POLITECNICO DI TORINO

Master's Degree Course
in Architecture For the Sustainability Design

Master's Degree Thesis

Brick facades in Turin, 1600-1800:
an introduction

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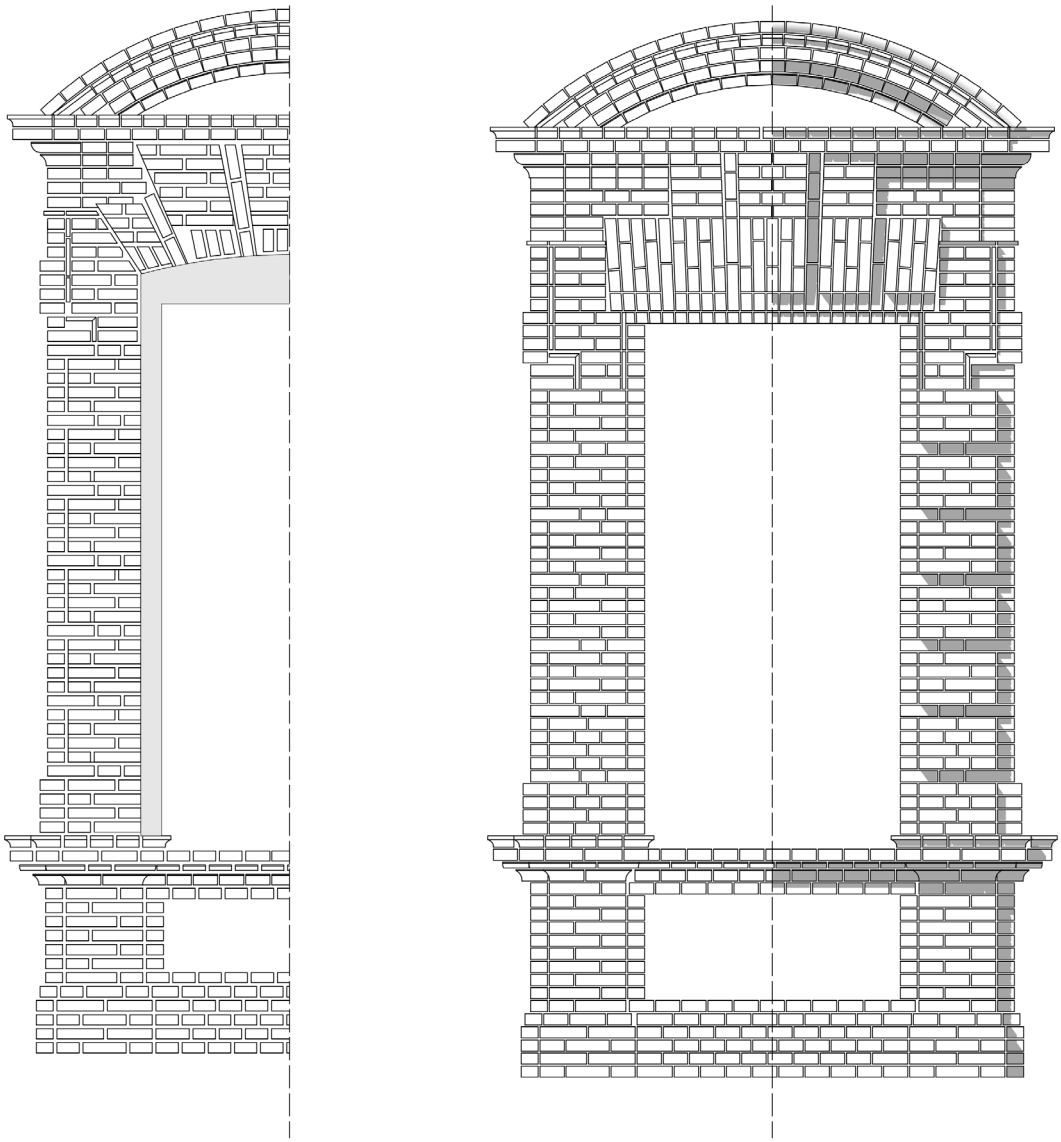

The elevation of the first-level window of the Ospedale di S.Giovanni, drawn by the author

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INTRODUCTION

The purpose of this thesis is to study and represent a general idea of the principles of brickwork of brick facades in early modern Turin, specifically 1600-1800. The thesis is not about the architecture in Turin in the early modern period[1], it is specifically about the brickwork in the construction of the facades. The thesis also does not include a discussion of the symbolic values of architecture in early modern Turin, for example, the Palazzo Madama, Piazza Castello, Palazzo Reale, etc. Elegant and magnificent as they were, most of them don't have an exposed brick façade for us to research into (or used to have but were covered by modern intervention), even though most of them are brick constructions. In this dissertation, seven buildings of early modern Turin from 1600 to 1800 will be the focus of research and discussion, providing readers with a basic explanation of the brickwork of their façades and information for those with interest for further study in this topic.

The thesis will start with a brief introduction to the protagonist of our research - brick in Chapter I, listing some basic rules in the field of bricklaying, and trying to explain why it had been a leading role in Italian architecture history. Then in Chapter II, a brief history of Turin from 1600 to 1800 will be introduced, intended to familiarize readers with the background of the enormous growth of Turin under the sovereigns of the House of Savoy. From Chapter III the focus moves to specific objects, and there will be seven case studies of the brick facades of seven buildings: the ducal villa named "Castello del Valentino", the hospital named "Ospedale Maggiore di San Giovanni Battista", the Baroque palace of the Prince Carignano named "Palazzo Carignano", the academic building named "Collegio dei Nobili", the barracks named "Quartieri Militari", and two churches named "Chiesa di Santa Pelagia" and "Chiesa di San Michele Arcangelo". Then in Chapter IV, the principles of brickwork of these facades are discussed in detail, breaking down to the basic elements of a façade, as well as the non-brick reinforcement system which plays an important role on the brick façade, utilizing illustrations and 3D models. At the end of the thesis will be a short paragraph concluding the main text, accompanied by the tables of the illustrations, the glossary, the bibliography and reference list.

The work that has been done in this thesis proves to be a long and continuous process, especially in the situation of an overgrowing COVID-19 epidemic all over the world in 2020. On-site surveys were carried out carefully at the first stage in the historical center of Turin, by the author with the guidance of Professor. Piccoli. Museums and churches had to be shut down as a result of

[1] In the history of Europe, the early modern period follows the Medieval period. It begins around the Fall of Constantinople in 1453, and includes the Renaissance period, and the Age of Discovery. It includes the discovery of America, and the discovery of the sea route to the East. It ends around the French Revolution in 1789.

the epidemic, and the observation of buildings was left only to the outside, making it more difficult to fully understand the construction of the facades without going into the buildings, even though the main focus of the on-site survey was the brick facades. Another obstacle was the unstable accessibility of books and dissertations. Personal access to libraries was denied due to regulations in response to the epidemic, hence I had to take the new routine: sorting on the Internet, loaning books from the libraries, going through the books for the useful parts and making notes, returning the book to loan another, again and again. This process of on-site surveys and archival reading went on until the end of July when the author decided to go back to China because of family considerations and an internship opportunity. The on-site surveys had to conclude, with enough sketches and photographs taken for the thesis, and so was the research of the books loaned from the libraries. After then the author had to turn to online resources to go on with the archival and bibliographical research. In the second half of writing this thesis, the author was in some ways in a work-study status, working in a local design institute while writing in off-work time. The lack of time and energy made the writing of this thesis difficult at first, however, with the understanding and help of the institute, the author was able to spare time and carry on with further research and writing.

The distant work on an architectural thesis, especially a historical one, is an undoubtful difficulty, especially for someone with little experience in academic writing in historical topics. However, with the help of Prof. Piccoli, the institute, and friends of the author, the long and continuous project that had spanned over half a year finally came to a result that almost meets the original expectations for this dissertation.

I would like to express my gratitude to Prof. Piccoli, who trusted me to work with him on this interesting topic of architectural history, supports me from basic historical knowledge to an advanced methodology of observation into the historical building, and to the skills to academic writing throughout the process of realizing this thesis. I would also like to thank my friends: Ye Xingting and Li Bowen, who helped me with access to bibliographical resources, and Wilhelm Yang, who gave me lots of advice on academic writing. I would also like to thank my supervisor of the institute: Pan Lei, who generously offered me amounts of off-work time for the realization of my thesis, as well as my preparations for graduation. Without any of this help, the completion of this thesis would never be possible.

