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SCIentific RESearch and Information Technology
Ricerca Scientifica e Tecnologie dell'Informazione
Vol 15, Issue 1 (2025), 1-16
e-ISSN 2239-4303, DOI 10.2423/i22394303v15n1p1

CASPUR-CIBER Publishing, http://www.sciresit.it

CULTURAL LANDSCAPING: DIGITAL RECONSTRUCTIONS FROM ARCHIVAL DOCUMENTS OF THE ROME SLAUGHTERHOUSE PROJECT IN THE 19TH CENTURY

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Abstract

This work presents digital reconstructions for the cultural landscaping of project proposals for the slaughterhouse in Rome during the 19th century, located near Piazza del Popolo. It was demolished in 1886, leaving no visible traces in the current urban landscape. It was then rebuilt in the Testaccio district in 1888, incorporating parts of structures from the original facility. Some archival drawings illustrate an evolutionary process in the organization of the complex. Consequently, 3D modeling, regarded as an interpretative cognitive model, enables the verification of graphic information by relating it to a 3D digital space and restoring the identity memory of intangible cultural heritage and historical technological processes.

Keywords

3D modeling, intangible cultural heritage, unbuilt architecture, industrial archaeology, archives, Rome

1. *Introduction*

This contribution proposes some digital reconstructions to define the cultural landscapes offered by the projects for the expansion of the slaughterhouse in Rome (*ammazzatora*) in the first location of Piazza del Popolo and the second in the district of Testaccio. It uses 3D modeling techniques and starts from a selection of drawings pertaining to different institutions[1].

The plant examined in Piazza del Popolo has been destroyed and is no longer detectable in the current urban landscape. As explained below, we also compare the solutions used for buildings intended for the *pelanda*, considering different historical economic conditions. The goal is to propose epistemological models of industrial architecture from the second half of the nineteenth century, linked to the application of health standards and the city's governance, as well as to recover a memory that is no longer visible.

The history of the slaughterhouse in Rome is not an isolated case. Still, it represents an emblematic example of the urban transformations of the nineteenth century since its development is part of a broader process of adaptations, new installations, and industrialization that will lead to the realization of Mattazione Public Establishments in many Italian cities. By analyzing the process and returning to the constructive design phases, we return to the progressive architectural and engineering culture path for defining typological, structural, sanitary, and architectural criteria.

The first *ammazzatoi* were built in Paris following the Napoleonic Decree of 1811 concerning the reorganization of markets and slaughterhouses (Racheli, 1978, pp.13-16). In Rome, however, the construction was approved by a decree issued on 29 May 1824 under the pontificate of Leo XII. The structure became part of the municipality in 1848. Its location had been chosen near the vaccine market at Porta del Popolo, but after several adaptations and implementations, it was moved to the Testaccio district in 1888. The structure of the *pelanda* of Piazza del Popolo was dismantled in its constituent elements and rebuilt in the new complex in 1888 (Figs. 1-2)(Ersoch, 1891).

The design invariants of these places were consolidated at the end of the nineteenth century when it became clear that spaces exclusively for slaughter were needed. Previously, beccherie

[1] The archives are Archivio Storico Capitolino, Ersoch Fund of Florence, Ersoch Fund of Rome.

served as both slaughter sites and meat outlets, a practice still widespread in the 1820s.

A key moment in the history of the Roman slaughterhouse is marked by the intervention of Gioacchino Ersoch (1815-1902), a prominent figure in the development of the architectural complex. He was a student of G. Valadier (1872-1839) and served as an assistant to G.B. Martinetti (1764-1830) in the accommodation until 1825. From the 1850s onward, he designed solutions in response to the municipality's requests until 1891, when the works at Testaccio were completed (Ersoch, 1891).

Fig. 1: T. Falcetti, Plastico di Roma, 1822-1826. Plaster and wood. Preserved at the Museum of Rome (Photo by autor).

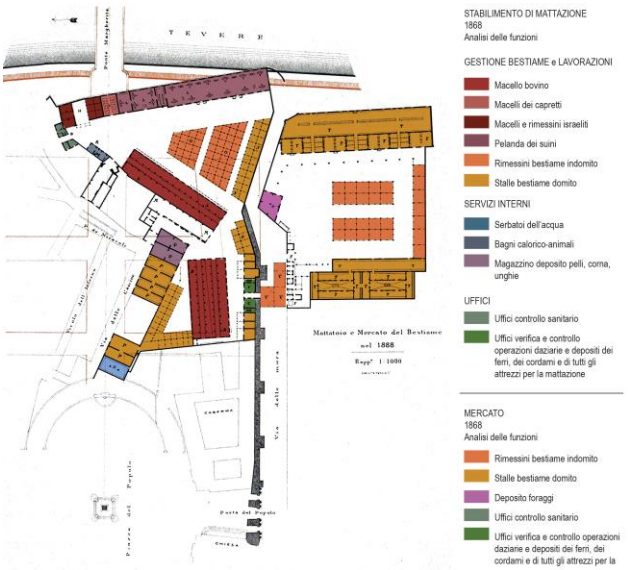

Fig. 2: 2D reinterpretation of G. Ersoch's print drawing of the project for the complex at Piazza del Popolo in its last layout of 1888.

From a philological and historical perspective, it is possible to identify several successive design phases by combining the fragmented nature of the information in the archive drawings. Numerous historians have discussed the analysis of drawings and documentary sources [Racheli, 1978; Tirincanti, 1975; Terenzi, 1989-1990; Perego, 1993; Stemperini 2009a; 2010b; Cremona, Crescentini, Pentiricci, Ronchetti 2014], but no 3D reconstruction has been created to verify the graphic content of the images. The drawings examined date between 1825 and 1888, some of which have never been published, and their graphic technique and medium distinguish them. Some include a graphic scale in Roman palms, while others use a metric or double scale.

The dimensional analysis has allowed the author to reconsider some dates attributed to the drawings, considering that in Rome, the decimal metric system entered compulsory use 1861 in the Regno d'Italia (but several years passed before the real and concrete application). Therefore, the drawings in meters can be dated beyond this date and not before.

The 3D models identified the different stages of project design. They considered pencil minutes, final watercolors, construction drawings, and printed images for dissemination (summaries of previous processes and project evolution).

The following study of the drawings' contents, with the help of digital tools for two-dimensional and three-dimensional reconstructions, will allow us to understand the consistency of the changes in the structure located at Piazza del Popolo and the part relocated to Testaccio.

2. *History and graphic narration of the non-existent complex at Piazza del Popolo*

In this paragraph, we describe the phases of the evolution of the Piazza del Popolo complex, considering both the results of iconographic analysis and the contributions of architectural historians [Cremona, Crescentini, Pentiricci, Ronchetti 2014].

The need to consolidate the slaughter business in a single location in Rome emerged following the Napoleonic Decree of 1811. The physical model (Fig.1) by T. Falcetti[2] illustrates the layout of a new facility designed to collect the city's *beccherie*[3]

[2] T. Falcetti, Plastico di Roma, 1822-1826. Plaster and wood. Preserved at the Museum of Rome.

