palazzo dei Pio is in perfect continuity with the series of activities planned by the Municipality of Carpi in synergy with the University of Padua. As in the other cases, in fact, the project was developed following two research lines: on the one hand, the collection of written and graphic documents relating to the architectural complex (the noble residence); on the other hand, the digitization of content using the Building Information Modeling method; finally, the design and implementation of multimedia products. Over the last ten years, these activities have been seen by the working group involved as real opportunities for research and validation of the method used to communicate scientific research, but also to intervene in and manage the urban historical heritage. Indeed, these are not only tools designed to represent reality through digital reconstructions: analytical models effectively measure the validity of our knowledge.

There is no doubt that, in order to understand and illustrate the processes of change and transformation of architecture and urban realities, digital humanities are therefore a powerful, but at the same time dangerous means, if not

⁷ *Il Torrione di Carpi. Work in progress*, edited by A. Giordano, M. Rossi, E. Svalduz, Carpi, APM edizioni, 2019.

⁸ *Il Principe e la sua chiesa. San Nicolò e il convento dei frati a Carpi*, exhibition catalogue (Carpi, 9 April - 26 June 2022) edited by A. Giordano, G. Guidarelli, M. Rossi, E. Svalduz, Modena, Franco Cosimo Panini, 2022.

supported by an established knowledge of the history of artefacts, spaces and cities investigated: a knowledge that has been built up in Carpi over the last twenty years. The analysis of any space or architecture remains an exercise in pure form if we don't examine in depth the study of the complexity of history and the philological reading of transformations. In agreement with Lorenzo Tomasin we can therefore affirm that the new technologies are arid⁹ without humanistic knowledge.

⁹ L. Tomasin, *L'impronta digitale. Cultura umanistica e tecnologia*, Roma, Carocci, 2017.

The representation for a “knowledge” in continuous evolution

Andrea Giordano

The Hypertextual Structuring of Culture has revolutionized and updated the classic linearity of the text and, for this reason, it is not possible to consider the organization of a Digital Visualization of the transformations of an architectural artefact - and of the city, that contains it - only through a hypertext. It therefore becomes essential to think and generate new processes through visualization, knowledge and communication codes, capable of facilitating and promptly making a dynamic and careful analysis of a vast amount of heterogeneous, complex and variable data, for the synchronic representation of multiple problems, from the territorial and landscape ones, to the urban and architectural ones¹⁰.

This innovative structuring has produced important effects for the disciplines of Representation, which can be found not only in the academic and training fields, but also in the design and management of artefacts on an architectural, urban and landscape scale. Therefore, the procedures of the forms of Representation are configured as privileged “device” for the design and / or measurement and management of what we identify with the terms “architecture” and “city” and with their relative safeguarding and protection. And such feedback is found not only for the Representation sector, seeing in other disciplinary areas (History of Architecture, Restoration and Recovery, Architectural Design, Urban Planning) substantial contributions aimed at the structuring of innovative methods for knowledge, all agreeing, however, on the contribution of Representation for intelligent / penetrating communication and, above all, shared.

¹⁰ *Rappresentazione materiale/immateriale - Drawing as (in) tangible*: 40° Convegno internazionale dei Docenti delle discipline della Rappresentazione. Quindicesimo congresso UID (Milano 13/15 settembre 2018) / 40th International Conference of Teachers of the disciplines of the Representation. XV congress UID, Milano, Gangemi Editore, 2019.

In line with the current trends inherent in the communication of Cultural Heritage¹¹, this research has dealt precisely with topics related to knowledge and experience, with fundamental repercussions in terms of safeguarding and managing assets, making use of advanced interdisciplinary specialist contributions. However, the complexity that embodies this project should be highlighted, branded by an organizational layout that is characterized by multiple application potentials, which systematize the strategies implemented in a real methodological guide, extendable and valid for any application case. In fact, the case study - objective of the research - is configured and articulated in the “construction” of an articulated path that aims to highlight / communicate / share the following procedural steps:

- Critical and in-depth historical-documentary research,
- Analytical systematization of the documentary apparatus,
- Interoperable modeling of the artefacts in question,
- Implementation of advanced communication systems,
- Design of interactive digital devices.

The impacts that this research can therefore generate are found in the needs of scientific operators in terms of knowledge, conservation and management of Cultural Heritage, as well as in terms of tourism-cultural promotion. It is therefore important to highlight the fundamental aspects and the results that the virtual “restitution” of the physical and material consistency of architectural artefacts taken into consideration can generate, being able to circumscribe the results in the following two points:

- Visualization and spreading of the recovery and restoration actions, with a positive feedback in terms of dissemination of the management and maintenance processes of the Cultural Heritage, with the aid of BIM modeling (Building Information Modeling)¹², virtual / augmented reality¹³, rapid prototyping¹⁴;

¹¹ A. Giordano, *Guardare/Fruire una mostra: il ruolo delle nuove tecnologie di rappresentazione*, in *Costruire il tempio: alla ricerca del progetto di Baldassarre Peruzzi per il Duomo di Carpi*, exhibition catalogue (Carpi, 18 September 2015 - 6 January 2016) edited by A. Giordano, M. Rossi, E. Svalduz, Carpi, APM, 2015, pp. 48- 51.

¹² R. Sacks, G. Lee, C. Eastman, P. Teicholz, *BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers*, Hoboken, New Jersey, Wiley, 2018. M. R. Hosseini, S. Abrishami, *BIM Teaching and Learning Handbook: Implementation for Students and Educators*, London, Routledge, 2021.

¹³ VR/AR and 3D Displays: First International Conference, ICVRD 2020, Hangzhou, China, December 20, 2020, Revised Selected Papers, Singapore, Springer Singapore, 2021.

¹⁴ C. K. Chua, K. F. Leong, C. S. Lim, *Rapid prototyping: Principles and applications*. New Jersey: World Scientific., 2003; A. K. Kamrani, E. A. Nasr, *Engineering Design and Rapid Prototyping*, Springerlink, 2010.

- Communication, dissemination and fruition of an inaccessible space – i.e. because it is still undergoing restoration works - and of its history, with immersive virtual approaches, furthermore for tourist-cultural purposes.

This research experiments the combined interaction between historical / archival documentation and virtual model, between interoperable model (BIM) and Virtual / Augmented Reality, between restoration project and intervention methodologies. Unprecedented synergies between different digital technologies¹⁵ therefore lead to a renewed awareness, with repercussions both for tourism development, for economic management and for the safeguarding of cultural and architectural heritage. In fact, a conscious “juxtaposition” between virtual space and prototyped models, between videos and apps (with the involvement of smart devices, videos on rear-projected screens, video mapping on physical models), makes the user able to “enter” interoperable digital model, gathered starting from accurate laser-scanner and photogrammetric surveys¹⁶. Furthermore, the critical use of the point cloud, generated by these surveys in interoperable modeling, configures the so-called SCAN to BIM operating process, a further field of improvement compared to current experiments. The architectural asset is studied, analyzed and enjoyed closely in its individual aspects and its visualization, with Augmented Reality, revolutionizes the analysis capacity of the specialized operator so as to also improve the knowledge of the visitor, for example in situations where the viewing enlarged details or when access to normally inaccessible spaces is useful. This leads to the creation of a virtual clone of the architectural artifacts in question: a Digital Twin that allows the interpretation of transformations over time through an automatic analysis of historical documentation. Furthermore, if properly interrogated, the model created of the artifacts in question will be able to assist and facilitate:

- The estimate of project interventions;
- The coordination of the response of the built asset with potential seismic actions;
- The dissemination of historical-artistic information.

This research organization can offer, from a touristic point of view, an engaging and inclusive experience: for example, the virtual reconstruction of artefacts and environments that no longer exist or of a project, will allow their “crossing” and perception. Then, the relationship between BIM and Virtual /

¹⁵ A. Giordano, R. A. Bernardello, P. Borin, I. Friso, C. Monteleone, F. Panarotto, *Rappresentazione / REPRESENTATION - Le opportunità fornite dai nuovi strumenti digitali - The opportunities of the new digital tools*, in PAESAGGIO URBANO, vol. 4, p. 50-73.

¹⁶ *Digital Research and Education in Architectural Heritage: 5th Conference, DECH 2017, and First Workshop*, UHDL 2017, Dresden, Germany, March 30-31, 2017, Revised Selected Papers. (2018). Germania: Springer International Publishing.

Augmented Reality offers enormous potential: in fact, all the information “loaded” in the 3D model can be viewed and consulted immediately in an immersive virtual space: a virtual space completely corresponding to reality but enhanced in the possibilities of movement and information. Therefore, if we consider the meanings of the term “Represent”, it is possible to immediately recognize the main ones, all-substantial for the disciplinary structure in general and in the particular case of research:

- the mimetic-reproductive one (re-presenting: the creation of the Digital Twin and its prototyping),

- the historical-documentary one (annotate / record: the structuring of the apparatus of historical and documentary sources),

- the descriptive one (show / demonstrate: the organization of the narration of historical transformations).

These meanings must be connected to the analytical aspect - as objective / neutral as possible - of the knowledge and communication of the architecture and the city.

Furthermore, the meaning of “model” distinguishes and identifies the discipline of Representation as a further statute (alongside the historical, theoretical and technical one) of architecture. The model, in fact, in addition to understanding the aforementioned meanings - mimetic, descriptive and historical - of Representation, assumes others, more meaningful, which qualify it as a “twin” of architecture: thus, it arises both as a medium between theory and built, and as a way of implementing architecture itself, that is, from the first idea until its realization¹⁷. We therefore arrive at a knowledge in continuous evolution, thanks to the modal meaning of the model, which allows us to recognize roles such as the prefigurative, configurative or institutional one (and the respective negations) which - together with the functions mentioned at the beginning - allow and assist in the communication of knowledge. In this way, we arrive at knowledge and dissemination that go hand in hand with the refinement of technologies.

¹⁷ V. Ugo, *Fondamenti della rappresentazione architettonica*, Bologna, Società Editrice Esculapio, 2002.

The Emoundergrounds project in the Palazzo dei Pio, between history and visualization

Rachele A. Bernardello, Simone Fatuzzo, Andrea Momolo

The main purpose of the research developed within the *Emoundergrounds project*, WPT2 - *design and development of innovative emotional paths in the undergrounds of the Palazzo dei Pio according to methods of transversal cultural enhancement* concerned the reconstruction and therefore the digital use of two areas of the Carpi complex, the “Torrione di Galasso” or “degli Spagnoli” and the “Sala del Guerriero”, based on an integrated survey of the buildings’ current state and on the historical analysis of the available sources, all coordinated and based on BIM methodology (ill. 1). The aim of this multidisciplinary research was to show the transformations of the Palazzo dei Pio over the centuries through the production of diversified multimedia content to be integrated into the new exhibition itinerary of the Palazzo dei Pio Museums. The work was conditioned by the different degree of knowledge related to the two areas of the building to be investigated. The Torrione, the protagonist of an exhibition in 2019 and of in-depth publications over the years, has been affected, since 2014, by a conservative restoration project and technical adaptation in view of its inclusion in the new, expanded, museum itinerary¹⁸. On the other hand, the Sala del Guerriero did not share a comparable knowledge base, neither from a historical-critical point of view, nor for the architectural survey¹⁹. The room owes its name to the great figure of an armed warrior frescoed on a pillar that emerged from the walls during twentieth-century restorations (ill. 12, 13, 18). It

¹⁸ *Il Torrione di Carpi. Work in progress*, edited by A. Giordano, M. Rossi, E. Svalduz, Carpi, APM edizioni, 2019.

¹⁹ A. Garuti, *Ritrovamenti e restauri in castello*, in H. Semper, F. O. Schulze F. O., W. Barth, *Carpi una sede principesca del Rinascimento*, translated by A. D’Amelio, A. E. Werdehausen, edited by L. Giordano, Pisa 1999 (ed. orig. Dresden 1882), p. 387.

is a heterogeneous space, in which the various architectural phases are partially visible and superimposed on each other. In the absence of detailed studies, the aim of the project was to verify the hypothesis that the pillar was a fragment of a portico that formed the entrance of one of the residences of the Pio family in the fifteenth century, the so-called Rocca Nuova, seat of the court of Lionello Pio (who died in 1477) (ill. 29, 30)²⁰. This entrance was then literally deleted by the construction of the large colonnaded courtyard ordered by Lionello's son and heir, Alberto, in the early 16th century²¹.

The activity was mainly divided into three interrelated phases: the acquisition and analysis of historical documentation, the digital survey and BIM modeling of the buildings, the creation of explanatory videos.

The first step consisted in retracing the available bibliography as well as the documentary sources, already partially known, preserved in the Civic Archives of the Municipality of Carpi and in the State Archives of Modena. Particular attention was paid to historical cartography, that is the series of views and plans of the city of Carpi, planimetry of the Palazzo dei Pio or portions of it, dating from the fifteenth century to the present, systematically analyzed and studied in the new perspective required by the project, particularly in connection with BIM models²².

In order to make the examination understandable and enable the whole research team to easily read it, two types of descriptive files have been prepared, the first for archival documents, the second for cartography. These cards uniformly present the main data (title, author, date, location, register, description) and a section highlighting the elements of interest related to the two areas of the palace. The worksheets, now published as an appendix to this volume, were the first cognitive and working tool, useful for understanding the historical-architectural development of the areas of the palace examined. In addition, the historical study was complemented by an in-depth observation of the buildings through inspections, which were also useful for planning targeted survey campaigns and setting up the modeling activity carried out in the second phase.

²⁰ Ibidem; M. Folini, *Nei palazzi quattrocenteschi dei Pio: apparati decorativi e organizzazione degli spazi di corte*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, edited by M. Rossi, E. Svalduz, Venezia 2008, p. 52.

²¹ A. Garuti, *Il palazzo dei Pio di Savoia nel «castello» di Carpi. Appunti per la storia edilizia e artistica dell'edificio*, Modena 1983, pp. 16-17; E. Svalduz, *Da castello a "città". Carpi e Alberto Pio (1472-1530)*, Roma 2001; E. Svalduz, «Fabbriche infinite»: *il palazzo di Alberto Pio*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, edited by M. Rossi, E. Svalduz, Venezia 2008, pp. 71-115.

²² *Materiali per la storia urbana di Carpi*, edited by A. Garuti, F. Magnanini, V. Savi, Carpi 1977; *Cartografia urbana di Carpi*, edited by A. Garuti, Carpi 1987; M. Ghizzoni, *La pietra forte. Carpi: città e cantieri alle fortificazioni (XII-XVIII secolo)*, Casalecchio di Reno (BO) 1997.

The survey of the buildings was based on indirect survey campaigns using modern technologies such as digital photogrammetry and terrestrial laser scanner (LIDAR). This was followed by digital modelling of the complex using Building Information Modeling (BIM) methodologies, firstly restoring the actual state of the buildings based on the restoration project drawings and then integrating them with the results of the digital survey described above. Then, the reconstruction hypotheses of the complex prior to the current state, elaborated on the basis of historical research, were transferred on the model, creating a chronological framework through the implementation of parameters such as the phase of construction and, if it occurred, the phase of demolition for each part of the building (ill. 30, 31, 32, 33). This allowed thus to provide, in the same digital environment, the entire construction history of the buildings involved. Furthermore, it was possible to define, through the enhancement of specific parameters, a degree of uncertainty to the assumed historical reconstructions using various grades of transparency for certain elements (ill. 2, 3).

The last part of the research concerned the production of multimedia content to support the visitor experience.

Three videos displaying the results of the research were designed to be integrated at the beginning of the museum circuit. Each video focuses on a research topic that shows these results at multiple levels and from different perspectives. Furthermore, understanding the entire multidisciplinary study process is made easier using different representation techniques.