CHAPTER I
Brick

1.1 Introduction to brick

"Architecture starts when you carefully put two bricks together. There it begins." As is said by the master architect Ludwig Mies van der Rohe, when we talk about architecture, we cannot neglect the most basic element of it throughout its history- brick.

> *"Brick is one of the oldest building materials and its story starts at the very beginning of the history of civilization. The mud brick was invented between 10000 and 8000 BC; the moulded brick was developed later, in Mesopotamia about 5000 BC. But the most significant landmark was the invention of the fired brick in about 3500 BC. It was this that enabled the construction of permanent structures in areas where it had not been previously possible. Firing the brick gave it the resilience of stone but with the added advantages that it could be more easily shaped and provide potentially endless exact repetitions of decorative patterns. With the subsequent development of glazes it became possible not only to make rich ornament in brick, but also to produce it in vivid colors."* [1]

The first step to appreciating one object of architecture is to understand how it was made. With brick, the observation is divided into two aspects - the brick itself and the object produced from it. These are two distinct manufacturing processes of brick: making and laying. Both of them may be done at the same place, but they are rarely done by the same person [2]. However, this thesis is determined to focus on the art of laying bricks, and the issues in the use of them.

The brick is one of the first examples of standardization in architecture and has changed little in size since the middle ages. The width of a common brick is usually determined by the size of the bricklayer's hand, for the bricklayer to hold it with one hand. The length then will be regulated by the geometry of bonding and the necessary joints, giving a dimension of just over twice the width. The remaining dimension, the depth (or height), has fewer restrictions. It is partly limited by weight and

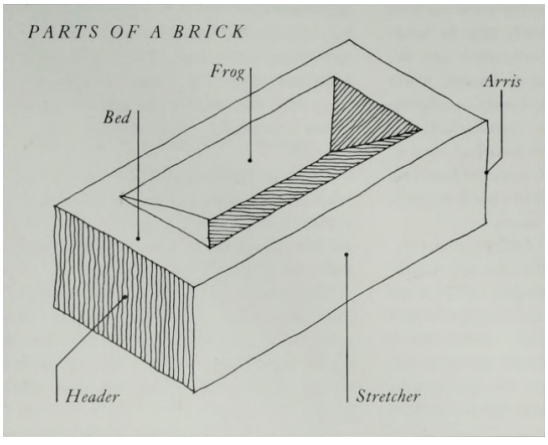

Fig.1 Names of parts of a brick (Andrew Plumridge, Wim Meulenkamp, Brickwork: architecture and design. New York: Harry. N, Abrams, 1993. p.164)

[1] James W. P. Campbell, *Brick: A World History* (London: Thames & Hudson, 2016), 13
[2] For more knowledge on the making of bricks, see: Campbell, *Brick*, 14-20
Andrew Plumridge, Wim Meulenkamp, *Brickwork: architecture and design* (New York: Harry. N, Abrams, 1993), 161-169

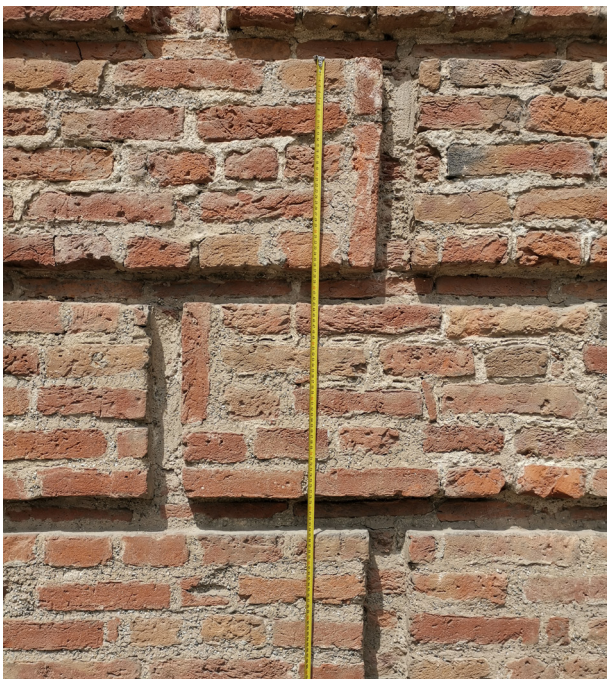

Fig.2 A part of the facade of Castello del Valentino, displaying the standard bricks used in the construction of the 17th-century facade.

Fig.3 A part of the facade of Castello del Valentino, displaying the window pediment and cornice with special bricks used in the construction of the 19th-century facade

partly by the fact that with some clays, a great thickness will cause difficulties in the drying process.[3]

To understand the principle of brickwork, one must have a general idea of the classification of bricks. Bricks suitable for one purpose may not be suitable for another. They are, therefore, classified according to either their intended use, physical appearance or quality.

Standard brick: They are sufficiently strong to enable them to support a normal load. In addition, they have the most regular shape and a moderate price so that to be used largely over a project.[4] In our case, the width of the standard brick used for the seven buildings ranges from 110mm to 130mm (very rare) according to different facades, and the length is mostly from 240mm to 250mm. The depth remains strictly regular among different facades, giving it 55mm for one type and 60mm for another.

Special brick: Bricks of special shape or size for forming features or construction details that cannot be built from standard bricks without cutting them. Most special bricks are defined as "Standard specials" because they are produced by most brickyards as standard items available.[5] The obvious examples are the Single Bullnose and Plinth Stretcher mostly used at the windows and cornices of the facades.[6] There is another type of special brick that has to be produced to order,

[3] Gerard Lynch, *Brickwork: History, Technology and Practice* (London: Donhead Publishing Ltd, 1994), 89-92
[4] Andrew Plumridge, Wim Meulenkamp. *Brickwork: architecture and design* (New York: Harry. N, Abrams, 1993), 171
[5] Ibid.
[6] For more examples of "Standard Special" bricks, see Fig.116 in Glossary

usually on-site, used for just the building it is dedicated to. The Palazzo Carignano is full of this type of special bricks, mostly due to its aesthetic requirements.

Bricklayers seek to lay bricks in a way that results in the strongest wall possible. The term bonding describes the various patterns created by the alternation of headers and stretchers. A wall built by simply stacking bricks one on top of another with a series of continuous vertical joints would be unstable. Unity and rigidity are obtained by overlapping one brick on another so that each brick is supported by at least two bricks below it. There are many different types of bonds, the most common of which are illustrated in the glossary at the end of the thesis.[7]

[7] For further information about bond types, see: Gerard Lynch. *Brickwork: History, Technology and Practice* (London: Donhead Publishing Ltd, 1994), 217-226

1.2 Brick use in Italy and Turin

"The adoption of constructive and decorative materials, especially brick, in various places and times throughout the history of architecture, depends upon geological much more than artistic or historical considerations. Wherever the development of human civilization has taken place in great river valleys there has arisen an architecture in brick, made possible by the alluvial deposits. When, however, the centers of government and the consequent building activities have been in the vicinity of mountains or rocky formations, the ease of securing the natural material for construction has led to stone architecture." (Carlo Roccatelli, Enrico Verdozzi, Gerhardt C Mars. Brickwork in Italy: a brief review from ancient to modern times (Chicago: American Face Brick Assoc.,1925), p. XI)

This phenomenon is reflected in an alternate distribution of zones of brick and stone architecture in Italy. Brick is widely used in the valley of the Po from Piedmont to the sea-coast regions on the Adriatic. In these areas, the bricks came from the numerous yards located in the valley zones. It also led to an interesting fact that in the areas mentioned above, the forms and the decorations characteristic of stone were often imitated in brick, and sometimes in terracotta, where the transportation of the more expensive materials was practically impossible.[8]

This type of brick use as an imitation of stone was widely found in architecture during the seventeenth and eighteenth centuries following the Renaissance. There are significant examples of this phenomenon in the architecture of Borromini[9] in Rome (the Oratorio dei Filippini for example, see Fig.6); or on the facades of seventeenth-century Piedmont architecture in Turin, Mondovi, Asti, etc., where brick is used in the massive elements like ornaments, quoins and windows (the Duomo di Carignano for example, see Fig.5). [10]