[3] Tommaso Falcetti, with the supervision of his uncle G. Valadier began the layout of this part of the city reporting the project of the beccherie proposed by Valadier and attested in the drawings present at the National Institute of Archaeology and Art History. The drawings are *Beccheria da farsi prossima alla Piazza del Popolo, occupando anche il Sito del ricovero delle legna da lavoro. S.d.* with graphic scale in

near Porta del Popolo. This facility spans an area extending to the Tiber River, part of the *Legnara Publica.*

With the drawings of Valadier from 1822, the design reflects a desire to create a comprehensive system dedicated to the slaughter and sale of meat, adhering to a regular grid formed by the dimensions of the cells and courtyards, which are organized according to routes linked to access points from the city (toward Piazza del Popolo and the nearby Port of Ripetta by A. Specchi). The system, however, employs a non-modern approach compared to other European countries, as it imposes a typology of the complex that is fragmented into individual elements rather than in gallery environments, which can be quickly inspected and controlled from an economic and health perspective.

In 1824, under the pontificate of Leo XII, the Chirograph of 29 May sanctioned the construction of a public slaughterhouse in Rome. The project is entrusted to the architect G. B. Martinetti, a member of the Art Council and inspector of waters and roads, who in 1825 proposed a structure around the project of the *beccherie* of G. Valadier, near the Aurelian Walls and the Tiber[4].

The Martinetti complex features offices designated for managing commercial operations, two slaughterhouses (one newly constructed and one repurposed from a former barn), stables for housing livestock, and a small health office located at the main entrance on Via Ripetta. Surrounding the walls are shelters for the resilient livestock, complete with wooden structures and masonry mangers. A drawing by L. Poletti (Giornale, 1826) illustrates the front of the slaughterhouses, which helps define the volumetric model proposed later.

Additionally, a drawing is attributed to G. Ersoch (n.d.) and found in the Ersoch fund of Florence, which is currently under inventory. The author interprets this as a survey drawing from the 1850s or 1860s, featuring the building for buffalo (for Israelites) highlighted in pink (to be built color). This image confirms the shape and layout of the project designed initially by Martinetti (depicted in black), which in the subsequent drawing, also attributed to Ersoch and dated by A. Racheli to 1860 (Fig. 3), incorporates new information, such as the additional buildings of the *pelanda* along the Tiber, a distinct buffalo slaughterhouse, and thermal baths for animals with an entrance to the city.

New access to the city was also envisioned between 1850 and 1868 (Figs. 4, 5). Nevertheless, despite these advancements, the slaughtering of pigs, sheep, and buffaloes continues to take place in private facilities, posing a significant unresolved hygiene issue.

In 1868, the municipal administration centralized all meat processing in the public slaughterhouse. G. Ersoch is commissioned to design an extension that will include specialized slaughterhouses (for Israelite cattle, kids, and pigs), a barn, stables, premises for the destruction of infected meat, and facilities for the thermal treatment of animals.

Ersoch details every aspect of the project, from the materials used (marble for the cladding, wood for the covers, iron for the columns) to accessories such as railings, benches, and drainage systems. The extension, realized in 1869, also includes new stables and warehouses around the *Legnara Publica* on the Tiber and was configured between 1886 (the year of demolition of the building of the pelanda because of the construction of the Bridge Margherita) and 1888, as shown in Fig. 2.

In March 1872, a project for a new plant in the Testaccio district was presented to the City Council [Cremona, Crescentini, Pentiricci, Ronchetti 2014, p.102]. With the Master Plan of 1873, curated by Alessandro Viviani, a new slaughterhouse between Monte Testaccio and the Aurelian Walls is planned to be built. In 1878, the location appears in the drawings of Viviani for the PRG of 1883, which then establishes the criteria for the choice of location: proximity to the railway Rome-Civitavecchia, to the Port of Ripa Grande and the Tiber. In 1888, G. Ersoch, Director of the Edility and Architecture Division of the City of Rome, began work on the new Testaccio slaughterhouse intended to replace the existing one in Piazza del Popolo.

Roman palms and Pianta Generale del Fabricato incontro la Chiesa di Santa Maria del Popolo, Semiciclo della Piazza ampliata, a similitudine dell'altro incontro e nuova Beccaria verso il Tevere. Tutto il colorito nero indica le Fabriche esistenti, il colorito rosso il Fabricato da farsi, come nel seguente.

[4] Ersoch reports an area size of 13,241.80 square meters, of which 3,650 square meters covered by buildings. It is assumed that these measurements were converted at the time of writing the text, since in 1825 was in use the architectural metrology referring to the Roman palm, as attested by the original drawings of the Ersoch Fund of Florence.

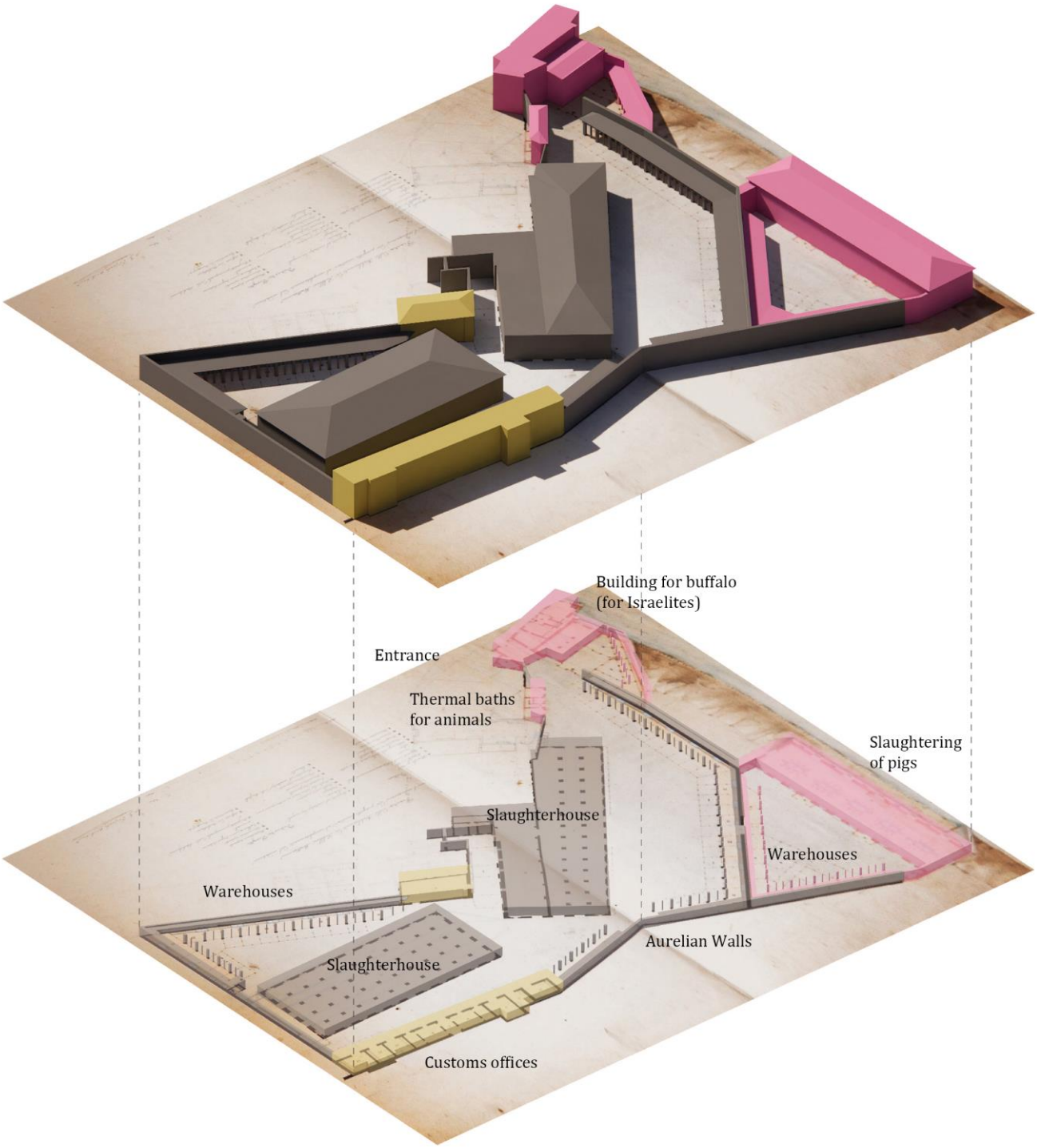

Fig. 3: 3D Modeling elaborated on the G. Ersoch's drawing (date post 1861).