The first video is functional to present the Palazzo dei Pio to the visitor within a general context, the city of Carpi, to reveal the close relationship between the complex and the surrounding urban fabric²³. Starting from the representation of how the building looks today (ill. 1) and going back in time, in this video are displayed the changes that have taken place in the city and in the stately complex over the centuries up to the time of Alberto Pio. In fact, Alberto reorganized the two fifteenth-century residences of the Pio family, the Rocca Nuova, home of their father Lionello, and the Torrione di Galasso, into a single sumptuous palace (ill. 4, 5, 6, 7). To visualize the city, capturing some of the most important architectural moments, it was decided to use the extraordinary iconographic source constituted by the bird's eye view of Carpi by Luca Nasi

²³ M. Ghizzoni, *La pietra forte. Carpi: città e cantieri alle fortificazioni (XII-XVIII secolo)*, Casalecchio di Reno (BO) 1997; idem, *Ordinamenti politici e strategie signorili: note di storia urbanistica carpigiana tra Medioevo e Rinascimento*, in *L'ambizione di essere città. Piccoli, grandi centri nell'Italia rinascimentale*, edited by E. Svalduz, Venezia 2004, pp. 121-153.

in 1677 (ill. 8, 9)²⁴. A fundamental junction for understanding the development of the city, however, is the era of Alberto's lordship with the architectures he commissioned, the demolition of the naves of the ancient parish church of Santa Maria, the foundation of the new Collegiate at one end of the current Piazza dei Martiri²⁵ and the construction of the new "palazzo" with the main facade facing the same square. In the last one, Alberto decided to unify two independent buildings, the Rocca Nuova and the Torrione, whose appearance in the fifteenth and fourteenth centuries has been partially restored thanks to recent historical research (ill. 2, 3). In particular, the towered aspect of the Rocca Nuova with the hypothesis about the Portico del Guerriero constitute the most relevant unpublished data.

In the second video, the still existing paintings, internal and external, serve as a reference to explain the development of the complex between the fourteenth and sixteenth centuries (ill. 10, 12)²⁶. In this case it was decided to highlight one of the methodological approaches of the research: the mapping of this paintings, inserted in the model, made it possible to verify the reconstructive hypotheses especially in reference to the Rocca Nuova. Its external walls, in fact, were covered by the construction, in the fifteenth century, of new wings built around the fourteenth-century fortress, preserving some fragments of the original decoration under new layers of plaster. The presence of these fragments made it possible to accurately identify the boundaries of the ancient fortress. The mapping in the orthophoto model of the decorative elements of some rooms located in various areas of the complex and displayed in the video, also allows us to grasp at a first glance the richness of the building, that the visitor is invited to discover in the museum itinerary (ill. 14, 15 16, 17, 21, 22, 23).

Finally, the third video deals with the problem of accesses to the Palazzo dei Pio, how they have changed over the centuries, a key theme of the Emoundergrounds project. In the present conformation of the building, designed at the beginning of the sixteenth century by the most ambitious of the counts of Carpi, Alberto, the main access is the one located under the clock tower, correspond-

²⁴ G. Mazza, *Luca Nasi nel fondo cartografico della Biblioteca Poletti di Modena*, in «Atti e Memorie della Deputazione di Storia patria per le antiche Provincie Modenesi», XXVI, 2004, pp. 325-364.

²⁵ *Costruire il tempio: alla ricerca del progetto di Baldassarre Peruzzi per il Duomo di Carpi*, exhibition catalogue (Carpi, 18 september 2015-6 January 2016) edited by A. Giordano, M. Rossi, E. Svalduz, Carpi 2015.

²⁶ Based on the detailed mapping of them provided by C. Dieghi, T. Previdi, M. Rossi, *L'apparato decorativo di Palazzo dei Pio*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, edited by M. Rossi, E. Svalduz, Venezia 2008, pp. 151-203.

ing to a *posterula* opened in the citadel walls already in the fourteenth century (ill. 24, 25). Further south is the so-called Passo degli Sbirri, next to the Torrione, considered a secondary access which in the fifteenth century must have been the main connection with the city of the residence of the Pio pivoted around the Torrione. These are counterbalanced by the two passages facing the Piazzale Re Astolfo, the ancient square of the citadel, in front of the parish church of Santa Maria: the first is an extension of the Passo degli Sbirri and certainly existed as early as the fifteenth century, the second opens in the east wing of Alberto's palace (ill. 27). However, before the construction of the large colonnaded courtyard, the connection of the Rocca Nuova with the heart of the Carpi citadel must have been moved further north, leaning against the fortress itself and consisting of a portico of which it is still possible to see the fragment with the fresco of the Warrior (ill. 29, 30). This first building phase, which can be placed around 1470, at the time of the lordship of Lionello Pio, was superimposed a few years later by a second one, which can be placed chronologically in the nineties of the same century or shortly after, in which the Rocca Nuova was connected to the fifteenth century building, facing Piazzale Re Astolfo - currently occupied by the Sala Poste on the ground floor and the Vigarani room on the first - by means of an elevated passageway resting on columns and vaults, perpendicular to the Portico del Guerriero (ill. 31). It was probably at that juncture that the fresco was covered, preserving it until the twentieth-century discovery, while the rest of the portico was demolished for the construction of the great court of honor of the Alberto's palace (ill. 32, 33).

Through the elaboration of these videos, which inaugurate the new tour of the Palazzo dei Pio, the main purpose is to narrate two stories: on the one hand that of the Palazzo dei Pio, in its extraordinary succession of transformations, on the other the multidisciplinary research developed thanks to Emoundergrounds project that still holds many surprises for the future.

Appendix

Simone Fatuzzo

[A.1]

AUTHOR: Unknown

TITLE: Plan of the Ground Floor of the Ducal Palace in Carpi, drawing of the main Facade

DATE: 1779

PLACE, N. INV.: Modena, Archivio di Stato, Cassa Segreta Nuova, b. 748, n. 38147

BIBLIOGRAFY: E. Svalduz, «Fabbriche infinite»: il palazzo di Alberto Pio, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, a cura di M. Rossi, E. Svalduz, Venezia 2008, pp. 71-115, p. 85; V. Tomasi, *Il palazzo durante la dominazione Estense*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, a cura di M. Rossi, E. Svalduz, Venezia 2008, pp. 123-135, p. 129

The drawing is a line plan of the palace, in the left wing of which is marked (letters ZZZZ) the section of the building to be used as the residence of the bishop of Carpi. In the right wing, the rooms assigned to the Governor of the city and those of the Provveditore are highlighted in purple and yellow respectively. The provveditore occupied the Giunzione Estense in the East side of the courtyard known as Cortile del Passerino and a series of rooms connected to it in the southern side, no longer existing. These rooms lean against the Renaissance court of the palace but, as you can see, they are not parallel to the partition wall. Probably, it means that the lost wing was part of the fortress of the Pio, the so-called Rocca Nuova, built in the XIV century. Some pre-Renaissance frescoes, originally external, are still visible in the Estense room on the main floor of the palace in the wall corresponding to the western facade of the Rocca Nuova, before the construction of the room in the second half of the sixteenth century.

Probably, the little rooms of the provveditore, still visible in the floor plan of Mazelli, N 203, constituted the southeastern corner of the Rocca Nuova, perhaps even the tower visible in the drawing of the facade of the building attached to this plan, and in the view of the Piazza di Carpi, engraved by Pietro Gualdi in 1828.

It is not known when the wing was demolished, most probably before 1824: it seems already disappeared in the drawing of that year by Francesco Bonasi, in ASMo, Mappa Campori, n. 4, which, however, considerably regularizes the whole wing. The tower disappeared after 1828, because it is still visible in the view of Gualdi. The traces of the wing are clearly visible in the walls of the courtyard, once internal to the demolished building. We can better recognize its original perimeter in the plans of the palace published in 2008 (*Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, a cura di M. Rossi, E. Svalduz, Venezia 2008, pp. 250-251), more accurate than those of the nineteenth century.

Thanks to this map, it is possible to hypothesize the medieval perimeter of the Rocca Nuova, already partially identified by Garuti (*Il palazzo dei Pio di Savoia nel «castello» di Carpi. Appunti per la storia edilizia e artistica dell'edificio*, Modena 1983)

SALA DEL GUERRIERO: The current Sala Posta and Sala del Guerriero are respectively used to house the Governor's stables and those of the Provveditore. A small courtyard, also used by the Provveditore, is attached to the latter room and now it is occupied by the boiler room.

TORRIONE: the plan reproduces only a portion of the perimeter of the Torrione: the Passo degli Sbirri with the no longer exist Civic Jail. The Pass was partially occupied by a staircase while the jail extended up towards the square. These elements disappeared before 1828 (as can be seen in the engraving by Pietro Gualdi), but they are accurately reproduced in the design of the façade attached to this plan.

[A.2]

AUTHOR: Andrea Mazelli

TITLE: Ground floor plan of the Palazzo dei Pio in Carpi

DATE: 1863 (December)

PLACE, N. INV.: Carpi, Musei di Palazzo dei Pio, N 205

MATERIAL AND TECNQUE: watercolor drawing on paper

MEASURES: 412x577 mm

INSCRIPTIONS: Rilevato e disegnato da Mazelli Andrea muratore in dicembre l'anno 1863

BIBLIOGRAPHY: A. Garuti, *Il palazzo dei Pio di Savoia nel «castello» di Carpi. Appunti per la storia edilizia e artistica dell'edificio*, Modena 1983; E. Svalduz, «Fabbriche infinite»: il palazzo di Alberto Pio, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, a cura di M. Rossi, E. Svalduz, Venezia 2008, p. 73

The plan could be the one initially attached to the contract for the sale of the building complex to the Municipality of Carpi by the State Property office, transfer which took place in December 1863 (see A. Garuti, *Dal dominio Estense al primo Novecento: utilizzi funzionali, restauri, prime destinazioni culturali*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, a cura di M. Rossi, E. Svalduz, Venezia 2008, p. 209, Garuti considers the map as lost). The contract together with detailed appraisal is in the Municipal Archives and the pertinence of the map should be verified in this documentation.

The plan outlines the ground floor of the entire Palazzo dei Pio complex. It is very detailed but there is no lack of simplifications, with some parts made more

regular. Some examples are the wall on which the staircase of the Sala dei Cervi rests and the adjacent dressing room, or the smaller rooms of the “Giunzione Estense”.

Compared to the current state, the complex shows some significant elements that indicate later tampering. The most important are:

- the presence of a portico and two adjoining rooms on the west side of the courtyard of the Passerino tower, which no longer exist today.
- an extension of the Roccavecchia wing, not in line with the Torrione, with two rectangular rooms. One was later completely eliminated, while the other was shortened and opened and today it constitutes an entrance to the portico. This change was made by 1874, the year of the later maps N 203-204 [A.4, A.5], and is probably related to the proposal to demolish the entire Roccavecchia wing submitted in 1864 and never implemented [A.3].

TORRIONE: In the Torrione the great hall appears to be partitioned, and Mazzelli outlines the roof as being composed by three cross vaults, probably due to an oversight or to the presence of false vaults. There is a staircase that starts from the Passo degli Sbirri to the upper floor and a spiral in the annex to the east.

SALA DEL GUERRIERO: The area appears regularized, especially the eastern wall of the staircase, perfectly straight which is actually slightly curved. The current warrior room is rendered as a rectangular room, with two windows towards the adjacent courtyard and a door towards the main courtyard. The brick column embedded in the eastern wall is not detected, perhaps because it is not considered important. To the north, the small room behind the staircase, used as a latrine, does not show the presence of the half-column in the corner. To the south, the Sala del Guerriero does not have doors connecting with the adjacent Stable, which later became the Post Office, characterized by the presence of a row of three pillars in the centre and a well leaning against the northern wall.

[A. 3]

AUTHOR: Luigi Firgini (?)

TITLE: *Atterramento della parte che si interna nel giardino di questo castello comunale*

PLACE, N. INV.: Carpi, Archivio Storico Comunale, Filze in Evidenza, 31, n. 345, fasc. 51

Date: Carpi, 1864, October 29th

Regesto: Luigi Firgini (?), an engineer employed by the Public Administration, presents two proposals to the Mayor and the City Council of Carpi: firstly to rearrange the room of the old theatre in the castle and currently in disuse; the

second to completely demolish the south-eastern wing of the complex, the Roccavecchia, in order to be able to expand the public garden around the Teatro Nuovo

Bibliography: A. Garuti, *Il palazzo dei Pio di Savoia nel «castello» di Carpi. Appunti per la storia edilizia e artistica dell'edificio*, Modena 1983, p. 34

Due to structural issues concerning the large empty hall caused by the demolition of pre-existing structures built by Vigarani, the city engineer proposes two solutions about the reduction of the hall. His proposals include the thickening of the eastern wall towards the inside part in order to make it regular and the split of the main hall into two environments. According to the first proposal the split should have been created through a diaphragm made of some columns and an arch; in the second draft by means of a wall. The second solution refers to the project stored in ASCC, Maps, folder 22, N 202, which was Annex A of the mentioned document.

The other proposal includes the demolition of a part of Roccavecchia, specifically the one set at “noon”, in the south of the Passo degli Sbirri. The main goal of this idea is to expand the public garden. In addition to a detailed estimate of the costs for the demolition there is also a plan of the southern area of the building, starting from the “Sbirri” passage and including both the Roccavecchia and the Torrione (State own Property). The plan only outlines the ground floor of the buildings and thoroughly copy the Mazelli plan, N 205 [A.2], defined the previous year.

As it is well known, the “landing” project was not implemented. However, it is possible to suppose that a debate has opened on the arrangement of this area overlooking the new gardens. The shortening of the Roccavecchia, aimed to align it to the Torrione, was the result. This structural change took place before the 1874, the year of the creation of N 203-204 plans [A.4, A.5], where the building already appears shortened.

[A.4]

AUTHOR: Unknown

TITLE: *Mappa del Pian-terreno dell'antico Palazzo nel Castello di Carpi e Proposta per Distribuzione degli uffizii Comunali*

DATE: circa 1874

PLACE N. INV.: Carpi, Musei di Palazzo dei Pio, N 203

CONDITION: the drawing is divided into eight sheets due to the folding and subsequent deterioration of the margins. It is laid down to another sheet of paper

INSCRIPTIONS: above in the center: “Mappa del pian-terreno dell'antico palazzo nel castello di Carpi e proposta per distribuzione degli uffizii comunali”.

Below: legend relating to the intended use of all the rooms of the building, systematically numbered

BIBLIOGRAFY: A. Garuti, *Il palazzo dei Pio di Savoia nel «castello» di Carpi. Appunti per la storia edilizia e artistica dell'edificio*, Modena 1983; V. Tomasi, *Il palazzo durante la dominazione Estense*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, edited by M. Rossi, E. Svalduz, Venezia 2008, p. 125

This large plan, together with the subsequent N 204 [A.5], depict the project to place the municipal offices in the building, proposed in 1874 but never implemented. The drawing is clearly legible despite the damage caused by the paper folds.

The Torrione is not depicted, unlike the Mazelli map of 1863, because it was a State Property, not a municipal one like the rest of the palace. Some parts of the building – as the wall of the north-east staircase near the Sala dei Cervi and the small rooms of the Giunzione Estense – appear more regular than in the real building, as in the 1863 plan, perhaps used as a model for this one.

The building has been modified since it was designed in 1863:

- the so-called Roccavecchia is shorter, and the southern wall is now aligned with that of the Torrione.

- the portico and the two adjoining small rooms on the west side of the tower of Passerino courtyard have disappeared.

SALA DEL GUERRIERO: the number 44 marked the room. The draftsman drew the walls, actually slightly curved, as if they were straight, especially the eastern one, next to the north-east staircase.

According to the project, the current Sala del Guerriero was destined to become a woodshed. It is a rectangular room equipped with two windows in the eastern wall and a door opened in the western one leading into the main courtyard.

Nowadays in the room stands a brick column that we know was once partially embedded in the eastern wall (see the projects for the Post Office of the 1910 [A.6]). In this plan the column is not drawn, perhaps because it is not considered relevant for the purposes of the project.

Likewise, the small room behind the staircase, intended as a latrine in the project, does not show the presence of the still visible brick semi-column in the corner.

The perimeter of the adjoining courtyard is barely visible on the east side of the room. On the south side, the now-called Sala Poste was at that time the stable of the palace, but it was destined to become the seat of various municipal offices. The room is crossed by a central sequence of pillars; a well stands near the northern wall. The renovation that took place in 1911 will completely change the layout of the room.