In the expansion of Turin exposed brick had been used by architects a lot. It was used prominently for two kinds of construction, the cladding of the fortification and the buildings of the ducal family. Guarino Guarini[11], a talented architect of the Baroque period, adapted this vernacular principle to higher levels of architectural language. He demonstrated that exposed brick could be sculptured into forms resembling the orders of classical architecture, which was perfectly displayed in the Palazzo Carignano, designed by him, as well in the Collegio dei Nobili (the two buildings will be discussed in detail in the next chapters). In the construction of private residences, exposed brick

[8] Carlo Roccatelli, Enrico Verdozzi, Gerhardt C Mars. *Brickwork in Italy: a brief review from ancient to modern times* (Chicago: American Face Brick Assoc.,1925),XI-XIX.
[9] Francesco Borromini (25 September 1599-2 August 1667) was an Italian architect born in the modern Swiss canton of Ticino who, with his contemporaries Gian Lorenzo Bernini and Pietro da Cortona, was a leading figure in the emergence of Roman Baroque architecture.
[10] Roccatelli, etc., *Brickwork in Italy*, XV-XVI
[11] Guarino Guarini (17 January 1624 – 6 March 1683) was an Italian architect of the Piedmontese Baroque, active in Turin as well as Sicily, France, and Portugal. He was an architect, priest, mathematician, and theologian whose designs and books on architecture made him a major source for later Baroque architects in central Europe and northern Italy.

Fig.4 The Palazzo Farnese, Piacenza, featuring a elaborate brick facade with quoin at the corner. (image from liberta.it)

Fig.5 The curvilinear brick facade of the Duomo di Carignano, featuring brick engaged columns and pilasters. (image from wikipedia under "Carignano")

Fig.6 The brick facade and tower of the Oratorio dei Filippini, Rome. (image from wikiwand.com under "Oratorio dei Filippini")

was rarely used, which made the ducal buildings and fortifications stand out in the city fabric. There were probably several reasons for the prevailing use of exposed brick according to Martha D.Pollak in her book. Neither did Turin have marble quarries in its vicinity, nor was the local stone of good quality. Meanwhile, granite and travertine were not of steady production, which drove brick to be the prominent building material for the building façade. Even if the occasional use of brick may have been construed as a sign of poverty, since it means lack of stone or means of transporting them, brick evoked associations with other powerful dynasties: it had been used in the sixteenth century in the construction of urban palaces in Rome, Parma, and Piacenza by the Farnese (for example, the Palazzo Farnese in Piacenza, see Fig.4). The Savoy and the Farnese had overlapping artistic and military interests, which made brick the optimal choice for the presentation of absolute power in the construction of Savoy buildings.[12]

As is written by Pollak:

The extensive and unabashed use of brick celebrated the victory over the initial poverty

[12] Martha D. Pollak, *Turin 1564-1680: urban design, military culture, and the creation of the absolutist capital* (University of Chicago Press, 1991), 237

of building materials, and the resolute severity of the local architectural language. It represented the paradoxical admixture of the unbending pride and consequent lavishness of the military spirit, and the alpine frugality that imbued the character of the dukes of Savoy. Finally, the parallel promoted between the ducal palaces and the fortifications through the use of identical finishes was intended to demonstrate that ideologically the dukes of Savoy were one with the defenses of their own. (Martha D. Pollak, Turin 1564-1680: urban design, military culture, and the creation of the absolutist capital (University of Chicago Press, 1991), p. 238)

CHAPTER II
Turin in the early modern period

The beginning as a capital

Turin's urban development in the early modern period is largely conditioned by the House of Savoy from its arrival to Turin and nomination of Turin as the capital of the Duchy. Before the arrival of Emanuele Filiberto[1], Turin was a modest settlement that had preserved its castrum form. Founded c.30 B.C. under Augustus as a military frontier, it had remained scarcely populated, much less developed than its Piedmontese neighbors Asti and Chieri, both culturally and commercially. The castrum plan of Turin with an orthogonal grid of streets, the forum at the crossing of the two major streets, and the towered brick walls had survived to the sixteenth century. (see stage A in Fig.7)

After the victory in the Battle of Saint-Quentin in the Italian War of 1551-1559 between the Kingdom of France and the Habsburg empire, Emanuele Filiberto, Duke of Savoy and general of the Spanish forces, retrieved Piedmont from the French in 1560 as a result of the treaty of Cateau-Cambrésis (April 1559), and decided to move his capital from Chambéry to Turin. Simultaneously, he restructured the government of the duchy, established its legislative and juridical agencies in Turin and declared the official language of the duchy Italian. [2]

To create a new capital, Emanuele Filiberto had to use all his political, military and cultural resources, especially those of religion. In 1578 he transferred the family's most precious pious possession, the Holy Shroud, from Chambéry to Turin. The transferal of the Holy Shroud to Turin raised the spiritual level of the city, making it the focus of important pilgrimages from the surrounding European lands, which naturally produced new architectural and urbanistic demands[3]. The appropriate sheltering of the Shroud was not solved until the construction of the chapel connected to the cathedral of Turin in the late seventeenth century.

Having retrieved the Piedmontese area as an outcome of war, Emanuele Filiberto was completely aware of the dangerous situation that the newly founded capital city was facing. Being the buffering area between the French and the Habsburg Spanish made Piedmont the center of the military threats from both sides. Under these circumstances, the duke decided to turn the city into an

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[1] Emmanuel Philibert (Italian: Emanuele Filiberto), 8 July 1528 – 30 August 1580, was Duke of Savoy from 1553 to 1580. He is remembered for the Italianization of the House of Savoy, as he recovered the savoyard state (invaded and occupied by France when he was a child) following the Battle of St. Quentin (1557) and subsequently moved the capital to Turin and made Italian the official language in Piedmont.

[2] Martha D. Pollak, *Turin 1564-1680: urban design, military culture, and the creation of the absolutist capital* (University of Chicago Press, 1991), 13-15