The new plant covers 106,664 square meters and is divided into two sections: the slaughterhouse (50,858 square meters) and the Campo Boario (55,786 square meters). Marotti, Frontini, and Geisser are responsible for the construction, with Carlo Tonelli as supervisor. Engineer Pietro Fumaroli curates the ironworks.

The distribution of spaces is designed to ensure hygiene and surveillance. The slaughterhouses are organized with a gallery system, which is more efficient than the previous cell system. The most problematic functions are located at the edges of the complex to facilitate access from outside. The project also includes a

building for water tanks and a structure to raise water from the Tiber.

The works began in May 1888 with the construction of the *pelanda* using some elements of the building of Piazza del Popolo, followed by tanks, the scales for livestock, the 115-meter filter gallery, and the room for water machines. Campo Boario is equipped with iron racks and divided into two separate areas for livestock tamed and indomitable. The project will also include crossing the Aurelian Walls, a railway station, and other supporting infrastructure.

The official inauguration occurred on 1 December 1891, with some modifications compared to the original project. In 1894, Ersoch drew up a general estimate of the work, which amounted to 7,022,598 lire: 4,042,622 lire for the slaughterhouse and 2,979,976 lire for Campo Boario. This new plant marks a turning point in the management of slaughter in Rome, improving hygiene and efficiency of the sector.

The articulated history of the object of study still today has some aspects that are not clearly interpreted. For this reason, in this context, we focus on the installation of the Piazza del Popolo, going down in detail some solutions for the articulation of the whole and the entrances and the solution of the building of the pelanda, which will then be partly moved to Testaccio. The connection with the livestock market, which developed during the nineteenth century, as shown in Fig. 2, has not been examined here.

3. *The digital reconstruction of evolutionary hypotheses*

To justify the following work, it is important to highlight that virtual reconstruction is intended as a result of the comparison between the data resulting from the comparative analysis of the iconographic and textual sources and the hypotheses of the development of the preceding ones in three-dimensional scope, in a space that requires qualitative and quantitative control. The literature on this methodological approach and the role of digital reconstructions for knowledge is extensive and always up to date [Apollonio, 2024, pp. 70-80; Frommel, Apollonio, Gaiani, Bertacchi 2020, pp. 53-66; Pfarr-Harfs 2020, pp. 19-30; Farroni, Faienza, 2024; Farroni, Faienza, Mancini, 2022, pp.39-50; Farroni, Rinalduzzi, 2016, pp. .36-47; Farroni, 2024, pp. 134-144; Palestini, 2024, pp. 166-174].

An important part of the research was the selection of drawings on which to reconstruct the 3D models to represent the considerations made and the verifications.

The following drawings were chosen to articulate a narrative that considers the innovative approach of the choices made from 1825 to the 1888 plant [Domenichini, Tonicello, 2004]:

- the planimetric drawing of G. Ersoch, attributed by the author after 1863 and constituting the basis of the volumetric model of Fig 3;
- the two drawings by G. Ersoch of the entrance towards the city (towards Ripetta and the port). The first in the portal shows the date of 1860; the second is dated between 1868 and 1869 (Figs. 4,5);

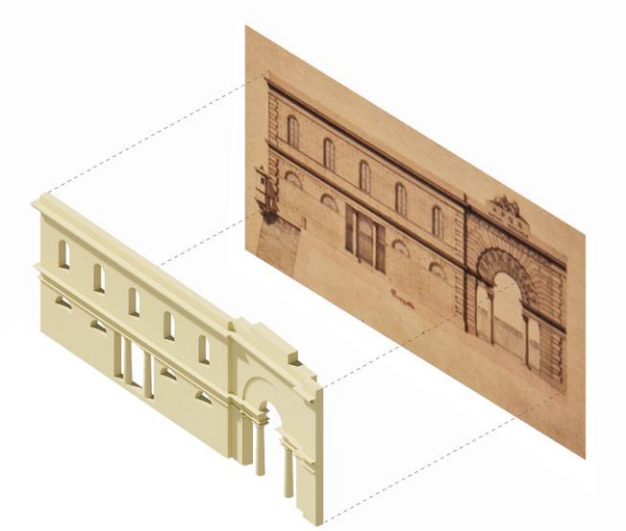

Fig. 4: First proposal of entrance to the complex and 3D model.

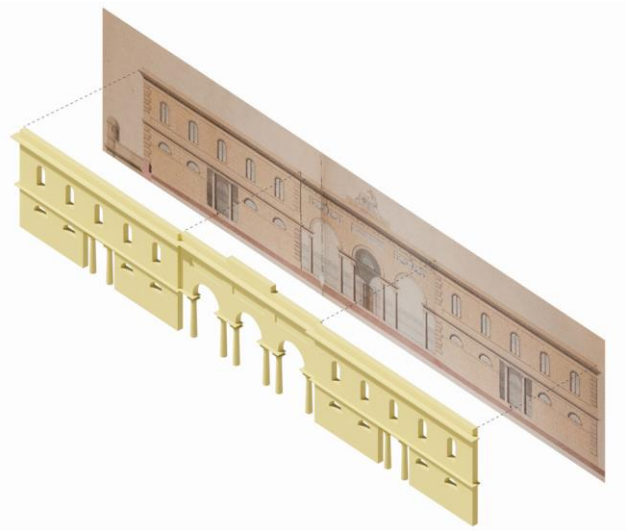

Fig. 5: Second proposal of entrance to the complex and 3D model.

- the design of the New Slaughter of the Buffalos for use by the Israelites in the embankment on the Tiber to the left of the entrance to the public Instrument of Killing, 1861 by G. Ersoch;
- the design by G. Ersoch, *Progetto del Mattatoio e Pelanda dei Maiali nello stabilimento di Pubblica Mattazione. Sistema a vapore.* This drawing is attributed to 1868. It is pencil, ink, and watercolor on paper and has no graphic scale (Fig. 6).
- the minuta of the building of the pelanda - present in the previous drawing - but containing a cross-section that was not present in the watercolor drawing. This last piece of information was helpful in comparison with the cross-section present in another hypothesis of pelanda developed for Piazza del Popolo. The drawing does not have a graphic scale but notes sums attributable to the Roman palms and is pencil on paper (Fig. 7).