[A.5]

AUTHOR: Unknown

TITLE: *Mappa del Piano nobile dell'antico Palazzo nel Castello di Carpi e Proposta per Distribuzione degli uffizii Comunali*

DATE: about 1874

PLACE, N. INV.: Carpi, Musei di Palazzo dei Pio, N 204

MATERIAL AND TECHNIQUE: watercolour pen drawing on paper, applied on canvas

MEASURES: 610x865 mm

CONDITION: the plan is divided into eight sheets due to the folding and subsequent consumption of the margins. It was thus counterfounded.

The large plan, as the previous N 203 [A.4], was outlined to show how to place the city offices in the building, according to the proposal of in 1874 and which was not implemented.

In addition to the title, there is a detailed “description” or legend relating to the intended use of all the rooms of the building. All rooms are systematically numbered.

[A.6]

AUTHOR: Arturo Prati

TITLE: *Progetto di riduzione di una parte del Castello di Carpi ad uso Poste e Telegrafo*

DATE: 1910

INV. N.: Carpi, Musei di Palazzo dei Pio, N 190

CONDITION: Excellent

BIBLIOGRAPHY: A. Garuti, *Dal dominio Estense al primo Novecento: utilizzi funzionali, restauri, prime destinazioni culturali*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, edited by M. Rossi, E. Svalduz, Venezia 2008, p. 213.

The project shows the plan of the rooms in the Palazzo dei Pio where to place the new Post Office.

The author uses three colors for the different works to be done: the walls to be preserved are marked in black; those to be demolished in yellow; in pink the new ones.

According to the project, Prati had planned the demolition of the pillars supporting the ceiling of the room, and the vaults of the so-called Sala Pacchi, nowadays the Sala dei Nomi of the Museo del Deportato. When the renovation was started, it was decided to save one of the pillars in the Sala Poste, while in

the second room was eliminated the central cross support to be replaced by two single pillars like those already existing. these changes were probably due to savings requirements.

SALA DEL GUERRIERO: on the left side, Prati planned to build a new wing on the site of the small courtyard adjoining to the Sala del Guerriero, an area which in 1779 (see the plan in ASMo, Cassa Segreta Nuova, b. 748, no. 38147 [A.1]) was used as a service courtyard for the Provveditore's stable that was in the current Sala del Guerriero.

The imposing brick column is clearly visible in the plan. It had to be preserved and used as part of the new partitions of the room. The profile of a semi-column is visible in the small room between the Sala del Guerriero and the staircase, in the opposite side of the pillar where the Warrior is frescoed.

It should be noted that in the plan N 191 [A.7], that shows the rooms before the renovation, the space of the current Sala del Guerriero is closed by a wall towards the small courtyard, not outlined in this project.

[A.7]

AUTHOR: Arturo Prati

TITLE: *Fronte attuale verso il piazzale del Pallone, Stato attuale della parte centrale del castello di Carpi (pianterreno)*

DATE: 1911

N. INV.: Carpi, Musei di Palazzo dei Pio, N 191

CONDITION: Excellent

BIBLIOGRAPHY: A. Garuti, *Dal dominio Estense al primo Novecento: utilizzi funzionali, restauri, prime destinazioni culturali*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, edited by M. Rossi, E. Svalduz, Venezia 2008, p. 213

In the upper part of the sheet, the east facade of the Palazzo dei Pio is depicted as it appeared before the renovation planned by Prati. Large arched windows would replace the much smaller square ones on the ground floor. On the right, we can also see the wall delimiting the small courtyard on which the boiler room now stands. Prati used this precise plan to illustrate the current state of the rooms before their transformation in a Post Office.

SALA DEL GUERRIERO: in the east side, the room is divided from the small adjoining courtyard by a wall with two windows. A column clearly protrudes on both sides of the wall. This means that the brick column was clearly visible at the time. The detail is missing from the nineteenth-century plans, probably because the Prati project required greater precision. In the same way, the quarter of a column, still visible today in the adjoining small room behind the staircase,

is not depicted in the nineteenth-century plans but it is clearly visible in this relief.

[A.8]

AUTHOR: Arturo Prati

TITLE: *Progetto di decorazione della sala del pubblico*

DATE: 1911

PLACE, N. INV.: Carpi, Musei di Palazzo dei Pio, N 192

MATERIAL AND TECHNIQUE: watercolour drawing on paper

MEASURES: 518x736 mm

CONDITION: Excellent

BIBLIOGRAPHY: A. Garuti, *Dal dominio Estense al primo Novecento: utilizzi funzionali, restauri, prime destinazioni culturali*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, edited by M. Rossi, E. Svalduz, Venezia 2008, p. 213.

The drawing shows the longitudinal and transversal sections of the public room of the new Post Office, adorned with beautiful liberty decoration.

[A.9]

AUTHOR: Arturo Prati

TITLE: Elevation of the east side of the courtyard, Longitudinal section

DATE: 1911

PLACE, N. INV.: Carpi, Musei di Palazzo dei Pio, N 193

MATERIAL AND TECHNIQUE: watercolour drawing on paper

MEASURES: 410x710 mm

CONDITION: Excellent

BIBLIOGRAPHY: A. Garuti, *Dal dominio Estense al primo Novecento: utilizzi funzionali, restauri, prime destinazioni culturali*, in *Il palazzo dei Pio a Carpi. Sette secoli di architettura e arte*, edited by M. Rossi, E. Svalduz, Venezia 2008, p. 213.

The drawing shows how the new façade of the east side of the courtyard must have looked after the post office restoration work, along with the new arched windows and the main arched door, all equipped with railings. The longitudinal section below, relating to the interiors of the post office and package room, shows the necessary masonry interventions highlighted in pink. On the right of the room designed for packaging it is clear how substantial the intervention must have been: it consisted of the demolition of a wall, all the pillars

and masonry vaults. The original layout of all these elements is outlined in the plan.

SALA DEL GUERRIERO: only the eastern wall of the telegraph office, as intended by the project, is defined. Currently this place is used as the boiler room.

[A.10]

AUTHOR: Architects B.B.P.R.

TITLE: Palazzo dei Pio, reorganisation project, plans 1-7.

DATE: November 1976

PLACE, N. INV.: Carpi, Archivio Storico Comunale

CONDITION: excellent

BIBLIOGRAPHY: unpublished

The seven plans of the Palazzo dei Pio complex were created in 1976 by the BBPR studio in Milan (Belgiojoso, Banfi, Peressutti, Rogers) as part of the reorganization of the internal and external spaces of the building. The same architects' studio had been involved in the design of the Museo del Deportato a few years before. In these very precise surveys is indicates the intended use of each room, except for that of the Museo del Deportato, which had already been built. Furthermore, the spaces are divided into "open" areas, that is open to the public, highlighted with a dark purple color, specialized areas (offices, archives, libraries, rooms for temporary exhibitions, etc.) and additional rooms (where to place the facilities), both colored-white.

The plan 1 [A.10.1] concerns only the underground floor of the complex, which develops exclusively under the main rectangular body of the Torrione.

In the plan 2 [A.10.2] the Torrione is depicted without the partitions and superfetations (which would have been preserved in the final project) to restore the great hall to its original proportions. in the arrangement project, the Sala del Guerriero had the function of an atrium for the adjacent room of temporary exhibitions in the former post office. The 1911 partitions are shown in transparency because they were all to be demolished. The building added in the same years to the east for the telegraph office, where the boilers are today, is destined either to house the facilities or also to be demolished. The embedded brick column is clearly visible in the survey. No elevations are given but the floor must still have been that at the level of the adjacent rooms and the main courtyard since no differences in height and stairs are indicated. The pillar with the Warrior frescoe still appears hidden behind the corner masonry.

Map 3 [A.10.3] shows the mezzanines between the ground floor and the first floor, i.e. the apartment of the Sala dei Cervi to the north and a part of Roccavecchia. The Torrione and the Sala del Guerriero are not shown but the

plan is interesting because you can see the upper floor of the small room on the east side of the staircase, adjacent to the Warrior pillar, where you can see the remains of the capitals of the pillar.

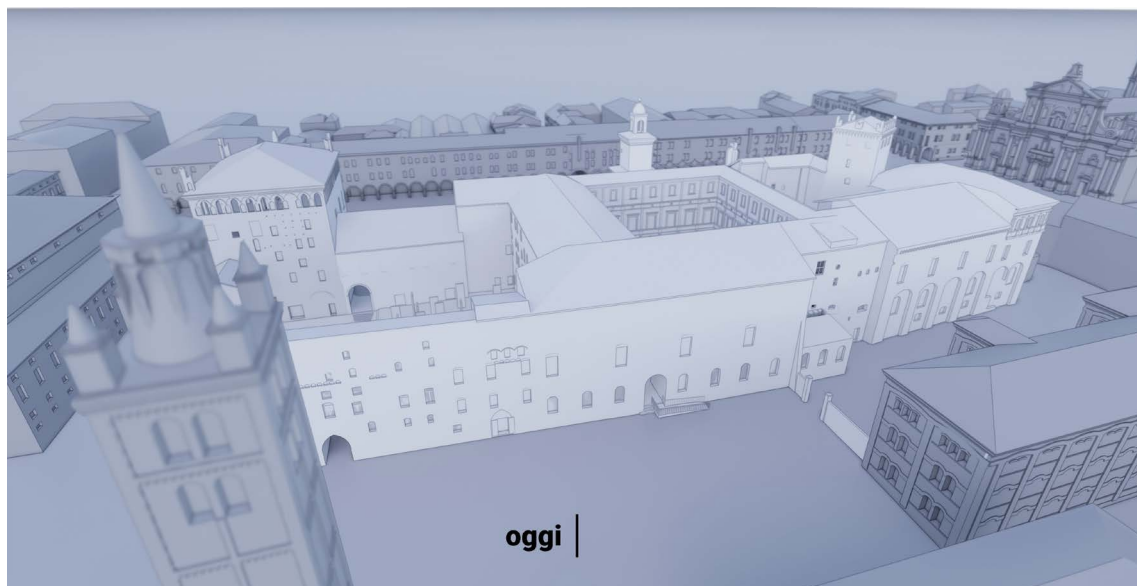
In the Map 4 [A.10.4], the first floor of the Torrione is intended to house the offices of Education, Culture, Sports and Leisure Department, precisely in the rooms of the actual tower and in the adjacent Bishop's rooms, connected to each other by a door. The project included a series of wooden partitions (planks) or other low dividers to create smaller rooms suitable for offices, which probably would not have affected the perception of the original dimensions of the rooms.

Map 5 [A.10.5] shows the mezzanine between the first and second floors, corresponding to the current museum offices.

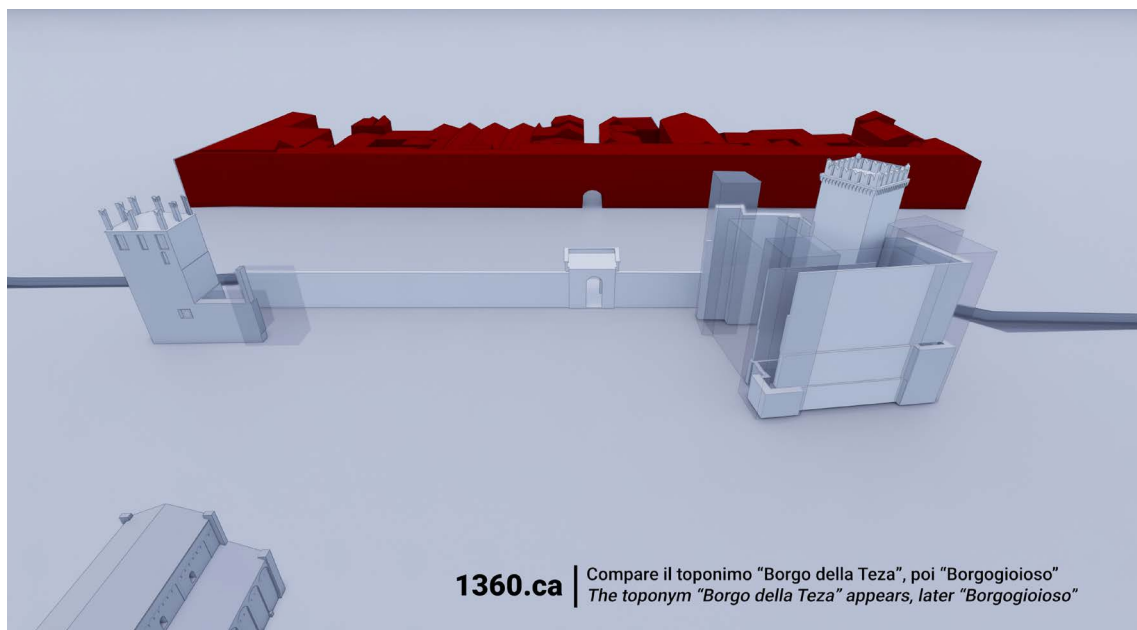
Map 6 [A.10.6] shows the second floor. The Torrione is divided into four rooms, two larger in the west side and two smaller in the east side.

Map 7 [A.10.7] shows the top floors of the complex, i.e. the two highest of the Tower of Passerino and the third of the Torrione. This has the current layout but according to project it is clear that the intention was to use it as a meeting room and storage.

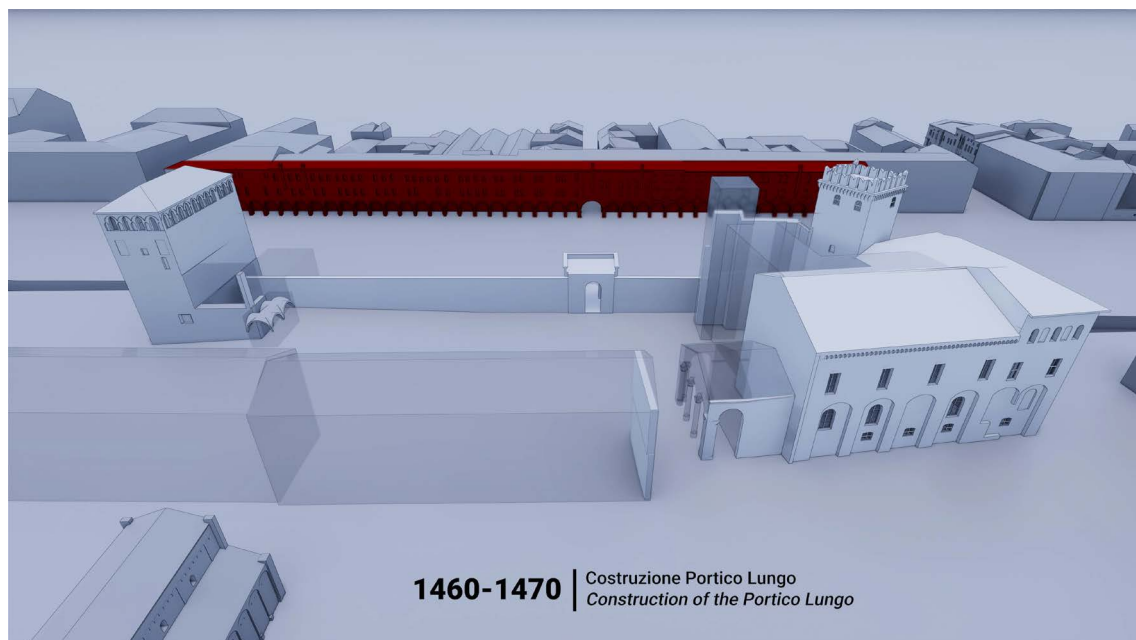
Illustrations



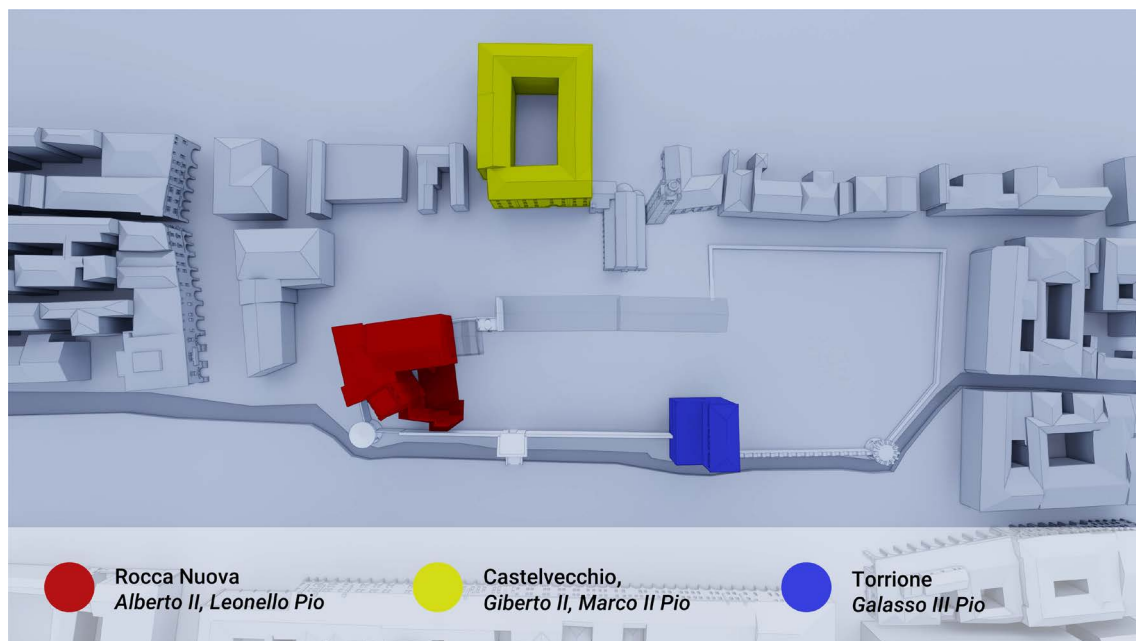
Ill. 1 - Palazzo dei Pio.