[3] Ibid., 13-15

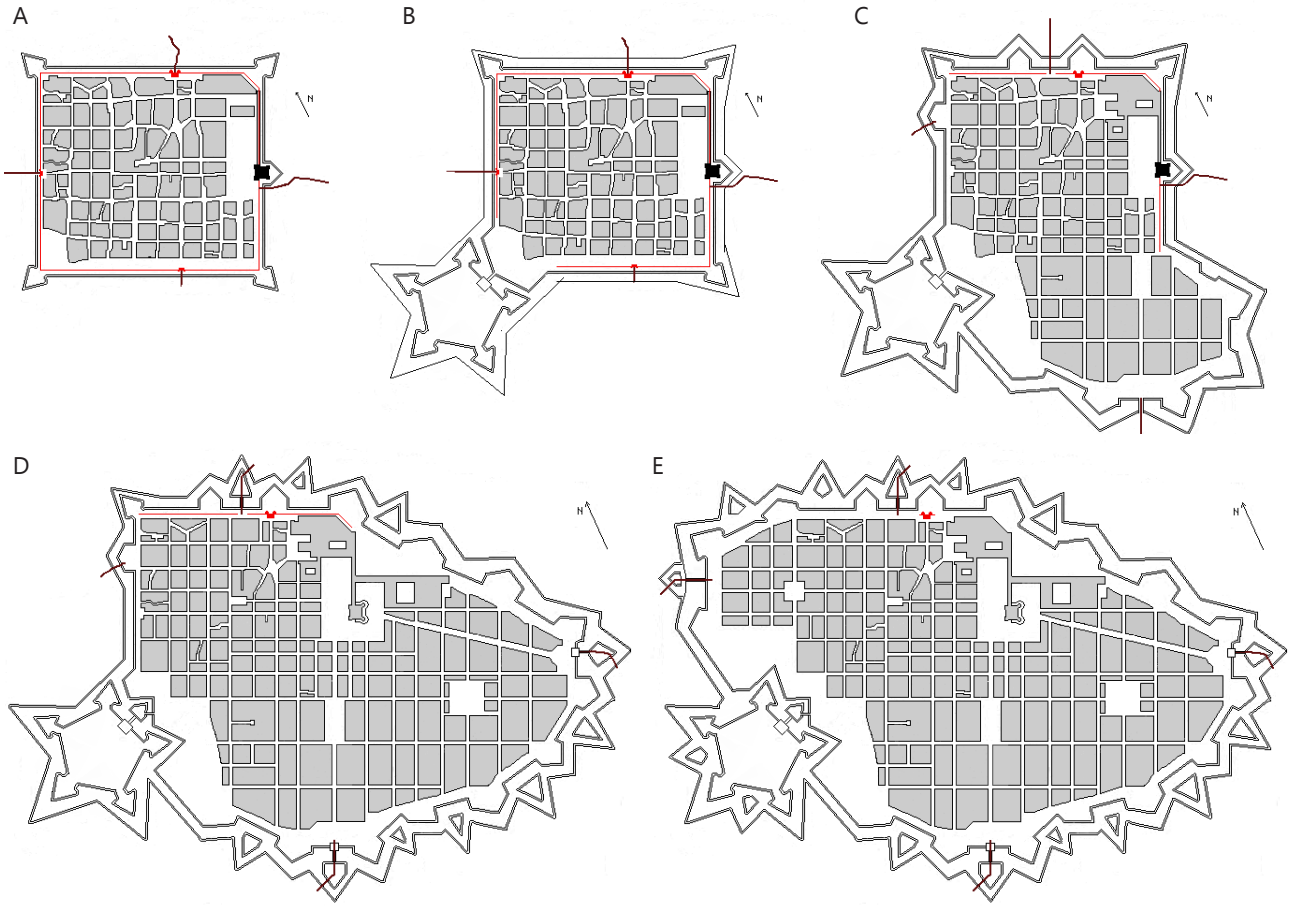

Fig.7 The expansion of Turin in four successive stages from the 16th- 18th century. They are - A: the Roman castrum layout B: the construction of the citadel; C: the Citta Nuova expansion; D: the Po expansion; E: the western expansion. (image: Wikipedia, "Storia di Torino")

unbreachable fortress. First of all, he commissioned the construction of a citadel for the southwest corner of the city, designed by Francesco Paciotto[4] and built by Francesco Horologgi[5] between 1564 and 1566. [6] (see stage B in Fig.7)

In order to maintain his territory and receive a balance between Spain and France, not only did Emanuele Filiberto urge the military consolidation of the city, but he also put interest in military science and expressed his inclination to military treatises. The Piedmontese state had a pressing need to develop military architecture at that time, thus, Emanuele Filiberto boosted the professional development of military architects, enriched the ducal library with sixteenth-century architectural and military treatises and provoked the production of new ones. Palladio dedicating to Emanuele Filiberto the entire second half of his Quattro libri dell'architettura is one example of his pursuit to enriching his collection of architectural and military treatises. [7]

[4] Francesco Paciotto (1521 - 1591) was an Italian military and civil architect, born and died in Urbino. He was commissioned by Ottavio, second Duke of Parma and Piacenza, for the initial design of the Palazzo Farnese in Piacenza.
[5] Francesco Horologgi (1500 - 1577) was an Italian military engineer. He was among the most important military engineers of the sixteenth century.
[6] For the history of the citadel and its political and military use, see Pollak, *Turin*, 15-17
[7] Pollak, *Turin*, 18-20

In the process of the fortification of Turin, military skills were given greater emphasis. The civil architects who received traditional training on projects such as hydraulics, draining of marshes, and construction of bridges had to give way to the group of people within the architectural profession with knowledge and experience on military architecture such as fortification design. These people were called “engineers”, from the term “engine”, which was used to describe war machines [8]. From then on, engineers took over the responsibilities of the urbanization of Turin.

Emanuele Filiberto laid down a solid foundation for the urban development of modern Turin, turning the city into a powerful "piazzaforte" and cultivating a group of engineers who would be dedicated to the urbanization of Turin in the future. However, it is to Carlo Emanuele I[9], his heir, whose military and political philosophy had largely encouraged the urbanization of the city, that we owe the appearance of a unified and urbanized Turin.

Carlo Emanuele I’s ambition for the capital

The first project of Carlo Emanuele I’s urbanization idea was the reconstruction of the ducal palace and its urban surroundings. At first it was the Galleria built as part of the composition of the ducal palace, housing the collection of the ducal court. After that the redesign of the Piazza Castello by Ascanio Vitozzi[10] began, defining the perimeters of the square with porticoed facades. "Vitozzi’s design for the Piazza Castello echoes this Piedmontese tradition of porticoed streets, but its application at the urban scale of Turin established a new monumental architectural language that became the fundamental model and point of departure for subsequent urban design in seventeenth-century Turin." (Pollak, *Turin*, 47) The porticoed language widely reflected on the façade designs in early modern Turin. For example, in the Quartieri Militari, the barracks designed at the western boundary of the city, porticoed facades feature the street sides of the building, which will be seen in the next chapters. Carlo Emanuele I’s urban planning for Turin proposed that the city will be expanded in two directions, to the south and to the eastward to the Po. The expansion in both directions brought formerly rural ducal villas, like Valentino, Moncalieri, Mirafiori, and Villa della Regina, into sight of the city. (see stage C in Fig.7)

In order to regulate the building industry by controlling construction materials and the labor force, in an edict of 10 March 1621, Carlo Emanuele I established the Magistrato delle Fabriche, an agency dedicated to supervising the construction of ducal buildings as well as controlling the quality and appearance of private buildings [11]. “The foundation of the agency was one of the first

[8] Pollak, *Turin*, 27-28
[9] Charles Emmanuel I (Italian: Carlo Emanuele di Savoia), 12 January 1562 – 26 July 1630, the only child of Emmanuel Philibert, Duke of Savoy and Margaret of France, Duchess of Berry. He was known as the Great, and was the Duke of Savoy from 1580 to 1630.
[10] Ascanio Vitozzi (1539–1615) was an Italian soldier, architect, and military engineer.
[11] Pollak, *Turin*, 71-72

attempts of the dukes of Savoy to centralize and to homogenize the building industry. It unified urban design, centralized administration, and formalized record-keeping, as well as regulating the quality of building materials."(Pollak, *Turin*, 70) Later on that year, the duke established another order to regulate the size and price of various bricks and tiles, as well as lime and plaster [12]. These orders and the ones coming later all together indicated the effort that Carlo Emanuele I had put into controlling the enlargement of Turin and his expectations for a coherent design of both civil and ducal buildings in early modern Turin.

The expansion of Città Nuova and the dynastic war

At the death of Carlo Emanuele I in 1630, his son, the new duke Vittorio Amedeo I[13] inherited a duchy under a disastrous condition: at war and impoverished by the plague epidemic raging through Piedmont from 1630 to 1632 [14]. The war and the plague thus prevented Vittorio Amedeo I from continuing his father's work on the expansion of Turin in the first two years of his reign. It was only in 1632 that he could begin the unfinished project started by his father in 1619. At that time, the priority of Vittorio's work was to continue the expansion of the southern segment of Turin, which came to be known as Città Nuova.

Vittorio Amedeo I instituted the Delegazione sopra le Fabriche delle Fortificazioni di Torino on 19 January 1633, the mandate of which was to oversee, direct, and accomplish the fortification enclosure of the expansion. Although the council duplicated the responsibilities of Magistrato delle Fabriche instituted by Carlo Emanuele in 1621, their duties were divided clearly as a separate Consiglio delle Fabriche in charge of nonmilitary construction was set up [15]. Later on, the two councils were united into one body, the Consiglio delle Fabriche e Fortificazioni by Vittorio Amedeo I's widow, the regent Cristina[16]. The members of the council, including the first ducal engineer, Count Carlo di Castellamonte[17], maintained close relationships with the duke and regent, directly executing their orders and wills in the process of the expansion of the city. The foundation of Consiglio delle Fabriche e Fortificazioni marked the beginning of a relatively mature building industry and the total control of it by the ducal government of early modern Turin. In 1633, the means of measuring tile, brick, and masonry construction, and the responsibilities of contractors

[12] Ibid., 72
[13] Victor Amadeus I (Italian: Vittorio Amedeo I di Savoia; 8 May 1587 – 7 October 1637) , born to Charles Emmanuel I, Duke of Savoy and Catherine Micaela of Spain, daughter of King Philip II of Spain, was the Duke of Savoy from 1630 to 1637.
[14] Pollak, *Turin*, 83-88
[15] Ibid., 83-88
[16] Christine of France (10 February 1606 – 27 December 1663) was the sister of Louis XIII and the Duchess of Savoy by marriage. At the death of her husband Victor Amadeus I in 1637, she acted as regent of Savoy between 1637 and 1648.
[17] Carlo Cognengo di Castellamonte (1560–1641) was an Italian architect, civil and military engineer, one of the main exponents of Piedmontese Baroque. He directed the renovation of Castello del Valentino and the construction of Ospedale di San Giovanni Battista as the ducal engineer, which we will discuss in detail in the next chapters.

were fixed by the municipality of Turin. New estimators were appointed at the request of the court to prevent speculation. In July of the same year, the municipal order established the rules for the measurement of buildings. The thickness of different types of walls had already been standardized so that materials, the number of bricks, for example, can be calculated in advance from drawings [18].