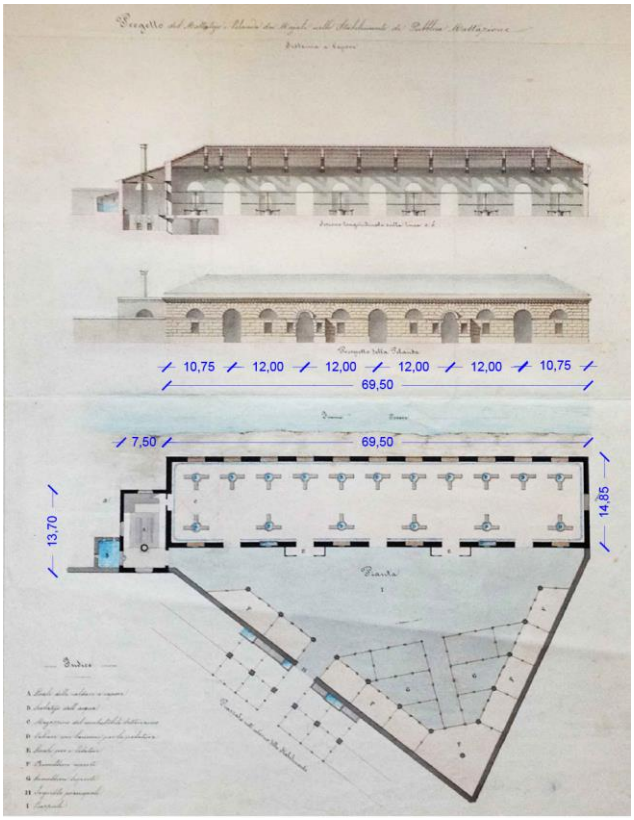

Fig. 6: Drawing of pelanda, by G. Ersoch (Found Ersoch of Florence).

- the cross-section of the pelanda of G. Ersoch, with the control of the difference in height between the complex floor and the Tiber's water. The drawing is annotated dimensionally in meters and appears constructive. The date for the author is after 1668. The drawing has never been published (Fig. 10).
- two cross-sections of the new pelanda of the complex of Testaccio, n.d., but dating from the years 1870/80, pencil on paper, and ink and pencil on paper, by G. Ersoch. These sections show a different degree of detail accuracy, from the general control to the graphical definition of accessory tools (Figg. 13, 14).

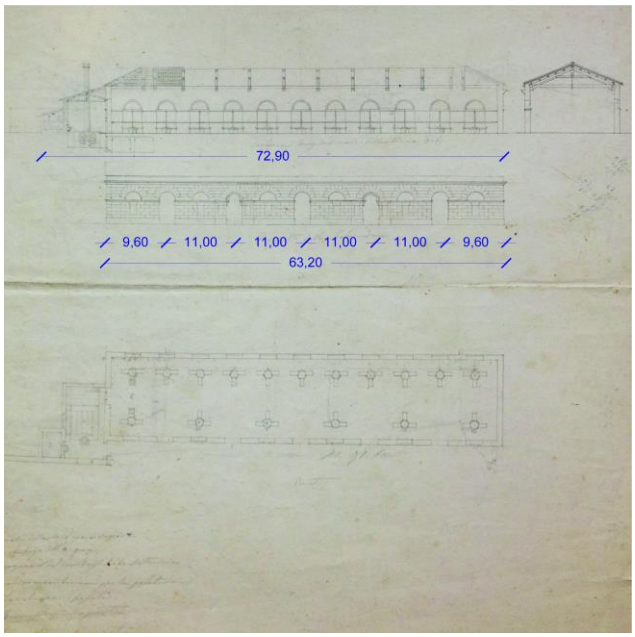

Fig. 7: Drawing of pelanda (minuta) by G. Ersoch (Found Ersoch of Florence).

3.1 Models for the Piazza del Popolo plant: research on the articulation of the complex and the specificity of the building

The purpose of this specific paragraph is to illustrate the application of the philological method which has the aim of giving account of the new descriptive information and the results obtained. The text is a commentary on the images chosen for publication and highlights the notations identified and the checks carried out in the models. The sequence of images is also linked to an order of accessibility of information which has made it possible to interpret primary sources.

The volumetric 3D model shown in Fig. 3 is based on a drawing by G. Ersoch dated by the author after 1863 and is presented with two 3D views related to each other, one with the axonometric section and the other with the volumetric plastic development of buildings. The

intention is to relate the present functions of the activities, their distribution on the part of land considered between the Aurelian walls and the Tiber, and the part of the city towards Ripetta. It is also intended to visualize the consistency of the existing parts and those of G. Ersoch's extension, maintaining the differentiation proposed by the protractor. The grey parts are based on the 1825 Martinetti plant, on which the new pink buildings are mounted. In yellow, the author has indicated the parts dedicated to offices, of which the height was assumed, not being available data except those of some engravings from the mid-nineteenth century[5].

Fig. 8 : Perspective view of 3D Modeling of pelanda.

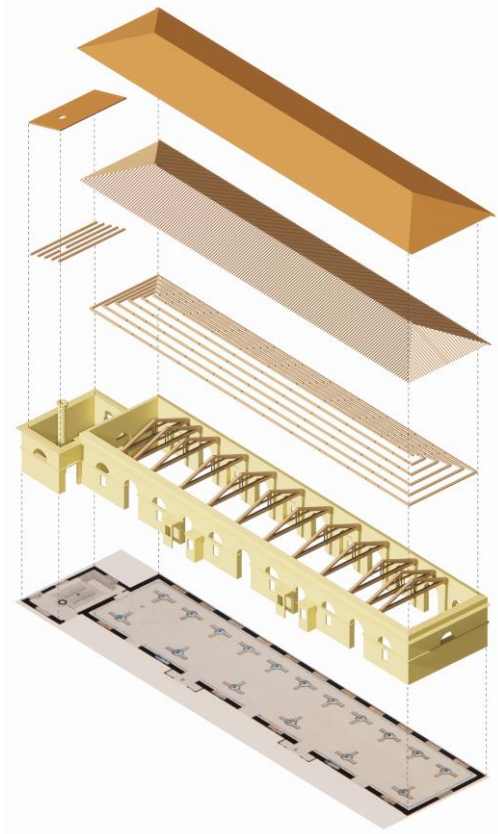

Fig. 9: Axonometric view of the elements of pelanda.

The objective is to represent the organism's plasticity, the topological relation of the forms expressed in the plan, and the connection of the buildings with the routes for the animal journey and the workers in the place. The model related to the plastic of Fig. 1 demonstrates a different design strategy in that it does not impose itself according to axes provided by the surrounding urban fabric but articulates its parts according to spaces between Aurelian walls and river, incorporating a pre-existence barn - slaughter to the walls- and developing a kind of functional collage according to different needs.

The linear modular design of the stalls (stables for indomitable animals) has a connective function. The designer's gaze turns to rationalizing space and functions by controlling access: an entrance to the market (close to the Aurelian walls) and the entrance to the city of Figg. 4,5. Inside the fence, the spaces are well dilated in the alternation open-semi-open-closed, very different from the rigid approach of cells proposed by G. Valadier. To the existing plant (grey), G. Ersoch adds an extension in line with the choices of the predecessor, experimenting with the placement of new functions in places where easy water supply and waste disposal were possible.

The control of the heights of the buildings was done with the already mentioned drawing by L. Poletti, the engraving of 1849[6] , and the drawings of the New Macello delle Bufale for use by the Israelites in the embankment on the Tevere to the left of the entrance to the public by G. Ersoch.

Figs. 4,5 show two hypotheses of entrances to the mattation complex from the city side. The first one is linked to the project proposal presented in the planivolumetrico, posing as a monumental portal according to classical language and a dimensional level that fits little with a type of main entrance. It was characterized by walls, cantons, lunette and serliane to express the architectural style of the time. The same language was also used for the slaughterhouses and the pelanda, which will replace the wooden structures iron. This solution was not implemented.