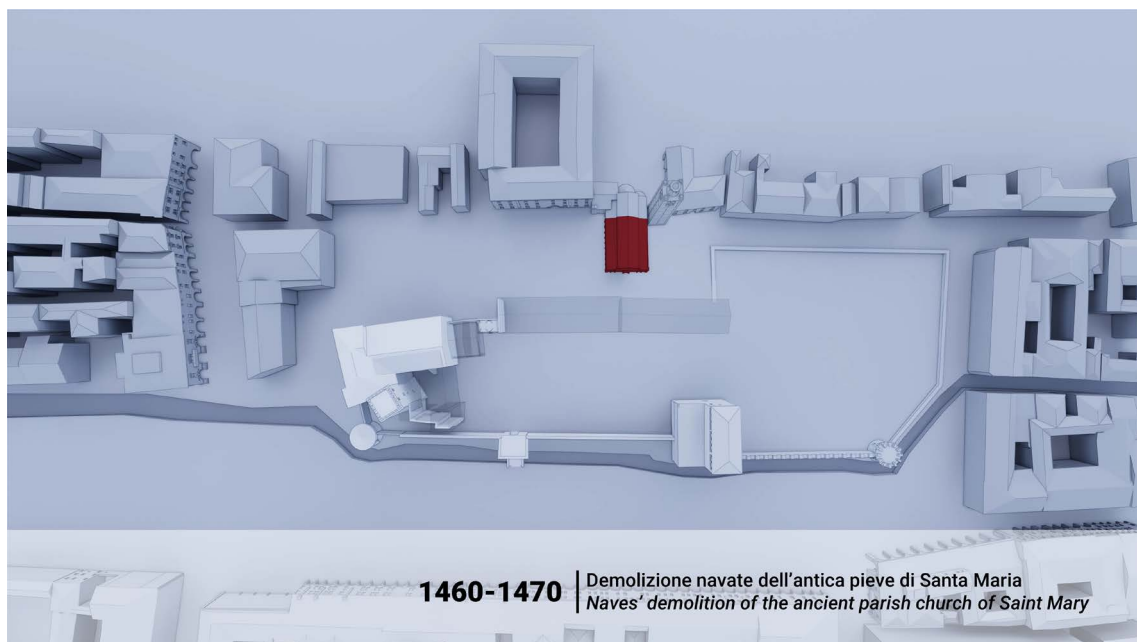
Ill. 2 – The area of the present-day Palazzo dei Pio in the 14th century. The 'Borgo della Teza' built in the same period is highlighted in the background.



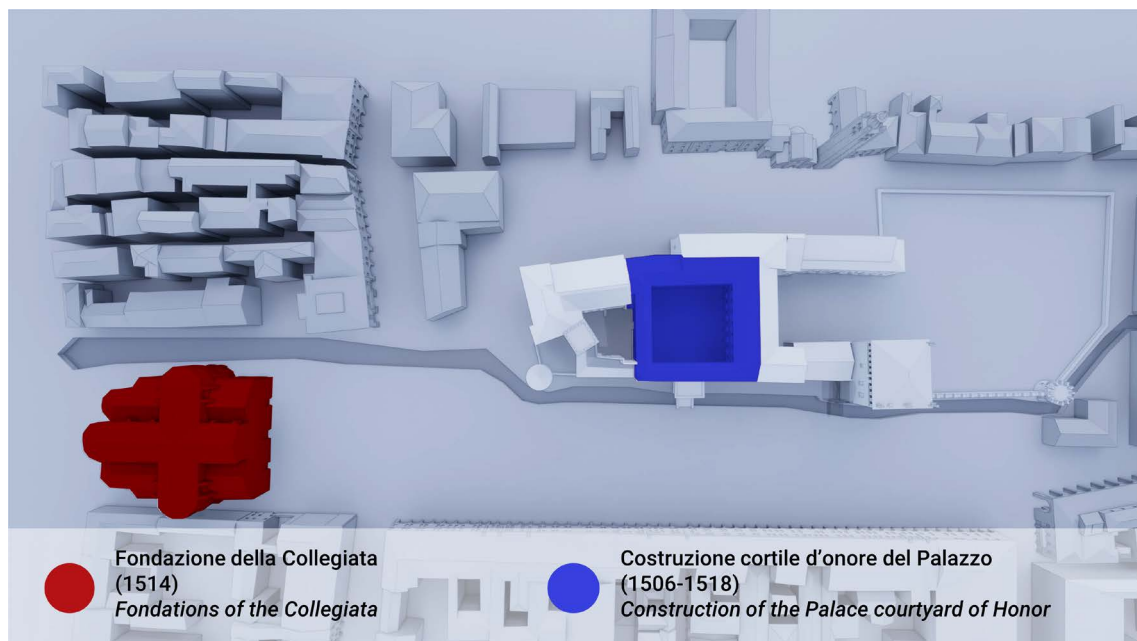
Ill. 3 - The area of the present-day Palazzo dei Pio in the 15th century. The so-called Portico Lungo, built in 1460-1470, is highlighted in the background.



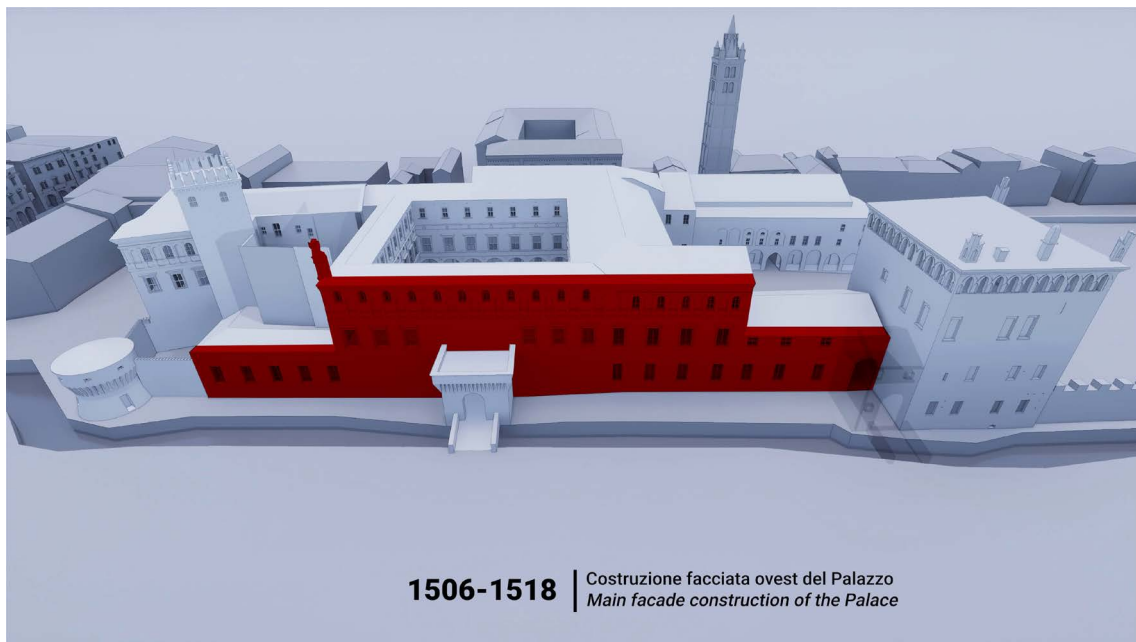
Ill. 4 - Aerial view of the Citadel of Carpi in the 15th century with the residences of the three branches of the Pio family in evidence.



Ill. 5 - Aerial view of the Citadel of Carpi in the 15th century showing the section of the ancient Romanesque parish church of Santa Maria, demolished in 1515.



Ill. 6- Aerial view of the Palazzo dei Pio complex with the Renaissance courtyard and Chiesa Collegiata commissioned by Alberto Pio.



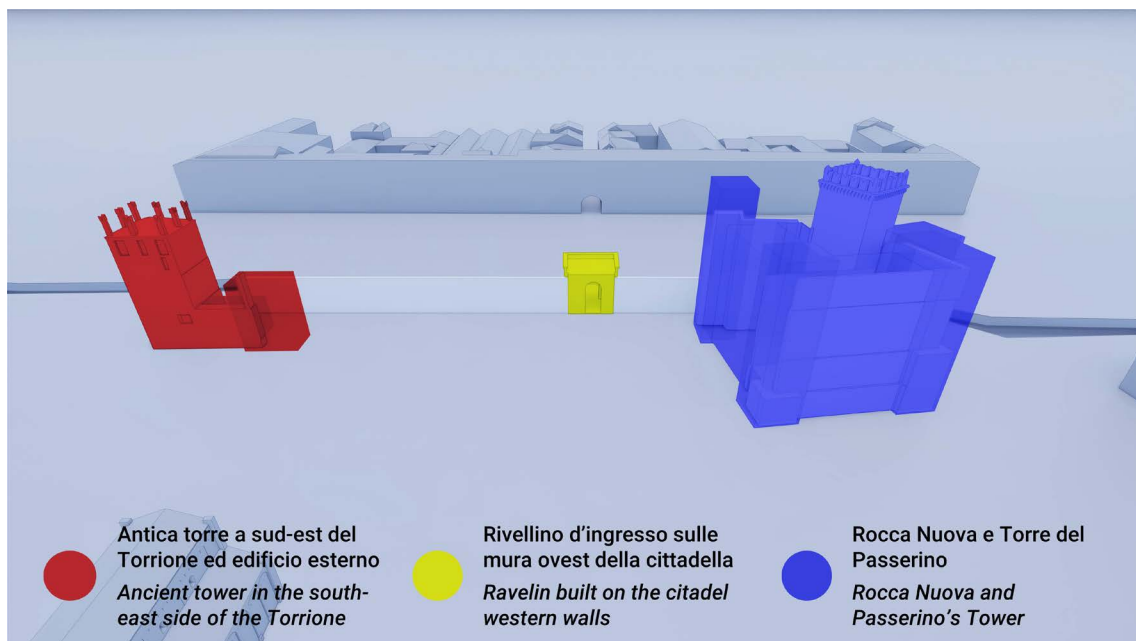
Ill. 7 - The Palazzo dei Pio with the west elevation commissioned by Alberto Pio in the early 16th century.



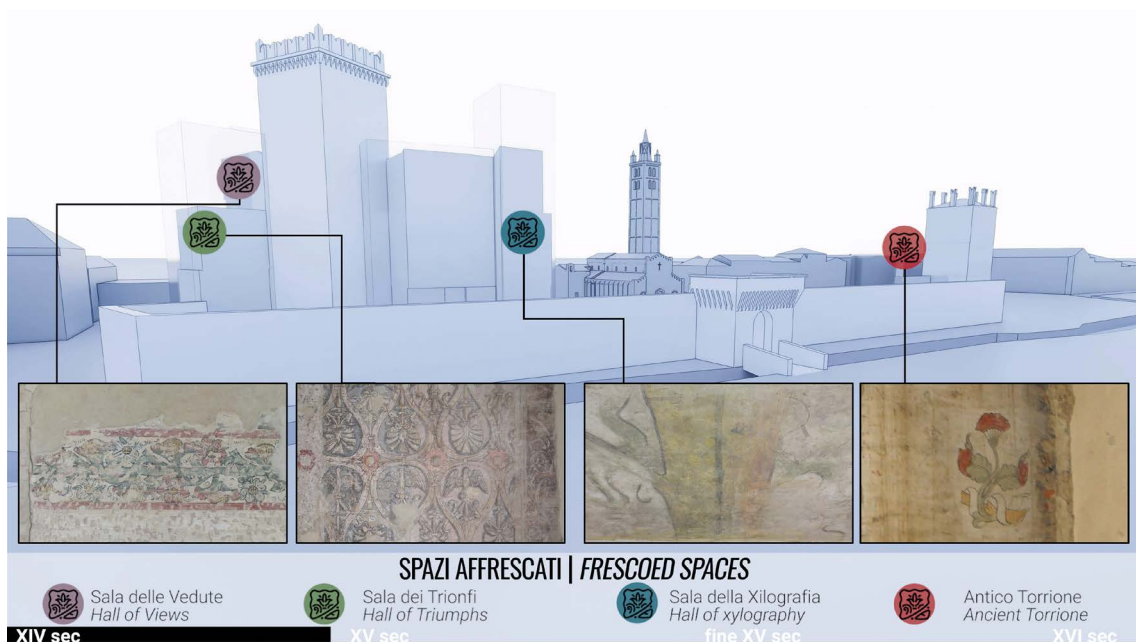
Ill. 8 - Graphic reworking of Luca Nasi's *Veduta di Carpi* (1677). The construction of the clock tower is highlighted.



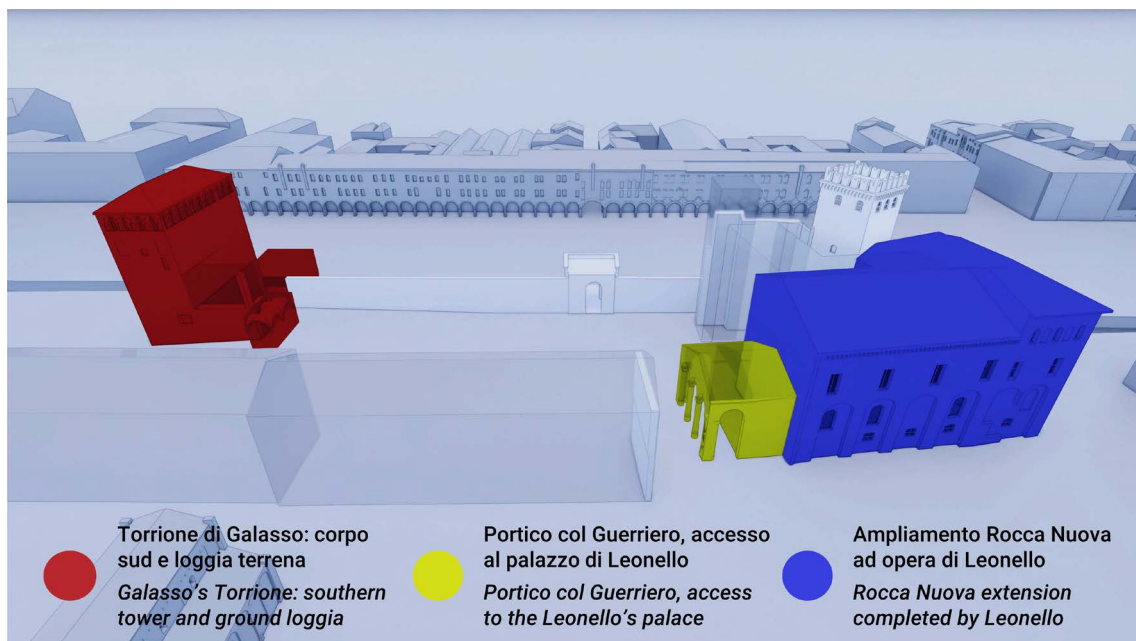
Ill. 9 – Graphic reworking of Luca Nasi's *Veduta di Carpi* (1677). The Collegiata church completed during the 17th century is highlighted.