At his death in 1637 Vittorio Amedeo left behind a rather difficult situation to his widow Cristina, with the duchy at the threat of Spain and the pro-Spanish relatives- Vittorio Amedeo I's two brothers Prince Tommaso[19] and Cardinal Maurizio[20] who attempted to replace the regent. In this climate of tension, the fortification of Città Nuova was one of the priorities of the new ruler of Turin. It was not long until the tension finally broke off in mid-1639 when the misunderstanding between Cristina and her brothers-in-law fanned by the Spanish and French evolved into larger conflicts that involved most of Europe in the ongoing Thirty Years' War[21].

The siege of Turin in 1639-40 was the climax of the dynastic war, with the city being occupied by two opposing armies one in the citadel and one in the city. The siege caused severe damage to the city, with private houses and royal residences being damaged and looted. Until 1645 Turin was occupied by the French, with the regent as nominal ruler. Although the city was finally returned to the regent due to her diplomatic dealings with Anne of Austria[22], the French army remained in the citadel and used it to control the city until 1657, when they were finally replaced by the ducal garrison.

After the siege of Turin, the regent proceeded to legitimize her claim to absolute rule through intense patronage of large-scale urban design, architecture, and art. Besides encouraging private construction and the building of the fortifications and villas outside the city, she sponsored several projects in the 1640s and 1650s, including the opening and rehabilitation of Porta Nova and Porta Palazzo, gates that had been walled in during the war; the rehabilitation of the Castello; the rebuilding of Palazzo Reale; and the restructuring of Palazzo di San Giovanni. Of the churches begun in the Città Nuova during her regency, Cristina helped to build Santa Teresa and Santa Cristina. She also sponsored Chiesa di San Salvario, which was designed by Amedeo di Castellamonte[23] in 1646 and was the halfway point between Turin and her earliest suburban

[18] Pollak, *Turin*, 103
[19] Thomas Francis of Savoy, 1st Prince of Carignano (Italian: Tommaso Francesco di Savoia, Principe di Carignano; 21 December 1596 – 22 January 1656) was the youngest of the five legitimate sons of the sovereign Duke Charles Emmanuel I. He was an Italian military commander and the founder of the Carignano branch of the House of Savoy.
[20] Maurizio di Savoia (10 January 1593 – 4 October 1657) was the cadet son of Carlo Emanuele I and Caterina Michela d'Asburgo.
[21] The Thirty Years' War was a 17th-century conflict fought primarily in central Europe, lasting from 1618 to 1648. It remains one of the longest and most brutal wars in human history, with more than 8 million casualties resulting from military battles as well as from the famine and disease caused by the conflict. In the end, the conflict changed the geopolitical face of Europe and the role of religion and nation-states in society.
[22] Anne of Austria (22 September 1601 – 20 January 1666), a Spanish princess and an Austrian archduchess of the House of Habsburg, was queen of France as the wife of Louis XIII, and powerful regent of France during the minority of her son, Louis XIV, from 1643 to 1651.
[23] Amedeo Cognengo di Castellamonte (1560–1641) was the son of Carlo di Castellamonte, the ducal architect in Turin.

residence, Castello del Valentino. The church was Amedeo's best work, of which the organization of roads around it altered the importance of Castello del Valentino, placing it within the orbit of anyone approaching Turin from the South [24].

With the Peace of Pyrenees (1660) signed, the Franco-Spanish conflicts finally came to an end [25]. No longer coveted by the two great European powers, the duchy of Savoy began to enjoy a time of stability and prosperity, which contributed significantly to the development of Turin, especially under the reign of Carlo Emanuele II[26].

Carlo Emanuele II and the Po expansion

Carlo Emanuele II began his rule after the transition of power from Cristina who died in 1663, by a series of new commissions of buildings in and near Turin in the early 1660s. This earned him, in 1670, the characterization of "great lover of buildings" from the visiting English ambassador. But Carlo Emanuele II's most important project for Turin was the expansion of the city towards the Po, considered from 1657 and officially begun in 1673. Initially, Carlo Emanuele I had planned to expand the city to the shore of the Po River, but his ambitious plans were revised by Vittorio Amedeo I, who put more effort into Città Nuova than in the eastern expansion. During Cristina's regency she emphasized the overall expansion plan as well. It is to Carlo Emanuele II that the enormous project of the eastern expansion of the city coming to final completion owe. (see stage D in Fig.7)

The official beginning of the Po expansion in 1673 marked the end of the planning process of the expansion, and the construction of the expansion was underway since then. In order to provide legal instruments and the principle for the expansion, Carlo Emanuele II promulgated a series of edicts and merged Fabriche e Fortificationi, the ducal agency in charge of building and fortification to the Consiglio di Finanze since 1666, which became a more important organization responsible for not only the layout of streets and the implementation of the construction of walls and gates, but also the realization of the extensive ducal building program [27]. In the process of a building project supervised by the agency, it discussed the bids for the building to be realized and chose the contractors which were usually favored in advance. Consequently, throughout the documents that record the building of Turin in the seventeenth century, the names of the same participating builders appeared frequently [28].

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[24] Pollak, *Turin*, 122-143
[25] The articles of the Peace of the Pyrenees that concern the duchy of Savoy are in *Monarchia piemontese*, 6:138-41.
[26] Charles Emmanuel II (Italian: Carlo Emanuele II di Savoia); 20 June 1634 – 12 June 1675, was the Duke of Savoy from 1638 to 1675 and under regency of his mother Christine of France until 1648. He was also Marquis of Saluzzo, Count of Aosta, Geneva, Moriana and Nice, as well as claimant king of Cyprus, Jerusalem and Armenia. At his death in 1675 his second wife Marie Jeanne Baptiste of Savoy-Nemours acted as Regent for their nine-year-old son.
[27] Pollak, *Turin*, 193-194; 207-208
[28] See, for example, Archivio di Stato Torino, Sez. Riunite, *Fabriche e Fortificationi*, art. 201,12 October 1673

The work of the Po expansion did not stop at the death of Carlo Emanuele II, continued by his widow, the regent Giovanna Battista[29]. In comparison with the former regent Cristina, the rule of Giovanna Battista encountered little opposition.

The Western Expansion

The final expansion of Turin in the early modern era took place to the west in the eighteenth century. At the start of the century, the outbreak of the War of the Spanish Succession and subsequently the Siege of Turin[30] by the French army urged the duchy of Savoy to implement its defensive program. Since 1711, Vittorio Amedeo II[31] launched the third expansion of Turin to the west, carried out by the engineer Michelangelo Garove[32] and then Filippo Juvarra[33], both primary architects of the duke. This area with its long axial street, Contrada Dora Grossa (now Via Garibaldi), connects Piazza Castello to a new city gate. The gate remained unrealized, however, with the project of the expansion carrying on, the western perimeter of the city was redefined and a new urban space was created. (see stage E in Fig.7)

The early modern history of Turin features the arrival of the House of Savoy and the struggling steps to acclaim itself as a powerful capital between two giant European forces, at war or not. It truly is a history of military, politics and civil conflicts and balance, which also led to significant progress in the architectural theory and practice, turning its architectural local vernacular into an example for the European cities.

[29] Marie Jeanne Baptiste of Savoy-Nemours (Italian: Maria Giovanna Battista di Savoia-Nemours) (11 April 1644– 15 March 1724) was born a Princess of Savoy and became the Duchess of Savoy by her marriage to Charles Emmanuel II.
[30] Victor Amadeus II (Italian: Vittorio Amedeo Francesco; 14 May 1666 – 31 October 1732) was Duke of Savoy from 1675 to 1730. He also held the titles of marquis of Saluzzo, duke of Montferrat, prince of Piedmont and count of Aosta, Moriana and Nice.
[31] The Siege of Turin took place from June to September 1706, during the War of the Spanish Succession, when a French army led by Louis de la Feuillade besieged the Savoyard capital of Turin. The campaign by Prince Eugene of Savoy that led to its relief has been called the most brilliant of the war in Italy.
[32] Michelangelo Garove (29 September 1648 - 21 September 1713) was an Italian architect, engineer and urban planner. He was formerly an asistant to Guarino Guarini, and worked under the Savoy as an urban planner and ducal architect.
[33] Filippo Juvarra (7 March 1678 – 31 January 1736) was an Italian architect, active in a late-Baroque style, who worked primarily in Italy, Spain, and Portugal.