The second proposal, dated 1868-1869, doubles its architectural-monumental consistency; the front is transformed into a portal with three arches compared to which two bodies of buildings with administrative functions are

[5] Cfr. A. Guesdon, J.Arnout Veduta di Roma da sopra Porta del Popolo, engraving of 1849 (Museo di Roma, Gabinetto Comunale delle Stampe MR4128).

[6] Ibidem.

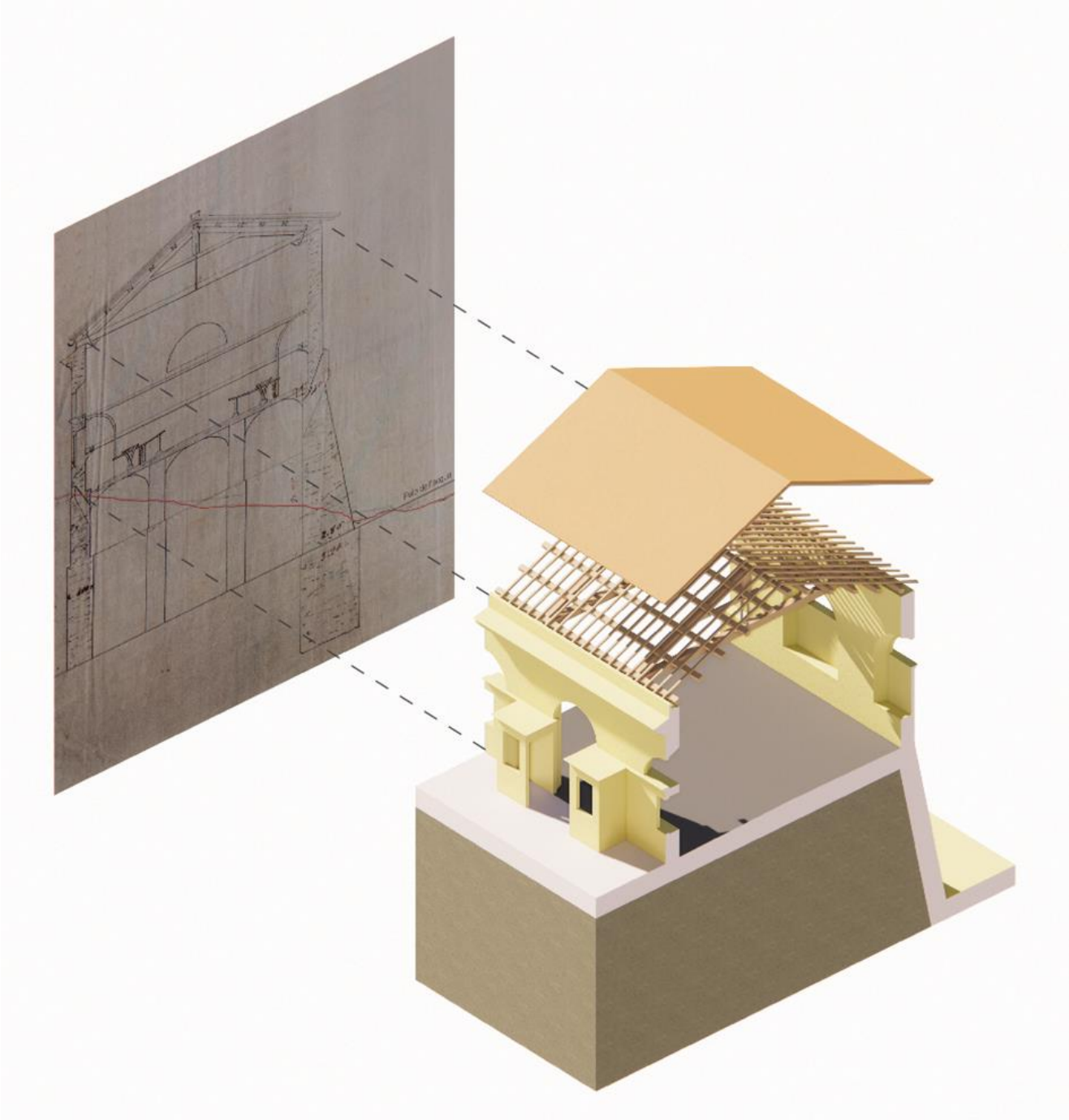

Fig. 10: 3D modeling of pelanda from the second section drawing.

symmetrically developed. The plant has expanded, the quantities of livestock to be slaughtered for demographic needs are increasing, and the economy is growing. This portal, when compared to the current entrance of the former slaughterhouse in Testaccio, appears very similar in size and language[7].

The study of the construction of the *pelanda* was deemed interesting because the drawings offer some reflections. The watercolor image (Fig. 6) presents the plan, the longitudinal section, and the view of a space developed on a single level.

There are 11 openings that alternate between walls and openings. In the pencil drawing (Fig. 7), a cross-section of the same building is depicted.

For the pelanda, there is another section drawing (part of Fig. 11), which is more articulated and accurate, displayed with the metric scale.

[7] You can see the image of the current front online.