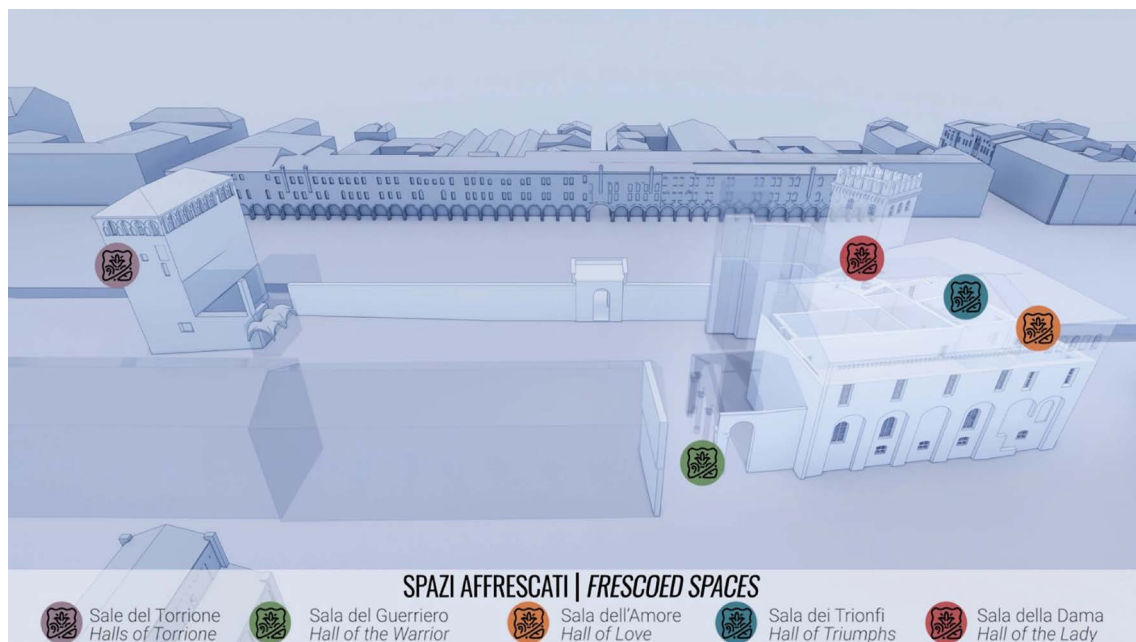
Ill. 10 - The area of the present-day Palazzo dei Pio in the 14th century from the east.



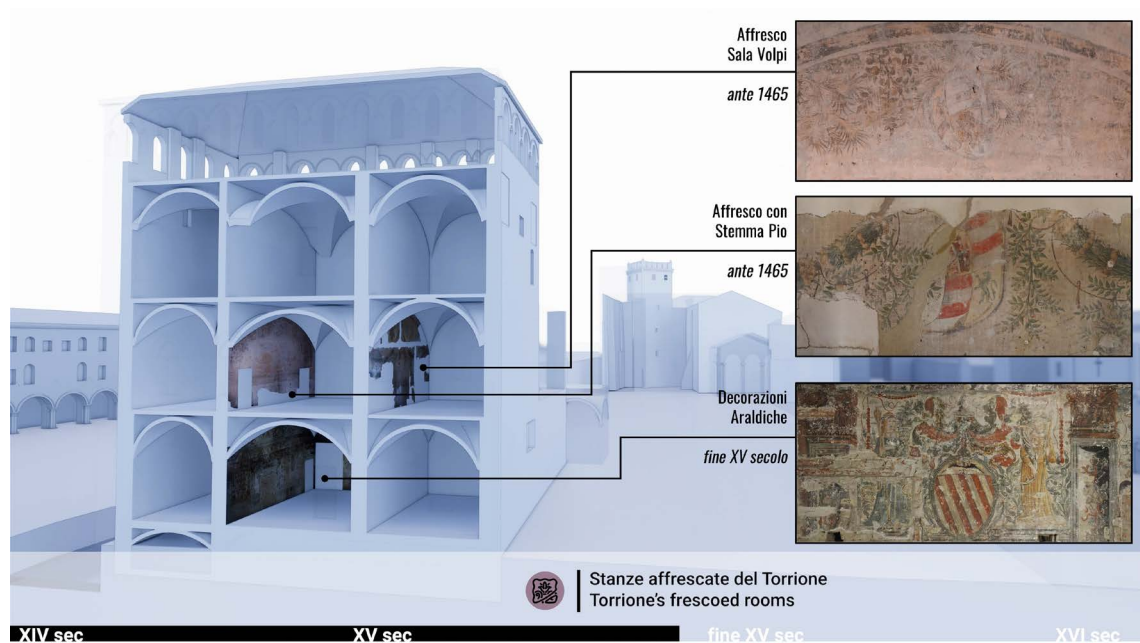
Ill. 11 - Location of the fragments of frescoes still existing within the reconstruction of the 14th-century residences of the Pio family.



Ill. 12 - The residences of the Pio family in the 15th century (before 1490) with the Torrione of Galasso and the additions to the Rocca Nuova.



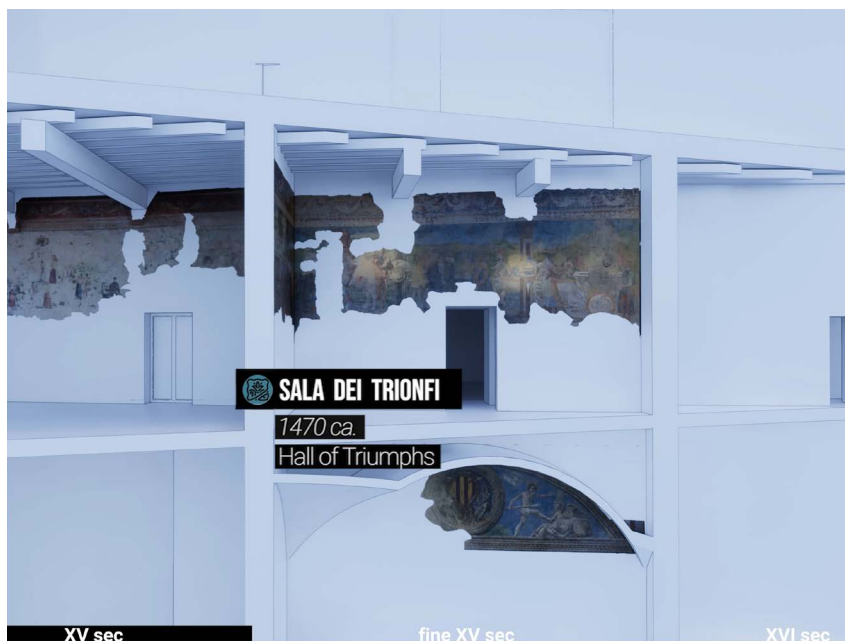
Ill. 13 – Location of the frescoed rooms within the 15th-century reconstruction of the residences of the Pio family.



Ill. 14 – Perspective section of the Torrione digital model with indication of the 15th century frescoes located inside the southern vaulted rooms.



Ill. 15 – Perspective section of the Rocca Nuova digital model with the frescoes of the Sala della Dama.



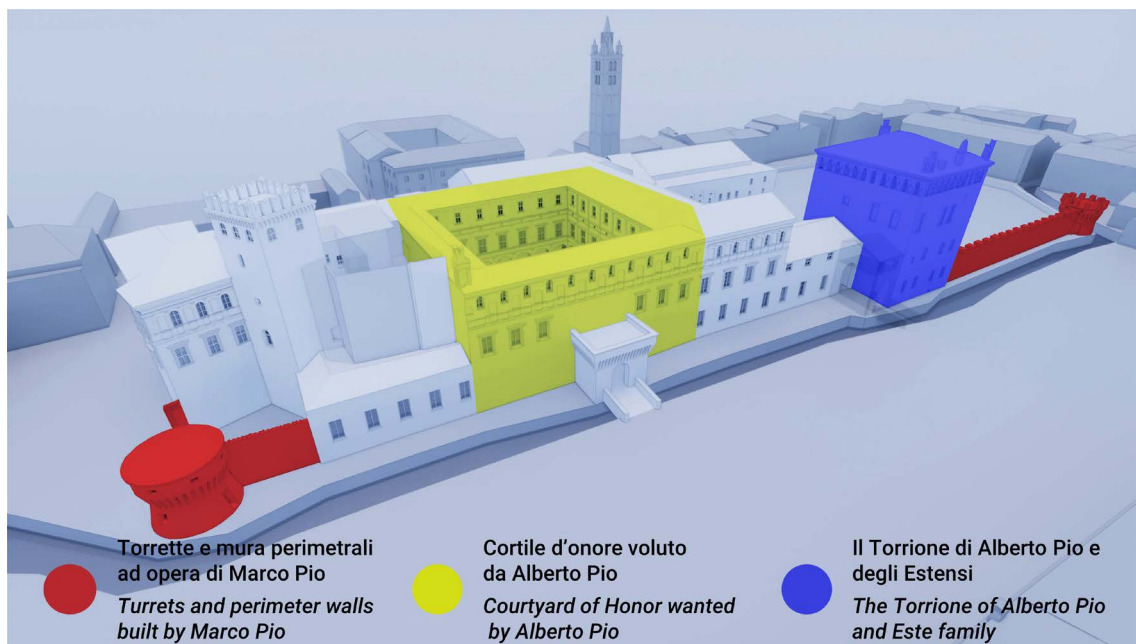
Ill. 16 - Perspective section of the Rocca Nuova digital model. Detail with the frescoes of the Sala dei Trionfi.



Ill. 17 - Perspective section of the Rocca Nuova digital model. Detail with the frescoes of the Sala dell'Amore.



Ill. 18 - Hypothetical reconstruction of the access portico to the Rocca Nuova with the Warrior fresco.



Ill. 19 - The palace of Alberto Pio in the early 16th century.



Ill. 20 -Location of the frescoed rooms within the 16th-century reconstruction of the palace of Alberto Pio.



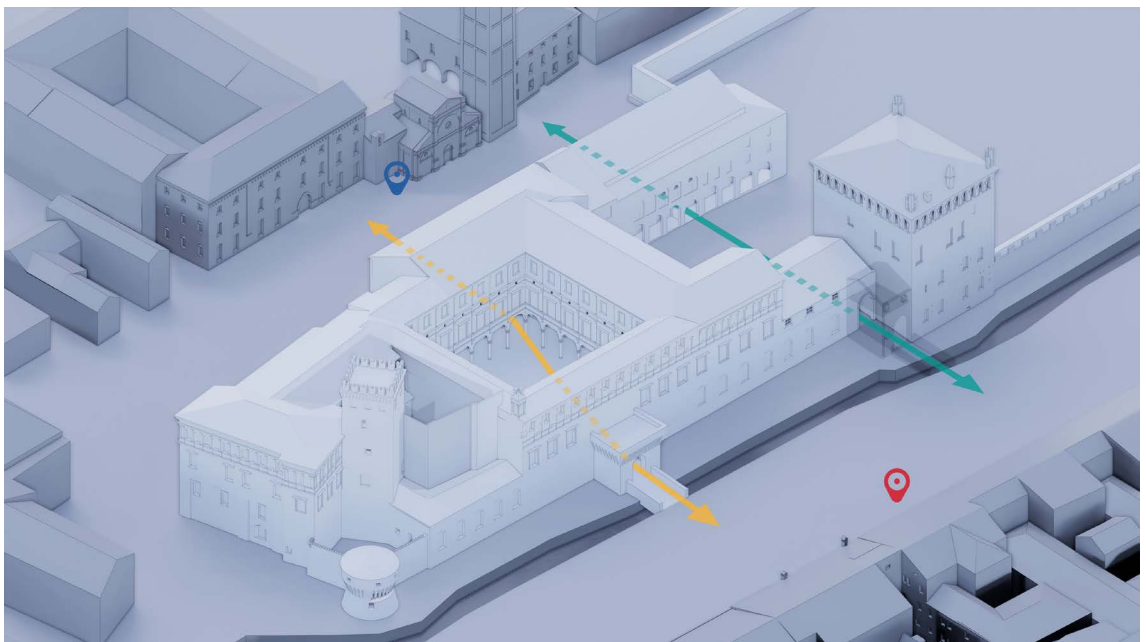
Ill.21 - Detail of the digital model of the Palazzo dei Pio, the Cappella dei Pio.



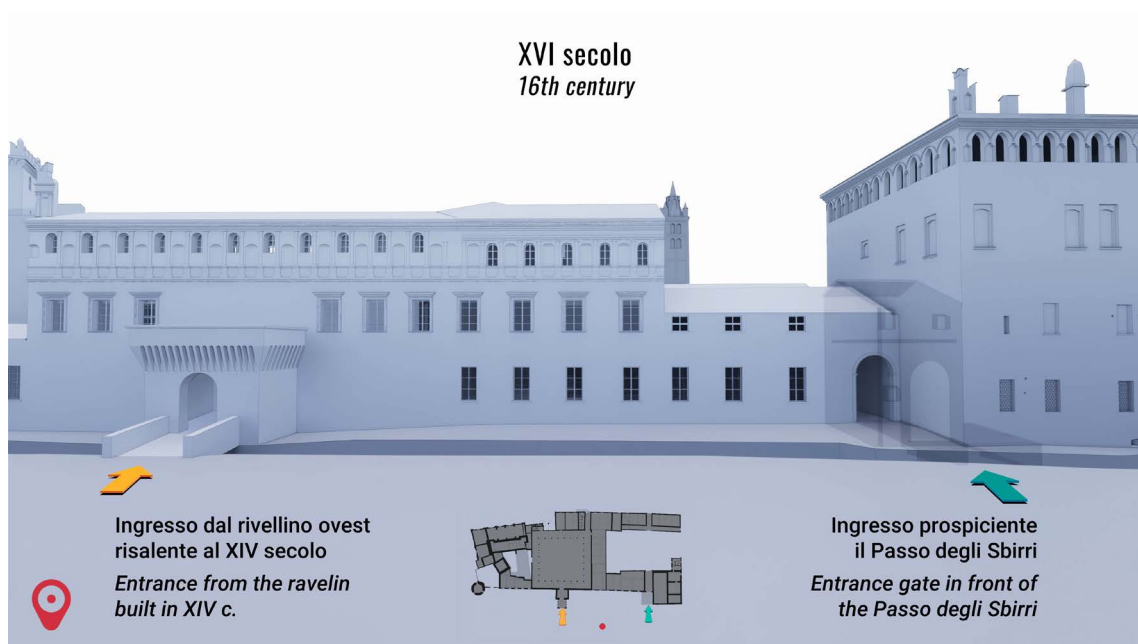
Ill. 22 - Detail of the digital model of the Palazzo dei Pio, the Sala dei Mori.



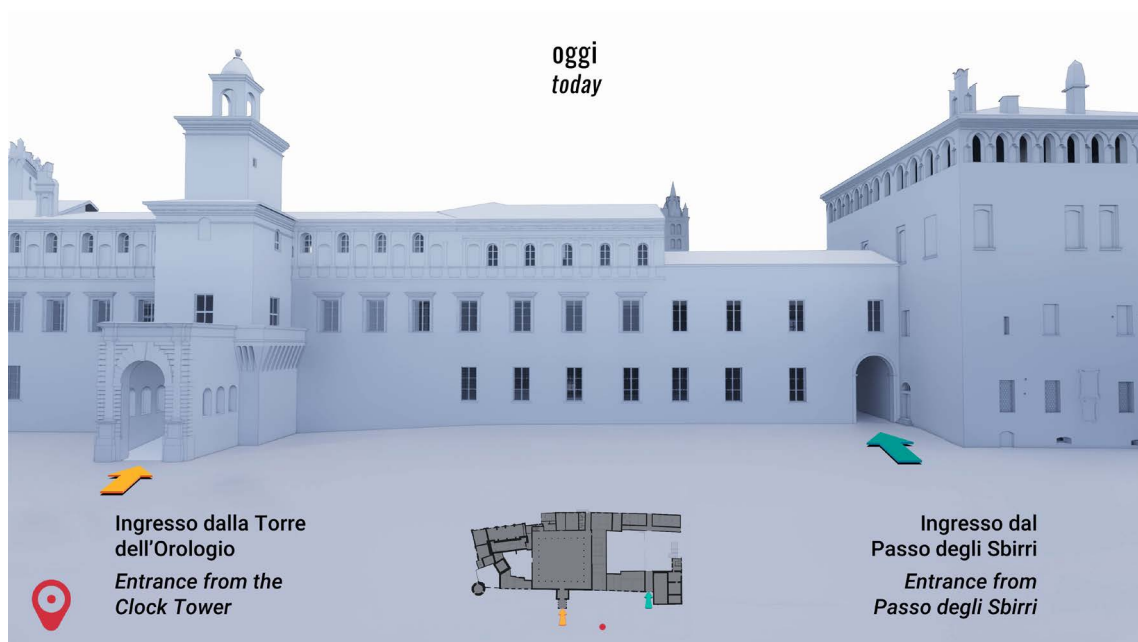
Ill. 23 -Detail of the digital model of the Palazzo dei Pio, the Sala dei Gigli.