CHAPTER III
Brick facades in Turin, 1600-1800

Fig.8 A plan of the city of Turin, published in Archiviodistatotorino.beniculturali.it. And the locations of the seven buildings discussed in this chapter hightlighted in yellow:

1. Castello del Valentino
2. Ospedale Maggiore di San Giovanni Battista
3. Palazzo Carignano
4. Collegio dei Nobili
5. Quartieri Militari
6. Chiesa di Santa Pelagia
7. Chiesa di San Michele Arcangelo

3.1 Castello del Valentino

The Castello del Valentino was built in the sixteenth century as a private suburban dwelling at first and then bought by Emanuele Filiberto, the duke of Savoy, when he made Turin the capital of Savoy, becoming the property of the Savoy Family. The castle was enlarged and enriched with interventions desired by him and his successor, Carlo Emanuele I. The latter donated the palace to his daughter-in-law, Cristina of France, probably in 1620 on the occasion of the wedding with the heir Vittorio Amedeo I. After her husband's ascent to the throne (1630), the duchess began a long season of works, directed first by the architect Carlo di Castellamonte then by his son Amedeo. Works started around 1633 and lasted until 1660. Minor modifications were made in the early nineteenth century. For the next half-century, the palace was more or less abandoned and fell into a state of disrepair. Major renovations including the addition to the main building, were carried out in 1860 when it was selected as the seat of the engineering faculty of Turin, and it remained the central building of the Architecture faculty of the Polytechnic University of Turin till now.[1]

The castle sits at the riverside of River Po, facing west in the direction of the city center. The building was not built as voluminous as it had been originally designed. Fig.9 shows the original

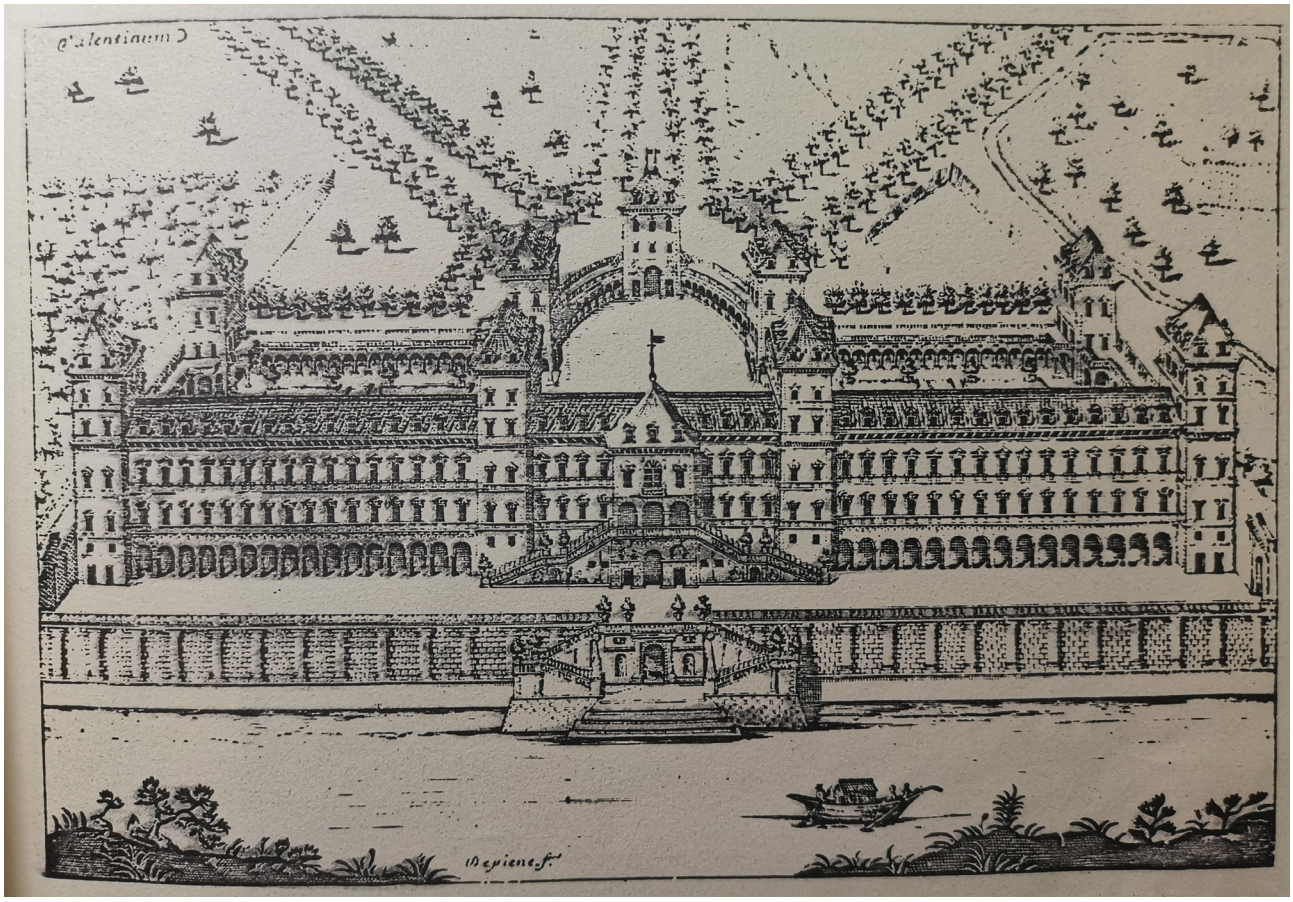


Fig.9 The original design of the Castello del Valentino by Carlo and Amedeo di Castellamonte.
Giovanni Brino, Attilio De Bernardi, Giovanni Gardano, etc, L'opera di Carlo e Amedeo di Castellamonte nel XVII secolo (Torino: Edizioni Quaderni Di Studio, 1966), 77.

[1] This paragraph is based on the author's adaptive translation of the text on: museotorino.it, "Castello del Valentino"

Fig.10 The eastern facade of the Castello del Valentino along the Po (Photo: Turismo Torino e Provincia, "Castello del Valentino")

Fig.11 The protruding eastern facade of Castello del Valentino, with the portal, the three-arch loggia above it, followed by the windows and arched opening of the main building

Fig.12 The tower at the edge of the main building of the Castello del Valentino with the southern wing attached to it

design of Castello del Valentino by the architect Carlo di Castellamonte and his son Amedeo di Castellamonte. It is obvious that the architects had the intention to build a voluminous complex with three wings spanning alongside the river. However, it came out that only the main wing, the two colonnades closing the courtyard, and four of the nine towers at the corners were built. The lateral wings of the courtyard could also be added, which were substantially remodeled and enlarged during the next century, following a clear suggestion of the rhythms of the existing building, but it was not until the nineteenth century that the southern wing was added to the building, finally determining the size of the castle that we see today. (see Fig.10)

The wings have two principal storeys and a basement, with four-storey towers standing at both edges, however, the riverside facade has three principal levels due to elevation difference. The building is decorated with plaster on its western façade, however, displaying the primitive brick façade on the eastern side. The brick façade shows two types of brickwork, the main building wall dating from the seventeenth century, and the southern wing wall which is subsequent construction, sharing the same appearance, however made out of different bricks, corresponding to its relative construction date. The main building wall uses both brick headers and stretchers on the surface. Although the southern wing wall is an imitation of the main wing wall, instead it uses only headers for facing. In Fig.12 we can clearly see the boundary of the ancient facade and the new one divided at the tower. A set of string courses are used to create the visual division between the first level

Fig.13 The southern wing facade with two sections of different brickwork of the Castello del Valentino

with the other levels, keeping coherence with the main building. The main building features an accentuated pavilion, emphasizing the portal on the ground level, an arcade of three arches on the first level, and an arched portal connecting to a balcony on the second level (see Fig.11). Two colossal staircases connect the first level arcade to the ground symmetrically, covered in plaster with niches and small rectangular windows on the wall.