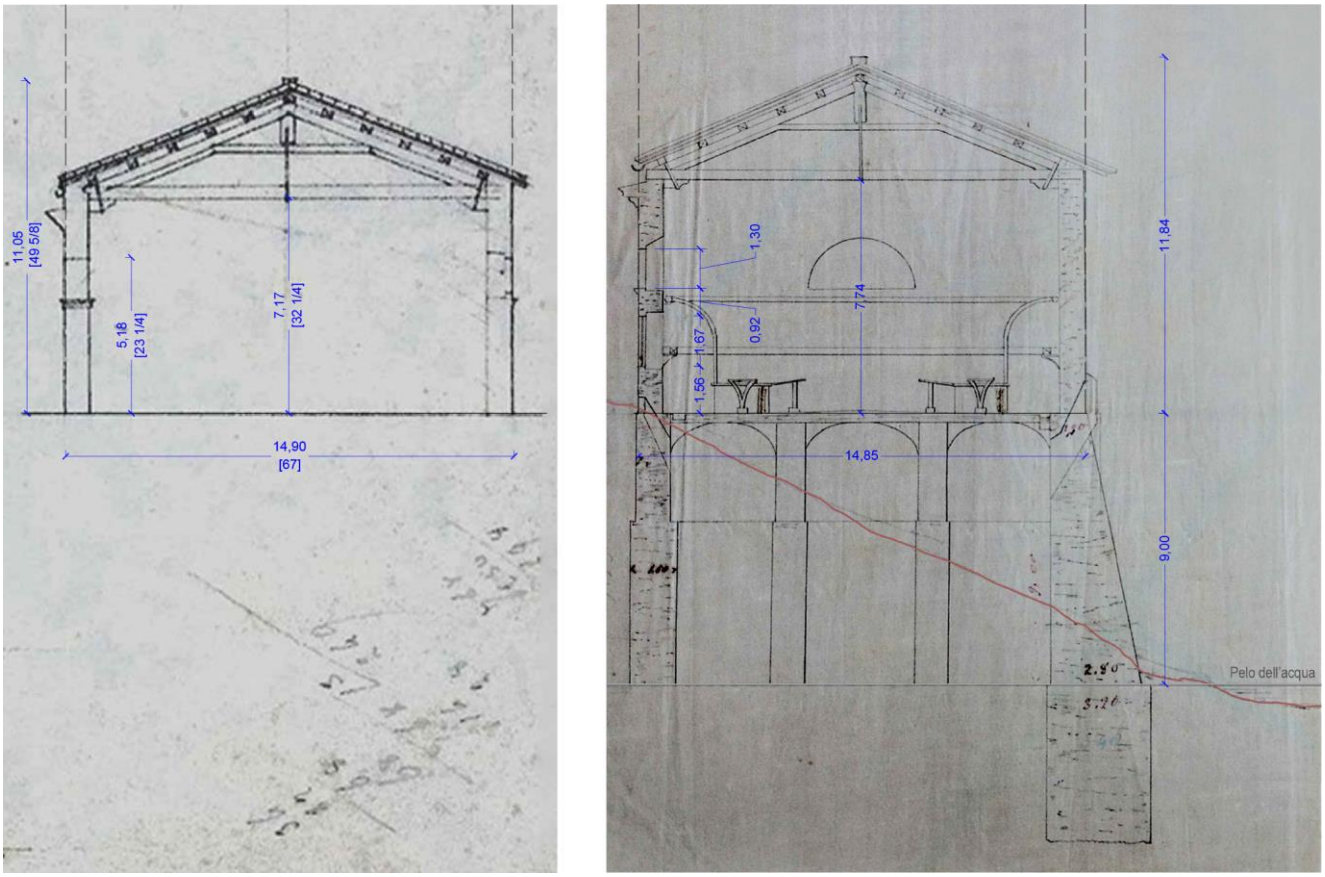

Fig. 11: Comparison between the two cross-sectional drawings by G. Ersoch of the pelanda. Measurements in metres and palms are given.

Regarding the construction of the model of the pelanda from Figs. 6, 7 it is specified that dimensional comparisons have been made and the linear dimensions of the drawing in Fig. 7 have been used because they are assumed to be more informative and reliable than the construction.

This drawing differs from the other in its informative accuracy. It appears to be constructive. In Fig. 11, the two sections are related by a two-dimensional redrawing, and their dimensions in palms and meters are identified.

The proposals seem similar in width, while the most accurate (and for the later author) is at least 80 cm higher. The section that the author defines as constructive develops the same cover with wooden trusses but presents the wall of buttress to support the difference in altitude of 8.00 meters on the Tiber that explains its location in the slaughterhouse, linking it to the proposal of the plant of Fig. 3, but placing it precisely as explicit the state of fact in 1888 represented in Fig. 2.

Figs. 8, 9 are two views of the model created by the section of the minute and its plan and explain the typology classes of the building, which does not consider the actual positioning in the area, presenting the sides on the same tread level. They are, therefore, cognitive models of adaptable design hypotheses, a kind of prototype from which to initiate modifications for concrete realization. Fig. 10 is the cognitive model, instead of the project to be built in the place calculated and defined by G. Ersoch.

Fig. 12: Interior photograph of a pelanda that the author attributes to the complex of Piazza del Popolo.

The section, in fact, presents measurements related to the ground which G. Ersoch had measured through operations of the survey of the

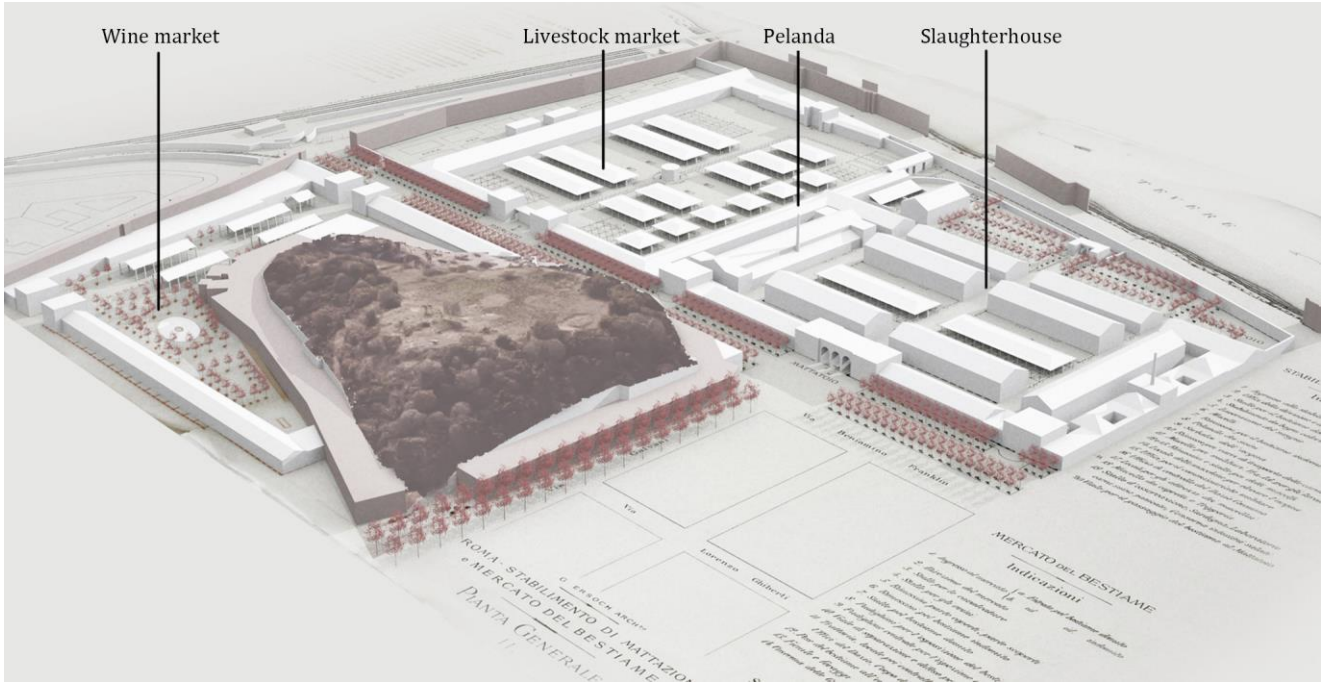

Fig. 13: 3D model of the complex of the new complex in Testaccio elaborated according to its design. The wine market will never be built.

riverbed[8]. In both models, the windows are open without glass to ensure ventilation, and the central room with tanks is accessed through a front that provides entrances with protruding volume accessories. These will also be present in the solutions of Testaccio's *pelanda* (Fig. 16). The model of Fig. 10 represents, therefore, the last arrangement of the actual position, but from the architectural structural point of view, the penultimate solution before the insertion of the elements in iron, which do not result from the documents.

A photograph in the Fondo Ersoch of Florence (Fig. 12), not dated, shows the interior of a pelanda. By studying the arrangement of the holes through the articulation of the 3D models of the pelande in Piazza del Popolo and then in Testaccio, it becomes clear that it refers to the layout of Piazza del Popolo during its last transformation, featuring Poloncau trusses along with vertical and horizontal iron elements for water and steam distribution. In this photograph, the industrial language is clearly established, dating to the late seventies or early eighties of the nineteenth century. This building was demolished between 1886 and 1888 to be rebuilt in Testaccio.