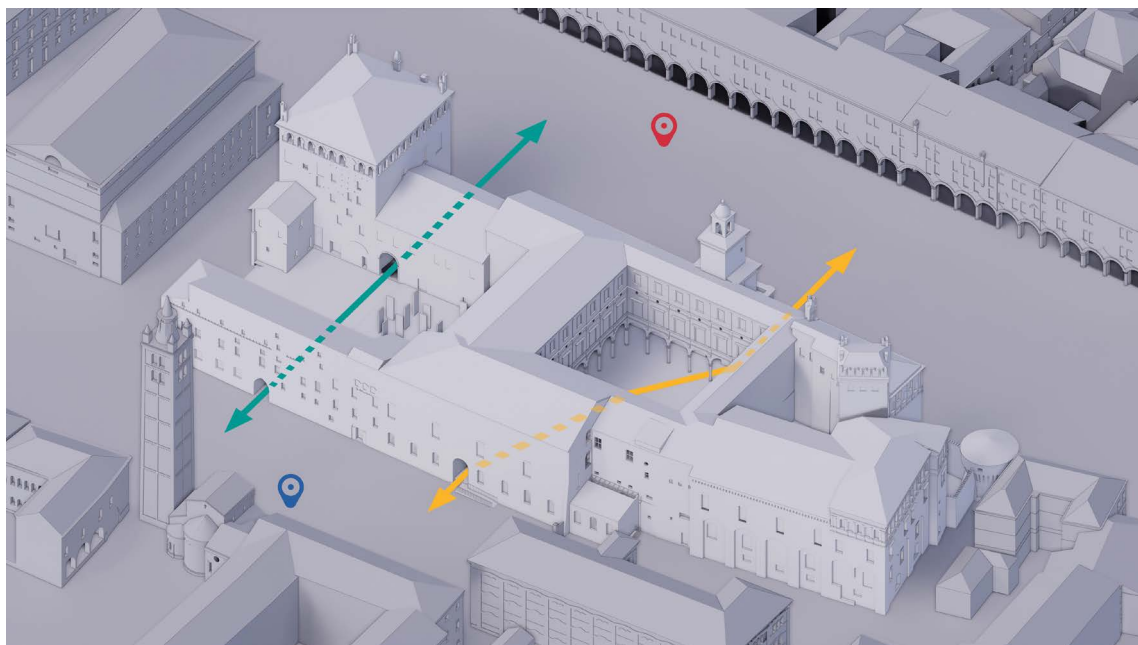
Ill.24 - Axonometric view of the Palazzo dei Pio in the 16th century: the dual system of accesses by east-west axes is highlighted (the two pins indicate the viewpoints in the following images).



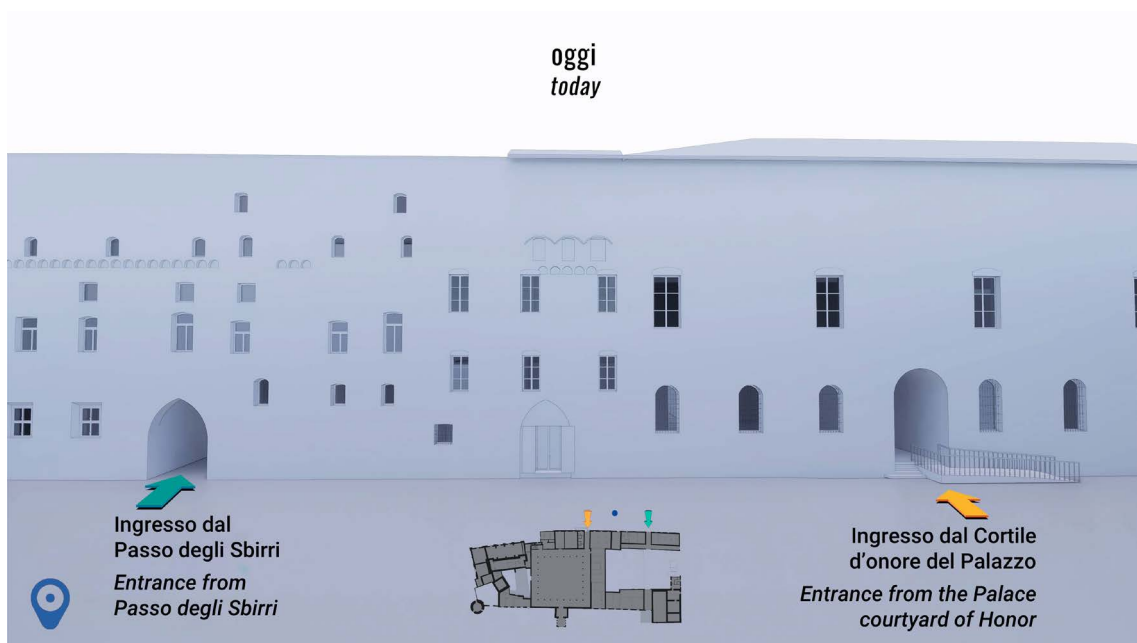
Ill. 26 - The 16th-century entrances to the Palazzo dei Pio, from the west.



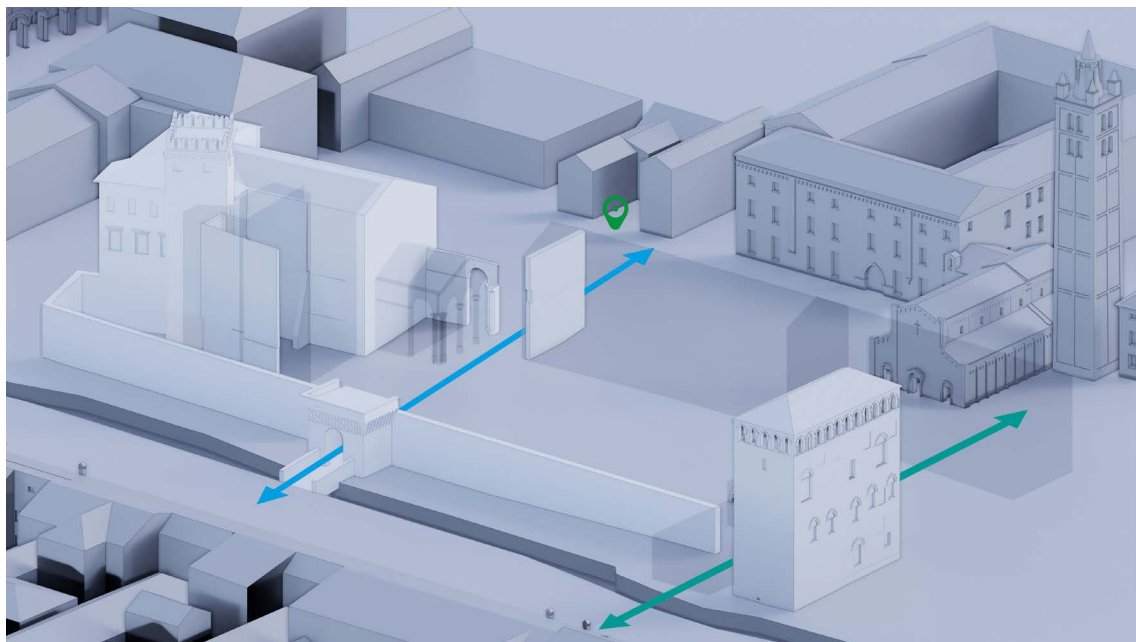
Ill. 27 - The current entrances to the Palazzo dei Pio, from the west.



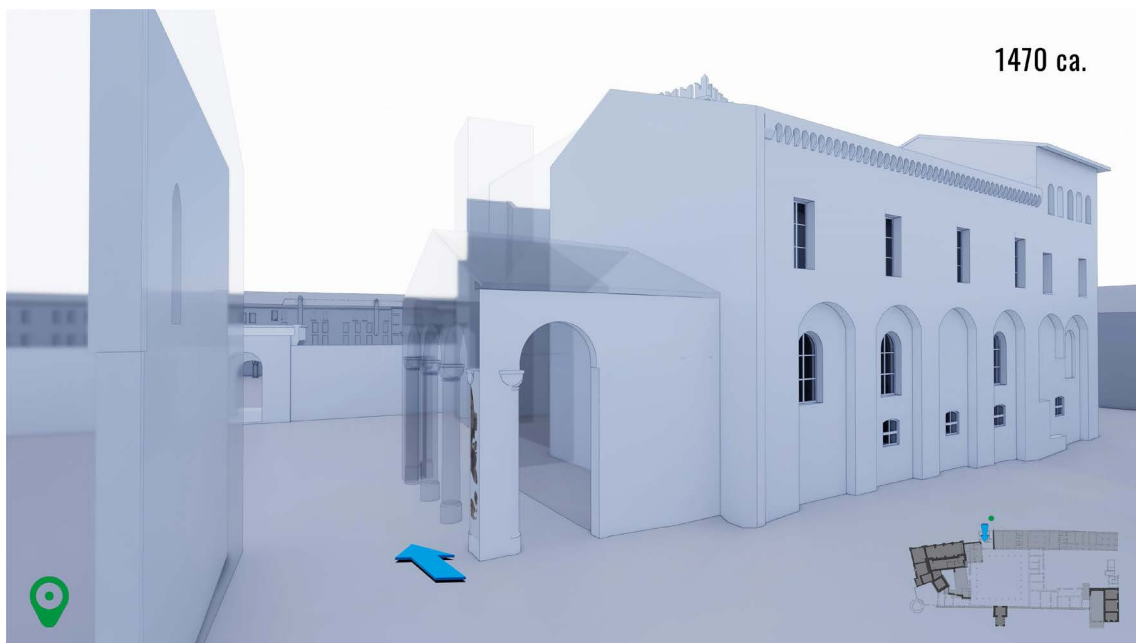
Ill.28 - Axonometric view of the Palazzo dei Pio and the east-west axis access system similar to the 16th century one (the two pins indicate the viewpoints in the following images).



Ill.29 - The current entrances to the Palazzo dei Pio, from the east.



Ill. 30 - Axonometric view of the residences of the Pio family in the 15th century: the system of access by east-west axes is in evidence, including the northern passage behind the Portico del Guerriero (the green pin indicates the viewpoint in the following image).



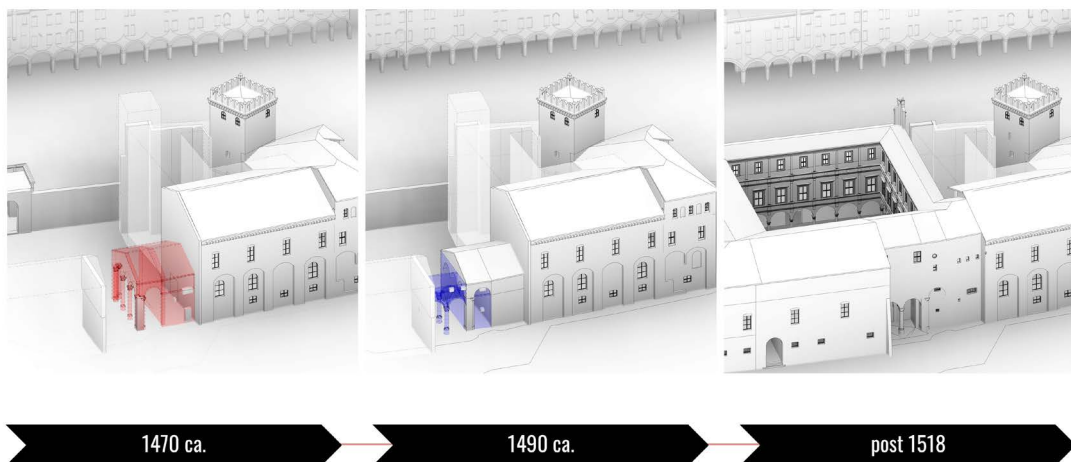
Ill. 31 - Hypothetical reconstruction of the access to the Rocca Nuova around 1470 with the Portico del Guerriero and the road connecting the square of the ancient parish church with the northern “posterula” of the citadel.



Ill. 32 - The area of the Sala del Guerriero around 1490: the portico was closed by a vaulted passageway to connect the Rocca Nuova with the wing now occupied by the Sala Poste and the Sala Vigarani.

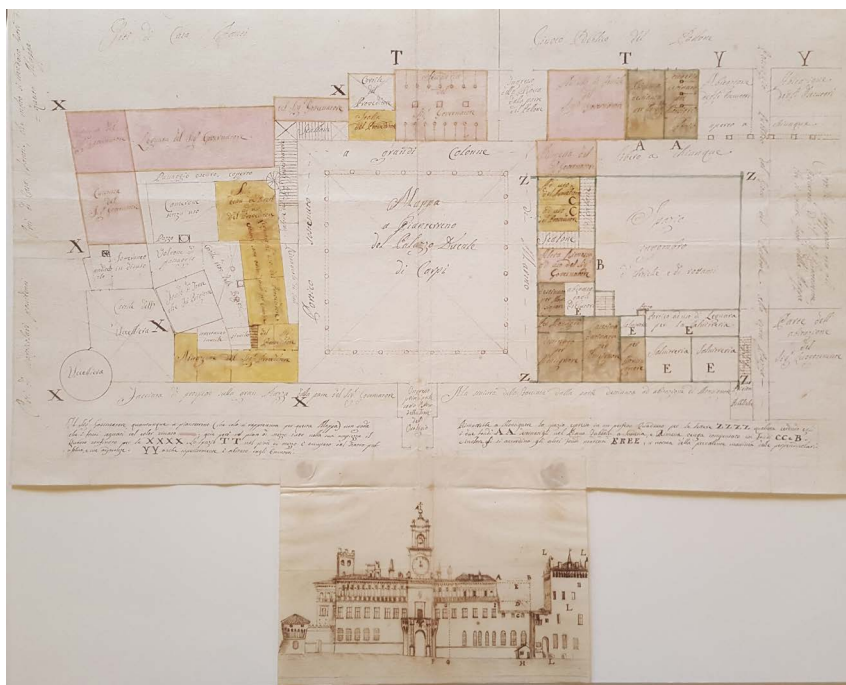


Ill.33 - The area of the Portico del Guerriero today.