Voluminous as the building is, there are only two kinds of window frames on the main structure and another two types on the tower. This contributes to the regularity of the monolithic façade on such a large scale. The first level window frame features rusticated brick patterns surrounding the window and a rounded pediment. The second level window frame features a niche cap on the top with a triangular pediment above. Every window frame on the main building façade has gone through restoration and intervention, where multiple types of mortar were used to reinforce the window frames and niche tops, also colored to match the rest of the structure. The brickwork of the first-level windows will be discussed in detail in Chapter IV 4.2.

Different interventions probably from different periods reformed the wing façade in two different ways. The original ground floor arcade was closed with bricks and transformed into a wall, with two different window types filling in. All the interventions have created a harmoniously consistent façade with the older parts of the building. (see Fig.13)

Beyond the corner of the northern end of the façade is the evidence of an incomplete wall of the to-be-built northern wing, with projecting bricks remaining which originally were supposed to be the connecting bricks of the two parts (see Fig.14). The brickwork of this part shows a clear difference from those of the rest of the façade. There is also evidence of some doors and windows being closed up, telling from the remaining brick arches which used to support the window. All these existing elements demonstrate that the building went through multiple restorations and interventions.

In the cornice, moulded curved bricks are used as corbels, supporting a projecting stone slab, and multiple courses of bricks shaping the roof. On the extended wing façade, elaborate leaf-shaped terracotta cornice has been used. The brickwork of the cornices will be discussed in detail in Chapter IV 4.4.

Fig.14 The northern facade of the Castello del Valentino, displaying the wall that was supposed to connect the incomplete northern wing.

3.2 Ospedale Maggiore di San Giovanni Battista

Ospedale Maggiore di San Giovanni Battista (hereinafter referred to as Ospedale di S.Giovanni), nowadays the Regional Museum of Natural Science, is a historic building, originally a hospital, founded by the Madama Reale, Maria Giovanna Battista di Savoia Nemours in 1680, and drawn up by the architect Amedeo di Castellamonte, laying out close to the eastern walls of the city. The project was carried out over approximately eighty years in successive stages. The first stage was started by the engineer Gian Francesco Baroncelli[2] and concluded in 1689.[3] Two aisles of infirmary were added first to the east (1680-1703), then to the west (1760-1762), which completed the original cross plan, inside a voluminous rectangular building on the entire block. Filippo Castelli [4] added the Church of S. Giovanni in 1763 and the sacristy in 1818. [5]

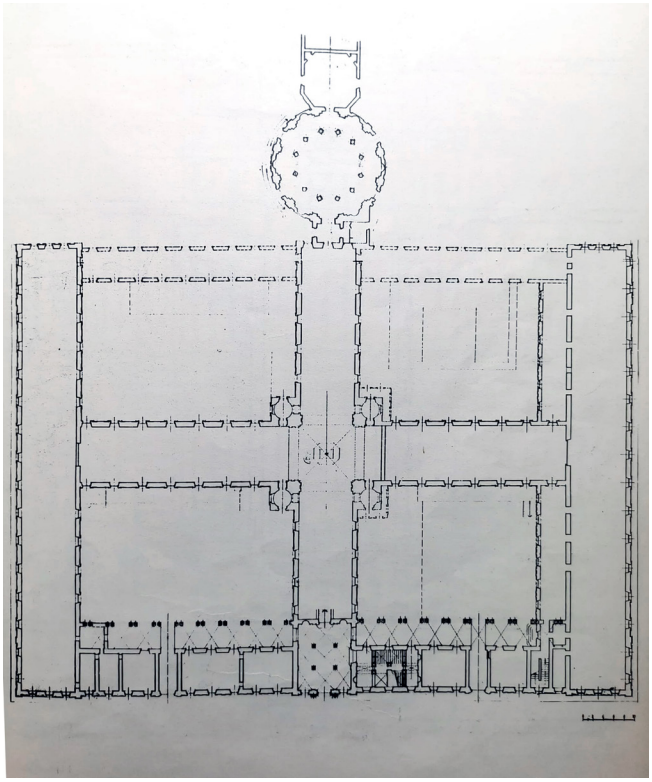


Fig.15 The plan of the Ospedale di S.Giovanni in the first stage. Giovanni Brino, Attilio De Bernardi, Giovanni Gardano, etc, L'opera di Carlo e Amedeo di Castellamonte nel XVII secolo (Torino: Edizioni Quaderni Di Studio, 1966), 153.

The former hospital sits in a block of 145 meters in length and 125 meters in width, with an elevation difference of about one meter, the north being the higher end. The complex consists of the wings and pavilions on the entire perimeter and the cross-shaped building in the center (see Fig.15). The building, excluding the northern wing, has two main levels, which used to be two separate levels for male and female patients, as well as a semi-basement. The only exception is the northern wing, which has three floors instead, serving the administrators and doctors for its original use. This different use of floor height is displayed on the facade (see Fig.16). The facades visible from the streets are all built of brick masonry except for the base, which is clad in stone in most parts.

The facades display a large variety of brickwork in terms of bonding types, windows, cornices and brick patterns. The western facade uses all headers on the facing, while on the northern

[2] Gian Francesco Baroncelli (about 1640-about 1699) was an architect active in Piedmont between 1672 and 1694. He was first a collaborator of Amedeo di Castellamonte, after whose death he replaced the master in the direction of the works for the Ospedale di S.Giovanni. He was also a helper of Guarino Guarini in the construction of Palazzo Carignano.
[3] Pollak, *Turin*, 225
[4] Filippo Castelli (1738-1820?) was an Italian architect, mostly active in Piedmont.
[5] museotorino.it "Ospedale Maggiore di San Giovanni Battista e della città di Torino oggi Museo Regionale di Scienze Naturali"

façade and eastern façade, a greater variety of brickwork bonding is present, and less organized use of brick headers and stretchers takes place. At the end of both the eastern and the western façade there is an extended wing facade that shares the same appearance with the rest of these facades. However, these parts are made out of different bricks in size and color, with joints of different thickness, corresponding to a relatively modern construction date (Fig.17). The facades are visually segmented by versatile brick patterns, specifically raised blocks and string courses achieved by offsetting bricks. (see Fig.18) A detailed analysis of the walls of the building will be presented in Chapter IV 4.1.

The most elaborate brickwork schemes are those of the window frames. A total of nine different types of window frames are displayed on the facades (neglecting minor variations of bricklaying). These window frames feature the majority of specially made bricks of the whole façade, which are used not only to display patterns but also contribute to the structure. Regularity is also a relevant factor in the brickwork of window frames. Windows on the same level of the same wall always share the same appearance, except for the two wall sections of the pavilions on the northern façade, where adjacent windows display different pediments, alternatively rounded and triangular (see Fig.16). Quite a number of the windows have gone through restoration and

Fig.16 The north-eastern corner of the Ospedale di S.Giovanni, displaying the pavilion at the end of the eastern wing, also showing the different number of floors between the northern wing and the eastern wing

intervention: for example, some of the openings are filled with bricks, while some have the original bricks replaced with newer ones, usually moulded (see Fig.19). The main entrance of the building is on the northern façade, featuring a magnificent stone portal as well as two smaller portals, all designed in a rich baroque style and decorated with plaster (see Fig.20). There are also some doors located on the other façades, but they all seem to be the results of subsequent interventions. In the continuous top cornice, moulded curved bricks are used as corbels, supporting a projecting stone slab, and a set of courses of moulded bricks shaping the roof. The brickwork of the cornice will be discussed in Chapter IV 4.4.