3.2 Reconstruction models for the Testaccio complex: verification of standardization of processes and types of construction

The Testaccio complex is reconstructed to reflect its original form in Fig. 13. Some configurations were modified during the construction period (1888-1891), while others were adapted later. It is

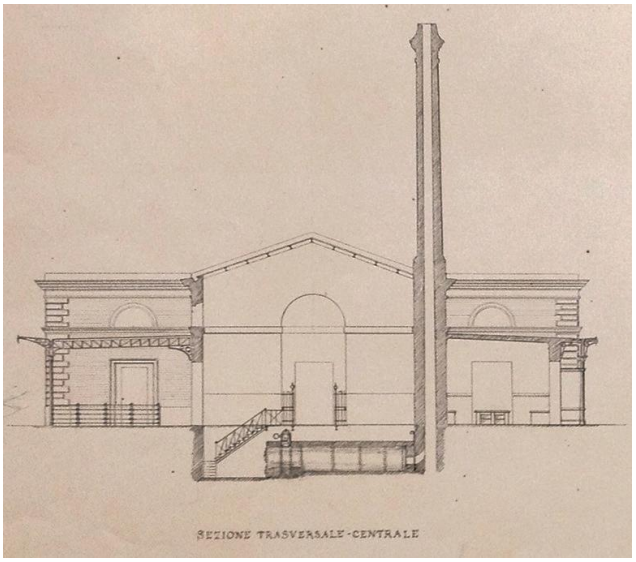

Fig. 14: Pencil drawing by G. Ersoch for the pelanda of Testaccio. Rapp. 1: 100.

[8] In the Ersoch Fund of Florence is a drawing *Icnografia della parte del Tevere fra la Legnara Comunale e il Porto di Ripetta*, metric scale, 1868, ink on paper, 63x89 cm.

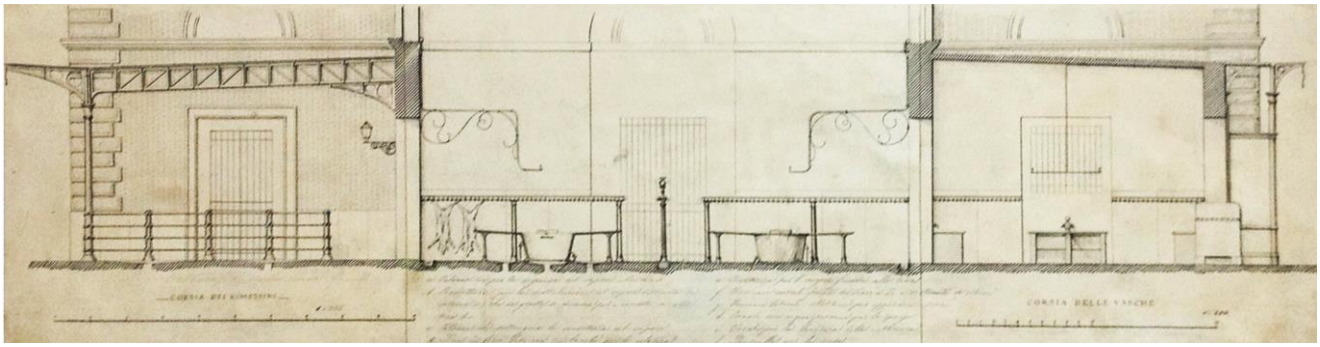

Fig. 15: Executive drawing by G. Ersoch for the pelanda of Testaccio, excerpt.

situated similarly to the area around Piazza del Popolo, near the Aurelian walls, along the left bank of the Tiber River, specifically in the southern quadrant of the city. As previously mentioned, its location stems from the PRG of 1883 and was intended for three distinct purposes: a livestock market, a slaughterhouse, and a wine market surrounding Mount Testaccio, which is located in an area designated for vineyards [Stabile 2024; Farroni, Pallottino, Stabile 2015, pp. 397-407; Farroni, 2013; Farroni, Novello, 2018, 223-233].

From 1919 to 1970, photographic and iconographic documents illustrate the transformations involving significant building interventions between 1909 and 1953.

These include the reconstruction of a stable in 1901, the construction of the Frigorifero building outside the wall in 1911, and the expansion of the complex toward the Tiber River in 1919. In 1924, the Pelanda building was extended and covered by a reinforced concrete shelter, and it was transformed again between 2000 and 2010 with restoration and adaptation into exhibition spaces by the following designers: Massimo Carmassi, Luciano Cupelloni, Studio Ove Arup & Partners, and Antonio Maria Michetti [Stabile 2024; Cupelloni 2001]. In 1932, a cold room and a museum of pathological anatomy were added to the neighborhood's front.

In the post-war period, the large sales hall, Hall 19 of the Ersoch project, was modified and consolidated into a single hall, while the slaughterhouse was connected to the western part of the city with the construction of the Testaccio bridge in 1948.

After discontinuing installations in 1975, the complex was intended for new purposes following heated debates in cultural and political spheres [Franco, 1998]. Today, the restored spaces accommodate the Municipality of Rome, the Department of Architecture of Roma Tre

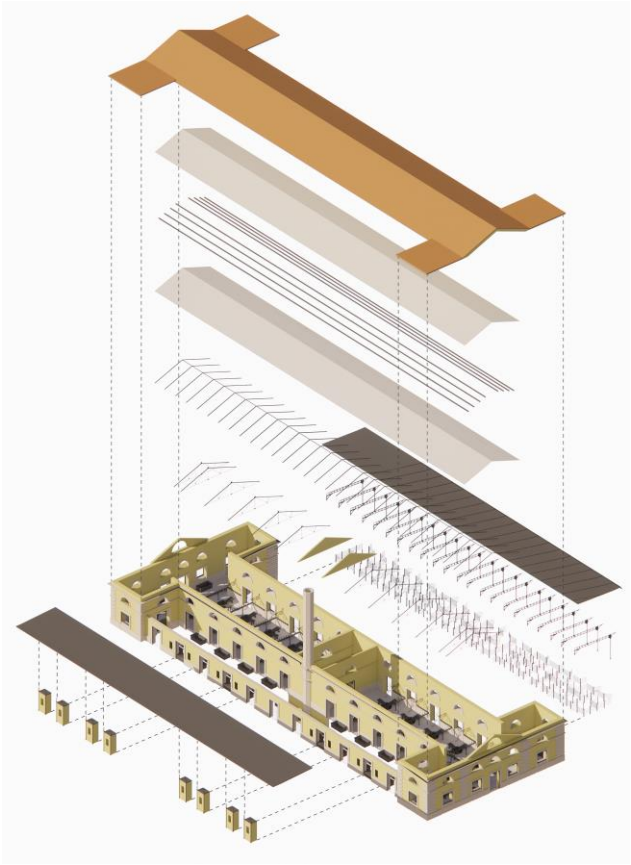

Fig. 16: Axonometric view of the elements of pelanda at Testaccio.

Fig. 17: Perspective view of the pelanda at Testaccio.

Fig. 18: Perspective view of the pelanda at Testaccio.

University, the Academy of Fine Arts, the Popular School of Music in Testaccio, and the Città dell'Altra Economia.

The reconstruction of the volumetric ensemble reveals a mature articulation concerning the dynamic and branching structure of Piazza del Popolo. The model of the complex aims to highlight how the regular orthogonal grid served as a means for distributing architectural structures with various functions while simultaneously shaping a portion of the city's territory and successfully incorporating Monte Testaccio. This reorganization also integrates the ancient wine storage caves and establishes a connection with the Rome-Civitavecchia railway. The use of courtyard-arranged buildings and the central area with parallelepipeds of varying dimensions reflects the layout suggested in Piazza del Popolo. A "city within a city" emerges in the area designated for Rome's industrial development.

The Pelanda building is situated in the southern part of the complex, at the boundary of the market. The drawings presented here originate from the Ersoch archive in Florence (Figs. 13-14) and have never been published. At various graphic scales, they provide multiple layers of information, progressing from an overview of the entire structure (33 meters wide and 92 meters long) to the detailed design of the instrumental apparatus (the original drawing only shows the ground-level section).