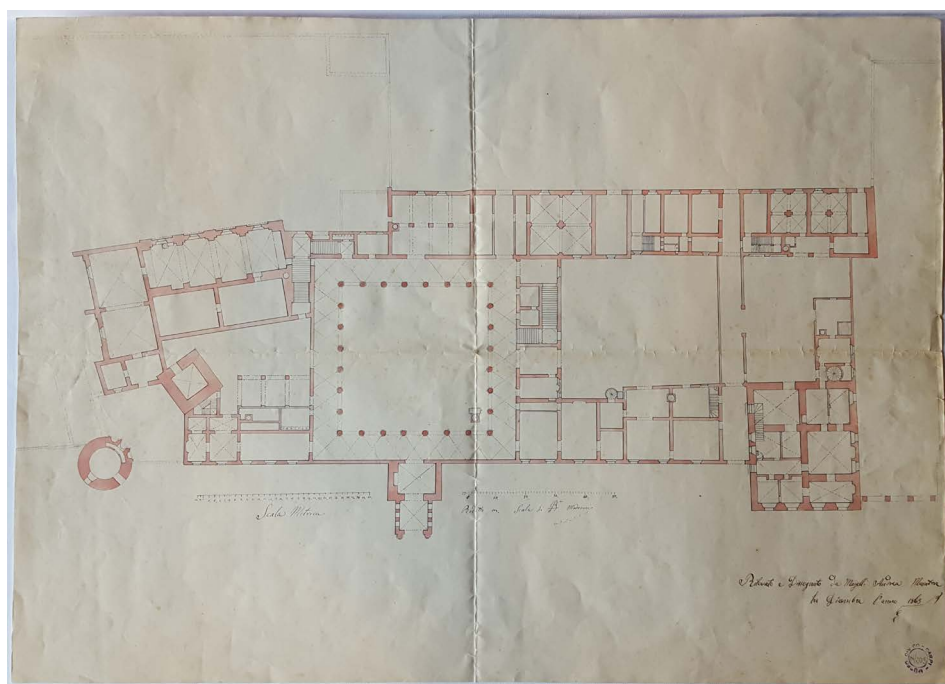


III.34 - Axonometric views of the area of the Sala del Guerriero between the 15th and 16th centuries.

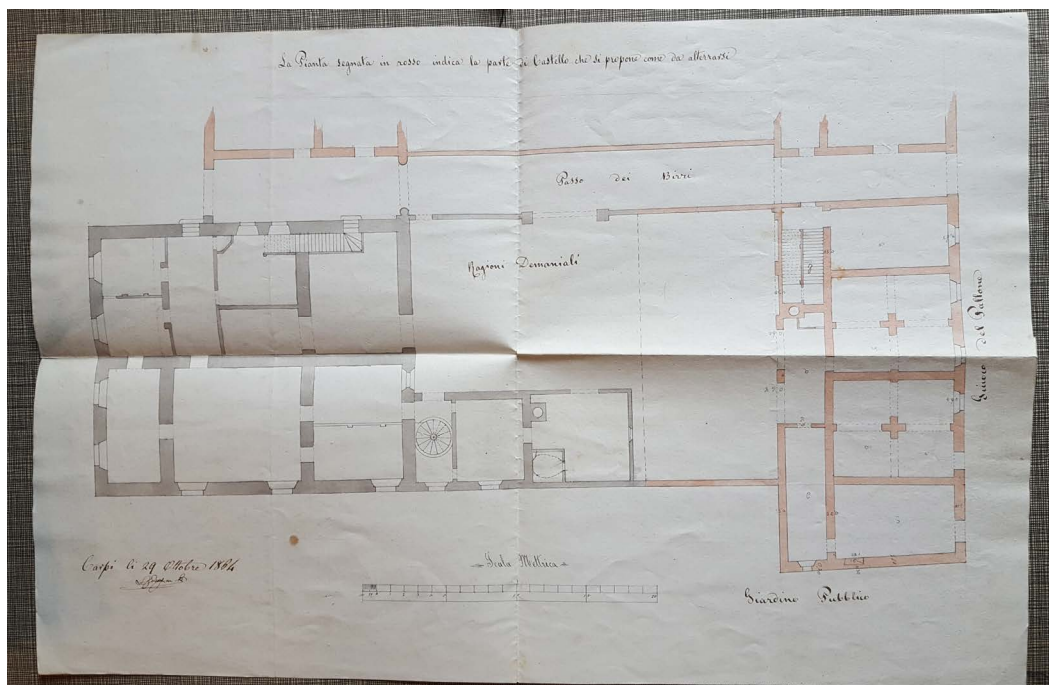
Worksheets



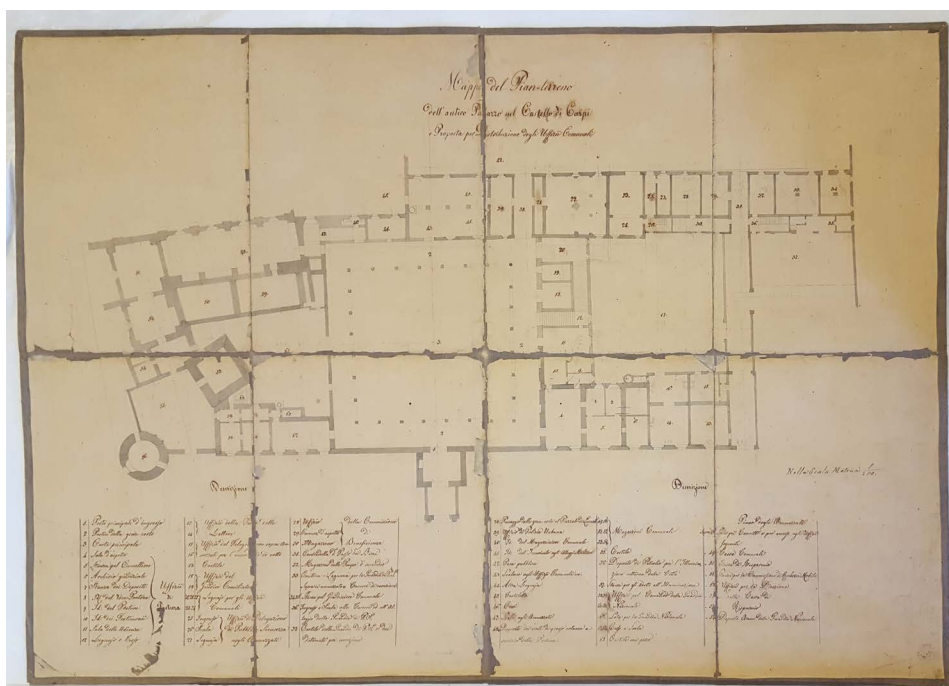
A.1: Plan of the Ground Floor of the Ducal Palace in Carpi, Drawing of the main Façade, 1779, Modena, Archivio di Stato, Cassa Segreta Nuova, b. 748, n. 38147.



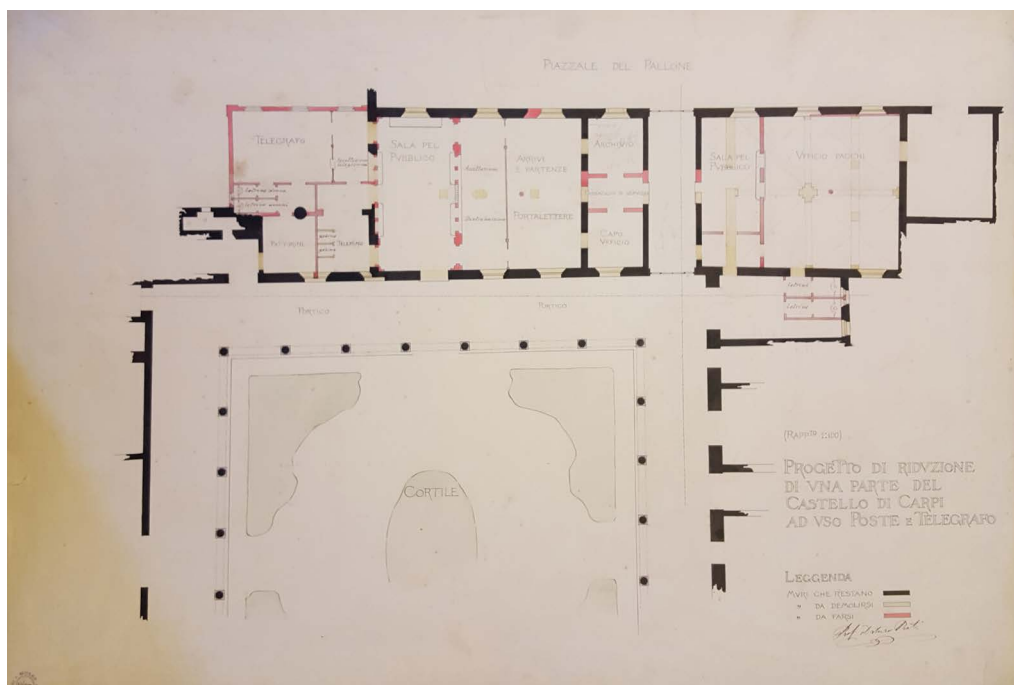
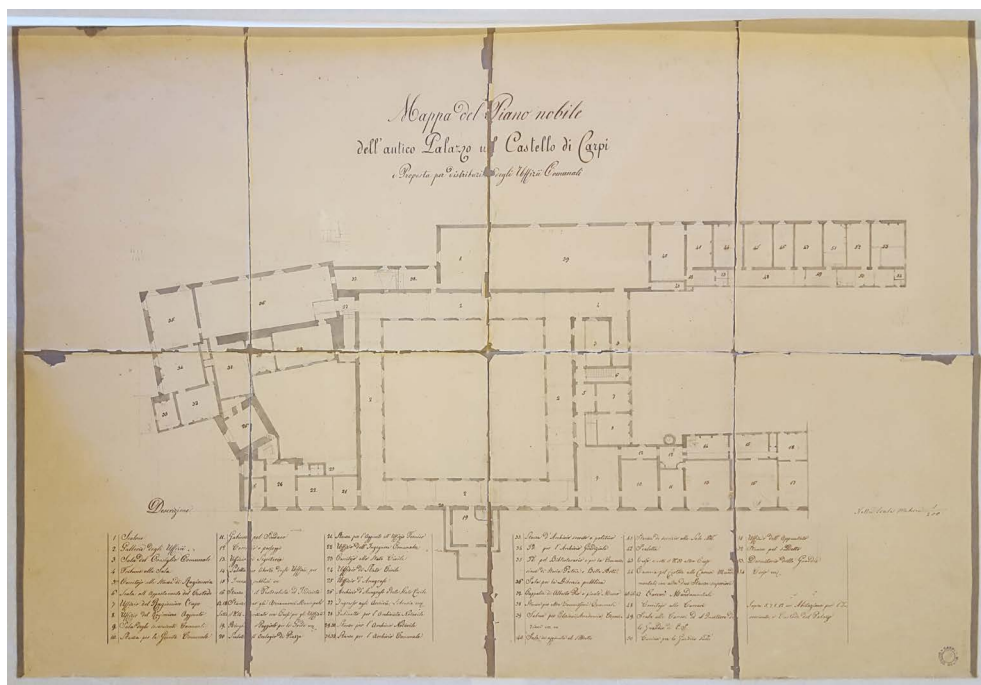
A.2: Andrea Mazelli, Ground floor plan of the Palazzo dei Pio in Carpi, 1863, Carpi, Musei di Palazzo dei Pio, N 205.

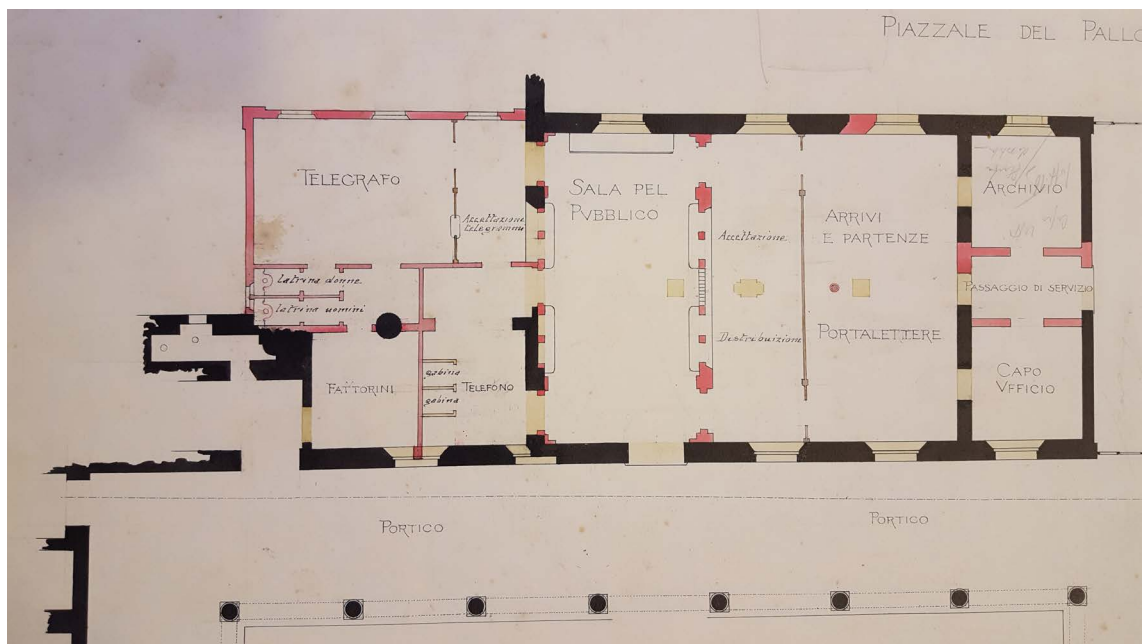


A.3: Luigi Firgini (?), *Ground floor plan of the Torrione and of the Roccavecchia*, Carpi, Archivio Storico Comunale, Filze in Evidenza, 31, n. 345, fasc. 51.

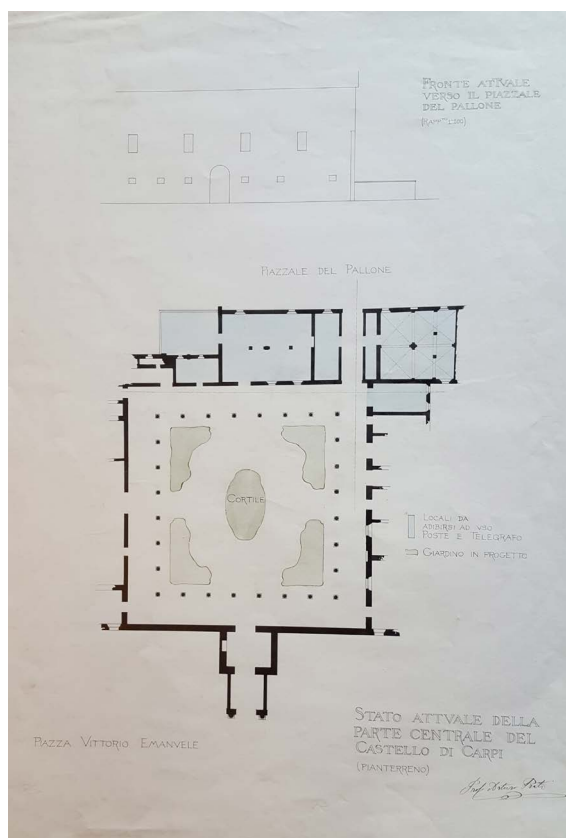


A.4: *Mappa del Pian-terreno dell'antico Palazzo nel Castello di Carpi e Proposta per Distribuzione degli uffizii Comunali*, 1874, Carpi, Musei di Palazzo dei Pio, N 203.