The 3D models (Figs. 15-17), reconstructed using information taken from drafts and printed images from G. Ersoch's book (Ersoch, 1891), aim to showcase the technical and construction elements that enabled the design of spaces organized according to the sequence of the industrial process. There are three main areas: the livestock holding pens, where animals are slaughtered; the large vat room, where pig scalding is conducted using steam-heated water; and the tank room, dedicated to washing intestines. These three sections are directly connected, forming a single, extensive complex. The holding pens, located on the southern side of the building, resemble those designed for wild livestock but are smaller in size. Their structure consists of cast iron columns and laminated iron beams.

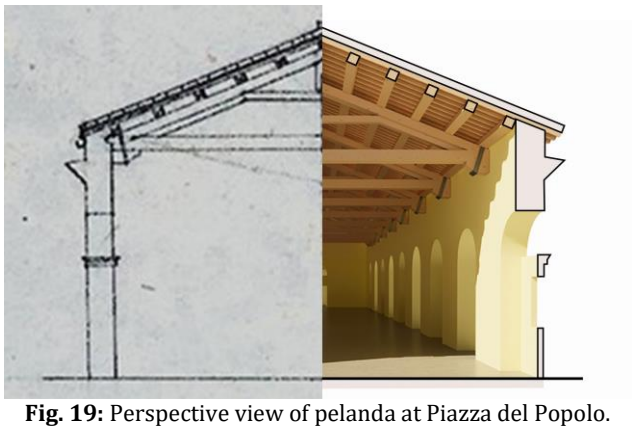

Fig. 19: Perspective view of pelanda at Piazza del Popolo.

The exploded view of the building's components illustrates the innovative technological solutions and their assembly, made possible precisely due to industrial prefabrication. Concepts such as mass production, workshop-

manufactured systems, and components assembled on-site make the narrative of the models simple yet complex, as they represent cutting-edge technological solutions. These models are significant representations of the early adoption of a new construction approach in Rome. For this reason, perhaps today, despite the modifications to the building that have led to the loss of its original identity (as shown in Fig. 17), it has been possible to reimagine its inhabitation—both in its specificity as a component of the complex and in its entirety as a place within the city.

4. Conclusion

As previously mentioned, the interpretations of the drawings, followed by the verification of 2D and 3D digital reconstructions of the design proposals from the nineteenth century—along with the analysis of the final drawings and drafts—enable a scientific visual narrative of what was built and modified over the 19th century in Rome's slaughterhouse complex. This approach also allows for examining a typological model, both at a general level in terms of the distribution system and in defining individual buildings with specific functions.

Additionally, attention is drawn to the impact of transformations on the pre-existing urban fabric through the control of architectural language within the enclosure and its relationship with the city. This is particularly evident in careful study of entrance hypotheses. The research thus attests to the memory of a part of the city that is no longer visible in the contemporary urban fabric, opening new possibilities for research. This could be achieved through in-situ AR applications, raising public awareness and fostering a deeper understanding of historical structures.

From a scientific contribution perspective, the verification of 3D reconstructions has enabled a revised dating of certain images previously analyzed by scholars, allowing for the recognition of the chronological sequence of the design phases. Furthermore, the reconstructions provide an opportunity to unify fragmented information found in various archives related to G. Ersoch and the slaughterhouse complex. The original sources, in fact, are preserved by different institutions. Ultimately, the 3D models serve as reconstructed knowledge models.

If this case study offers various applied approaches for experimental methodologies in the hypothetical reconstruction of buildings, it is based solely on information contained in primary archival sources, which in this case remain unpublished. This contributes to strengthening the speculative theoretical framework that scholars are currently developing.

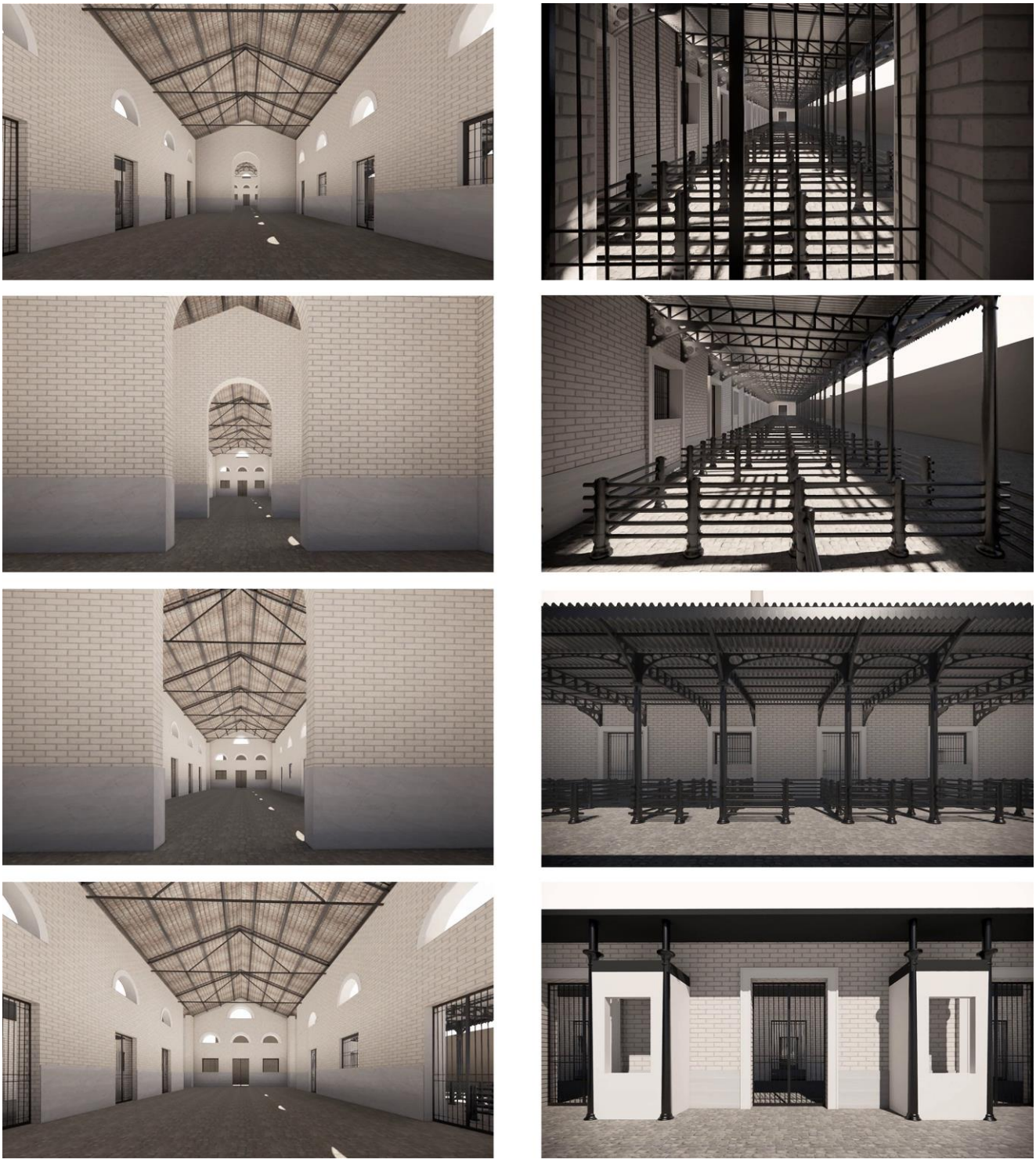

Fig. 20: Sequence of views of the environments of the pelanda di Testaccio in its original configuration.

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