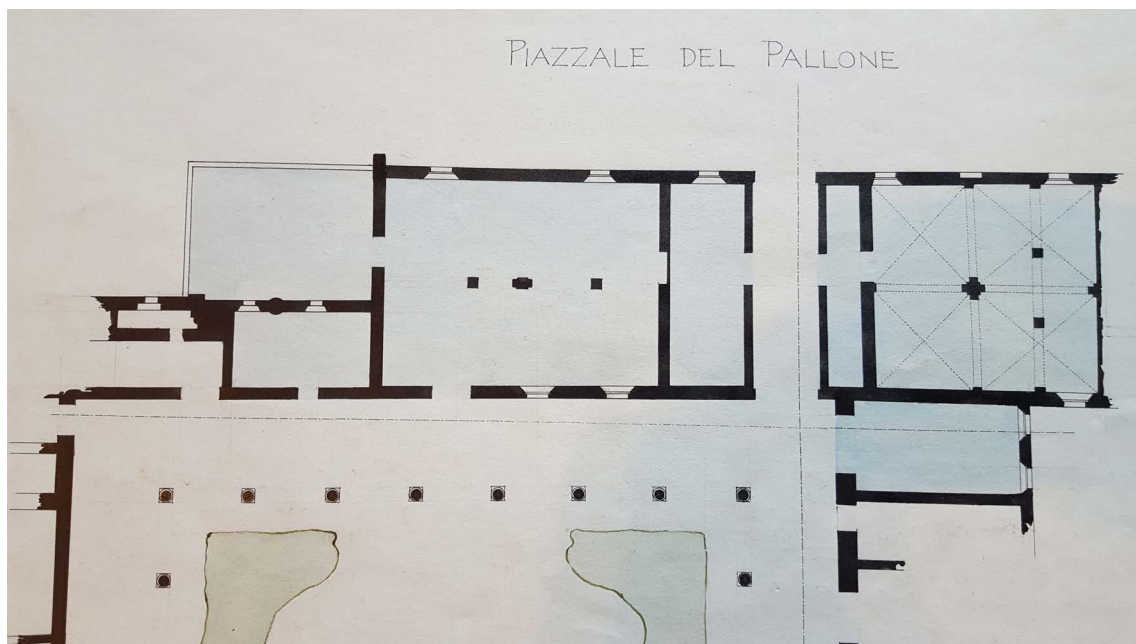




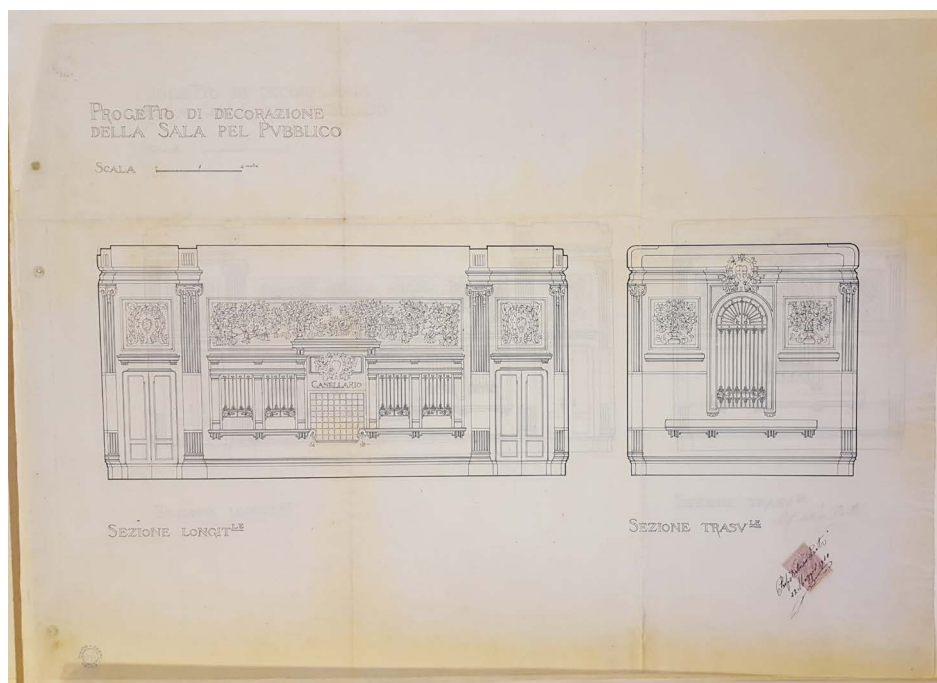
A.6b: Arturo Prati, *Progetto di riduzione di una parte del Castello di Carpi ad uso Poste e Telegrafo*, 1910, Carpi, Musei di Palazzo dei Pio, N 190, detail.



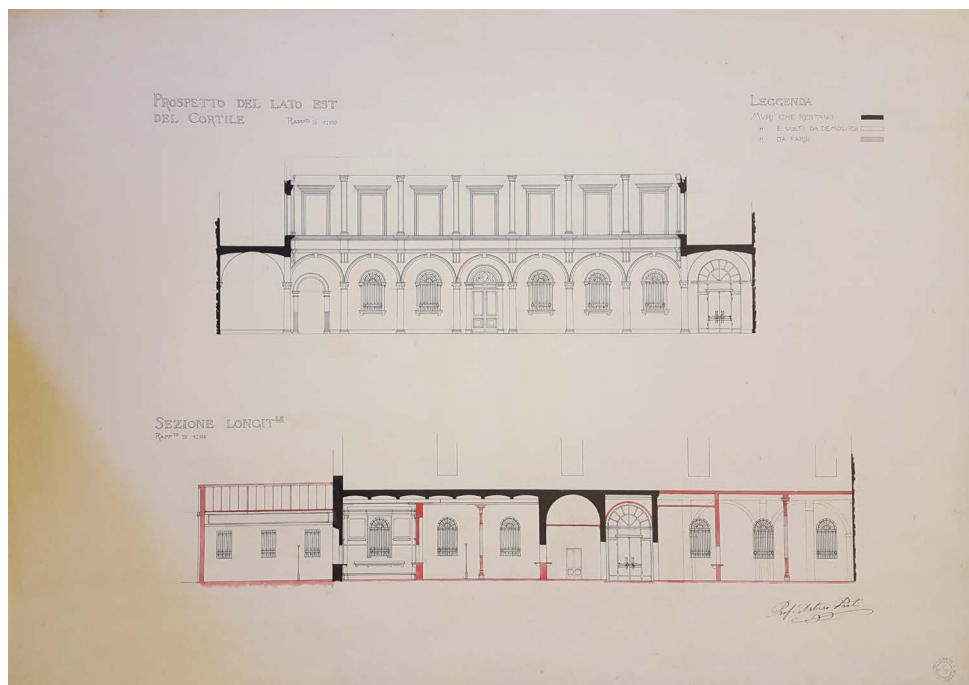
A.7a: Arturo Prati, *Fronte attuale verso il piazzale del Pallone, Stato attuale della parte centrale del castello di Carpi (pianterreno)*, 1911, Carpi, Musei di Palazzo dei Pio, N 191.



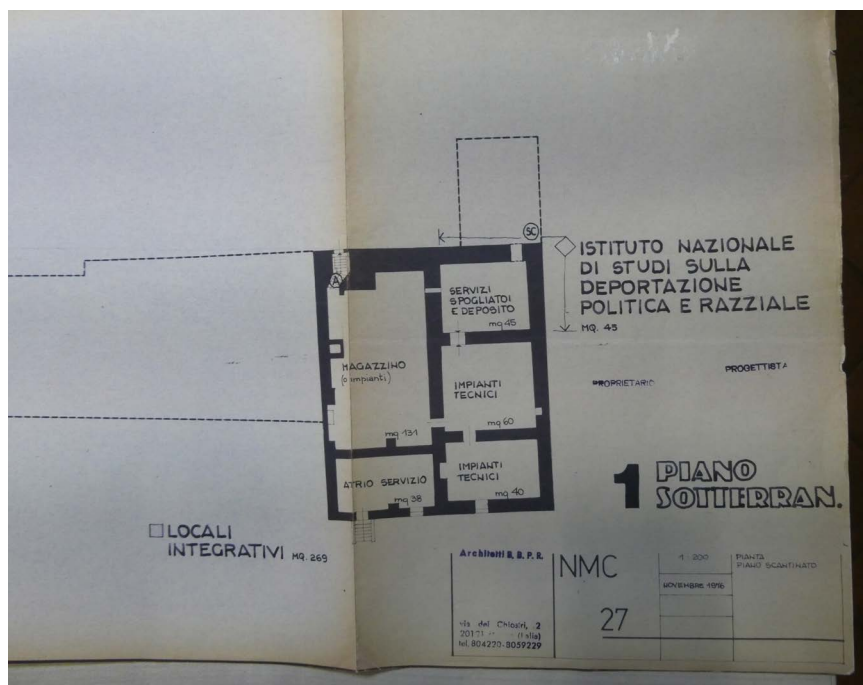
A.7b: Arturo Prati, *Fronte attuale verso il piazzale del Pallone, Stato attuale della parte centrale del castello di Carpi (pianterreno)*, 1911, Carpi, Musei di Palazzo dei Pio, N 191.



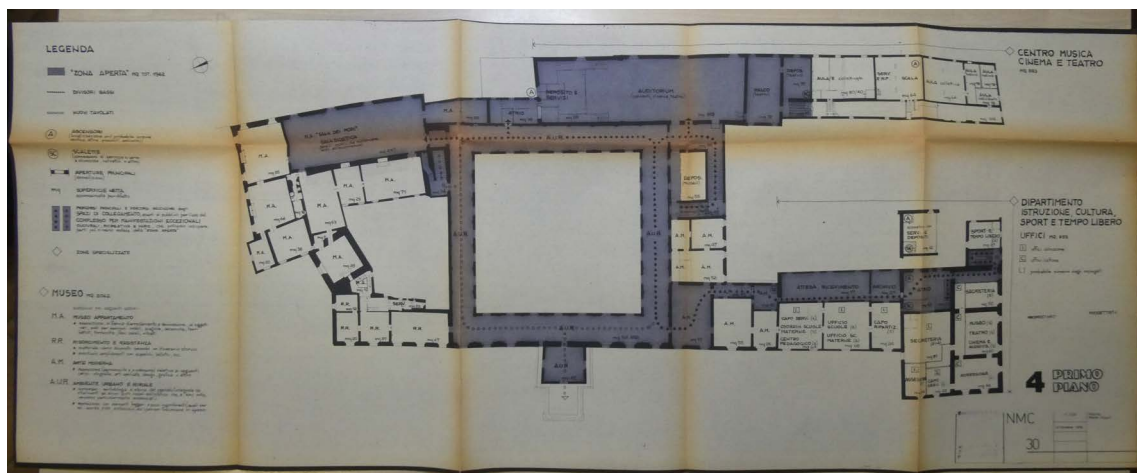
A.8: Arturo Prati, *Progetto di decorazione della sala del pubblico*, 1911, Carpi, Musei di Palazzo dei Pio, N 192.



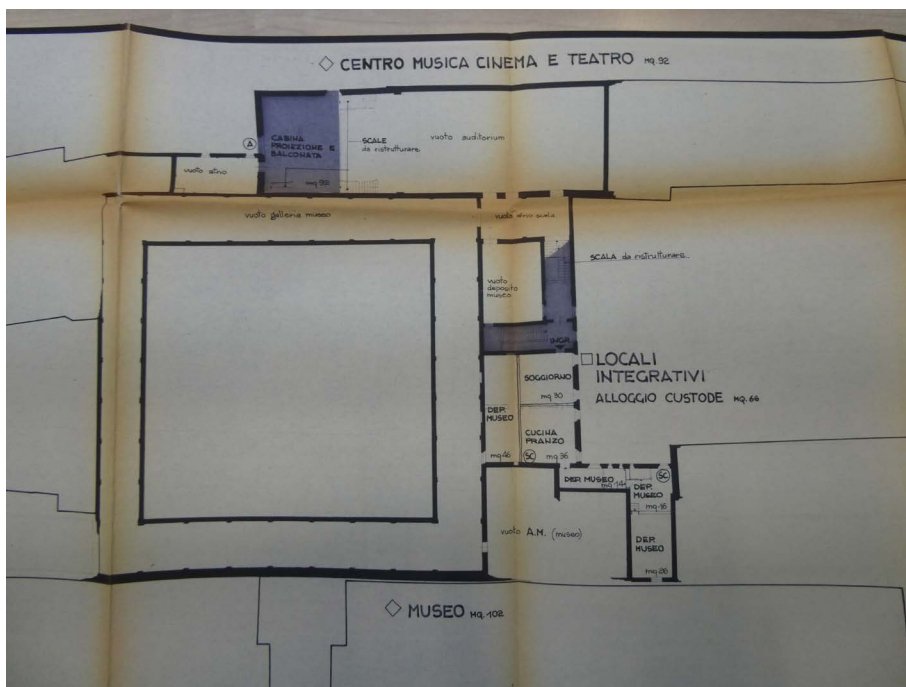
A.9: Arturo Prati, *Prospetto del lato est del cortile. Sezione longitudinale*, 1911, Carpi, Musei di Palazzo dei Pio, N 193.



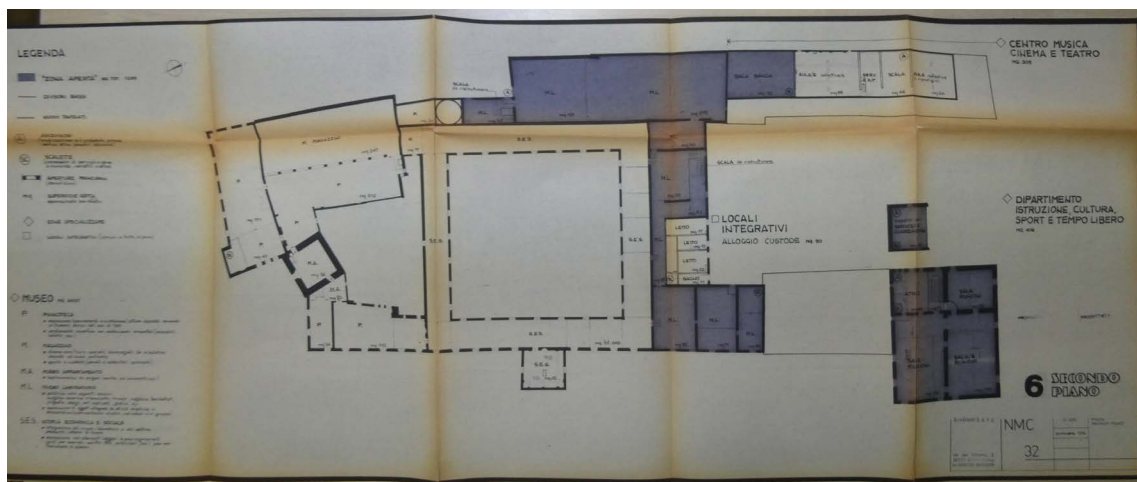
A.10.1: Architects B.B.P.R., *Project of reorganization of the Palazzo dei Pio, 1, plan of the Basement*, 1976, Carpi, Archivio Storico Comunale, detail.



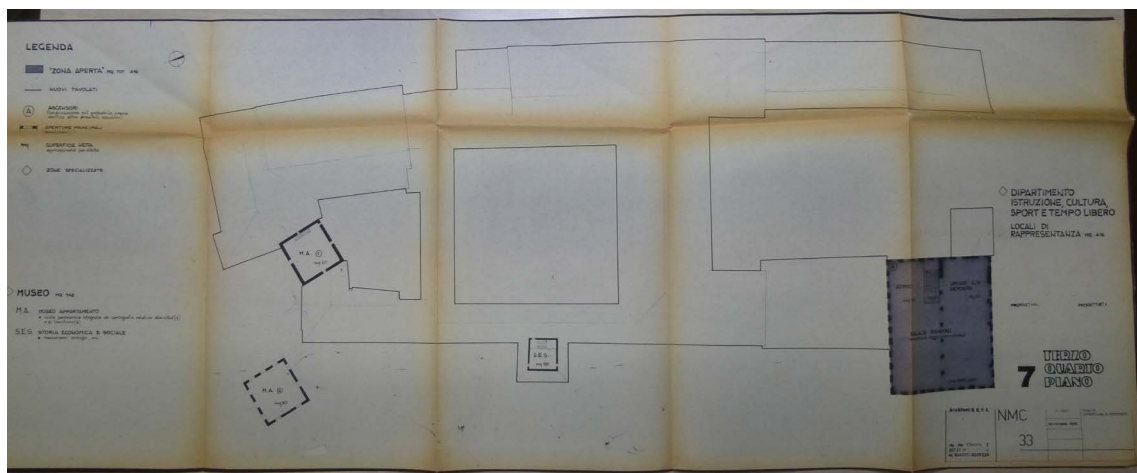
A.10.4: Architects B.B.P.R., *Project of reorganization of the Palazzo dei Pio, 2, First floor plan*, 1976, Carpi, Archivio Storico Comunale.



A.10.5: Architects B.B.P.R., *Project of reorganization of the Palazzo dei Pio, 2, Second Mezzanine floor plan*, 1976, Carpi, Archivio Storico Comunale, detail.



A.10.6: Architects B.B.P.R., *Project of reorganization of the Palazzo dei Pio, 2, Second floor plan, 1976*, Carpi, Archivio Storico Comunale.



A.10.7: Architects B.B.P.R., *Project of reorganization of the Palazzo dei Pio, 2, Third and fourth floors plans, 1976*, Carpi, Archivio Storico Comunale.

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