Fig.17 The two parts of the western facade with the same brickwork but brick of different size

Fig.18 The string courses and brick ornaments dividing the western facade of the Ospedale di S.Giovanni

Fig.19 The windows on the northern facade of the Ospedale di S.Giovanni which have been repeatedly modified

Fig.20 The portal functioning as the entrance on the northern facade of the Ospedale di S.Giovanni

3.3 Palazzo Carignano

Fig.21 The front facade of the Palazzo Carignano, featuring the curved brick facade in the middle (photo: "Palais Carignan", by H. Le Lieure, 1867 (Palazzo Carignano, Ed. Treccani. Rome, 2018))

In 1679 the prince Emanuele Filiberto di Savoia Carignano[6] commissioned the architect Guarino Guarini to build a new townhouse near the castle (the nowadays Palazzo Madama), in the Borgo di Po extension carried out by Carlo Emanuele II since 1673, introduced in Chapter II. In the political uncertainty that reigned afterward the death of Carlo Emanuele II in 1675, the succession of the duchy seemed to be directed towards the collateral branch of the Carignano family, legitimizing the conception of a royal-looking palace inspired by the projects that Gian Lorenzo Bernini[7] had prepared for the Louvre of Louis XIV and which, in all probability, Guarini had been able to examine directly in Paris, in 1665, while he was working on the construction site of the church of Sainte-Anne-la-Royale (demolished).[8]

Being the largest private property built within the Po expansion area, the two-storey palace

[6] Emmanuel Philibert of Savoy, 2nd Prince of Carignano (20 August 1628 – 23 April 1709), Prince of Carignano, was the son and heir of Thomas Francis, Prince of Carignano.
[7] Gian Lorenzo Bernini (7 December 1598 — 28 November 1680) was an Italian sculptor and architect. While a major figure in the world of architecture, he was more prominently the leading sculptor of his age, credited with creating the Baroque style of sculpture.
[8] This paragraph is realized by the author's adaptive translation of the description on museotorino.it, "Palazzo Carignano".

Fig.22 The gable, the central niche of the entrance and the loggia on the front (western) facade of the Palazzo Carignano

stands out in the rectangular city fabric with its extraordinary curved hall facade facing the square, the Piazza Carignano, which was also part of the Po expansion by Carlo Emanuele II. The building differed from the austere military and uniform façades of the palaces built by Carlo and Amedeo di Castellamonte. The key structure of the building is the oval atrium projecting from the center of the western facade, which determined the curvilinear course of the front on the square, closed between the two corner pavilions and marked by a giant order of pilasters (Fig.21). The entrance of the hall features a niche and a loggia on the second level of the building, with a giant broken gable standing on top of the cornices defined by the curvilinear façade (Fig.22). The giant orders and baroque windows are assembled symmetrically, matching the curved façade, along with delicate string courses, cornices and rectangular patterns. The façade of the side pavilions follows the same brickwork as that on the curvilinear façade. And so is the case for the northern and southern façade.[9]

The first-level windows on the front façade acclaim themselves as the most elaborate theme of the palace, the brickwork of which is probably inspired by the work of Gian Lorenzo Bernini. Two layers of bricks are combined to form the sophisticated winged window frame, where specially moulded bricks are used. Similar brickwork can also be found at Collegio dei Nobili, the building across Piazza Carignano. Some of the windows are filled with bricks, forming a niche integrated with the winged window frame.

The palace was designed to be spacious and delivering noble dignity, thus the floor height is much higher in comparison to its neighbor Collegio dei Nobili where every element is arranged closely and clinging to each other on the facade, leaving space for a great variety of elements. Several sets of windows are constructed for both storeys, with elegant string courses in between. The pilasters with motifs on them take up the first storey, and the giant orders rise from the second floor to the magnificent and complicated cornice upon the mezzanine storey.

Through the oval atrium is the rectangular courtyard of the palace. The façade features bands with star motifs weaving vertically and horizontally, surrounding the arched windows and small rectangular ones on the second storey and the circular windows on the mezzanine storey (Fig.23). The brickwork of windows on the courtyard façade follows a simplified principle of the complicated winged frame on the front façade, but in a more sculptural way, using moulded bricks which are barely seen on other parts of the building, even on the buildings built in its same period in Turin. (see Fig.24)

The palace is divided into two parts in terms of the date of construction. The second half was added to the east as an extension to the seventeenth-century building in order to house the first Italian Parliament opened in 1861. Therefore there is a clear boundary in the middle of the facade, dividing the facades into two parts, the original late-seventeenth-century facade and the nineteenth-

[9] This description of the Palazzo Carignano is extracted from Pollak, *Turin*, 222-223

Fig.23 The courtyard facade of the oval atrium of the Palazzo Carignano

Fig.24 The courtyard wing facade of the Palazzo Carignano, with the sculptural window frames and the bands with star motifs

Fig.25 The original facade of the Palazzo Carignano (left) and the 19th-century facade imitating it (right)

century one which imitated the former. Modern bricks are used for the new facade, however, the brickwork imitated, to some extent, that of the old façade (see Fig.25). The broken gable on top of the main entrance with "QVI NACQVE VITTORIO EMANVELE II" written on it was also added during the nineteenth-century intervention, designed and built by Carlo Ceppi[10], using modern bricks (see Fig.22).

[10] Carlo Ceppi (Torino, 11 October 1829 – Torino, 9 November 1921) was an Italian architect and engineer, active in the Turin area.

3.4 Collegio dei Nobili

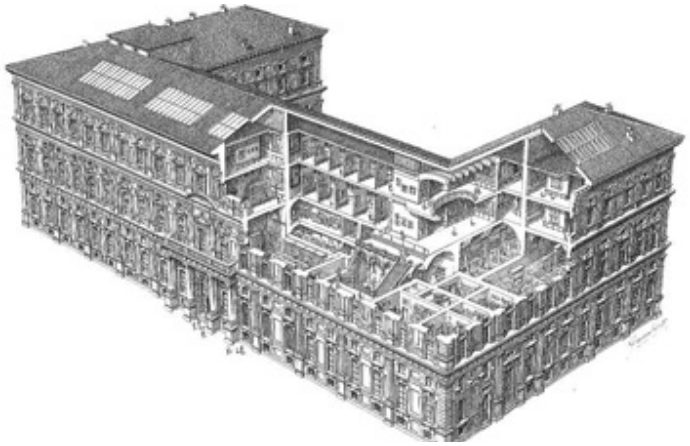


Fig.26 The perspective of the Collegio dei Nobili. (image: Francescocorni.com, "ex Collegio dei Nobili ora Museo Egizio e Galleria Sabauda")

Collegio dei Nobili, nowadays the site of Museo Egizio (Egyptian Museum) and Galleria Sabauda (Sabauda Gallery), was originally a college for the nobles in Turin. In 1678, the Jesuits presented an ambitious proposal to the duchess, Maria Giovanna Battista di Savoia Nemours, to create a College of Nobles in the center of Turin, where they could teach the young offspring of the Piedmonts' aristocracy. The new complex, in the great ideas of the father Carlo Maurizio Vota[11] and the design by Michelangelo Garove, a former assistant to Guarino Guarini, should have occupied three whole blocks in the area of the eastern extension of the city, between Piazza Castello and Piazza Reale (now San Carlo), and to host, in addition to the college, a Jesuit seminar and a church, dedicated to the perpetual glory of the regent. However, the large sums that the project required ended up too heavy for the Society of Jesus even though Madama Reale laid the foundation stone in June 1679. Thus, not until in the 90s was it possible for the engineer Michelangelo Garove to complete the construction of the complex on the 'contrada della Cittadella'(now via Maria Vittoria), in the southern block. As it stands today, it is the result of construction work completed in 1824.[12]

The three-storey brick building sits on the south side of Piazza Carignano, diagonally across the square from the Palazzo Carignano. The palace inherited the tone of the rich ornamentation and the accentuated relief of the modeling of the facades (which in the past induced an attribution to Guarino Guarini) and the emphasis on the aspects of representation. The façade is rather distinguished in its richness in brickwork. The façade is divided into three different storeys, each of which features a different composition of Baroque orders and windows, while maintaining the same spacing between windows, keeping a coherent general appearance of the whole façade. Despite the different brickworks, the three kinds of windows are all framed with an array of curved bricks, which distinguishes Collegio dei Nobili from other brick buildings built in Turin in the same period. The main window itself is always accompanied by a small oval or rectangular window with the same width on top of it, framed by the pediment on the first and second storey. The ones on the ground level feature a delicate layout of curved bricks pointed to each other in two lines, forming a groove in between, framing the window opening. On top of the window opening is a keystone component consisting of vertically laid bricks, smoothened for the wave-shaped surface. The

[11] Carlo Maurizio Vota (1629-1715) was an Italian Jesuit and confessor of Jan III Sobieski, king of Poland.
[12] This paragraph is realized by the author's adaptive translation of the description on museotorino.it, "Collegio dei Nobili"; Pollak, *Turin*, 223-225.

Fig.27 The three types of windows and orders on the northern facade of the Collegio dei Nobili

Fig.28 The north-eastern corner and the plastered quoins of the Collegio dei Nobili

Fig.29 The door integrated with original window structure on the eastern facade of the Collegio dei Nobili

windows on the first and second storey are less complicated at the framing but more sophisticated at the pediments, both broken and inserted with a small window in each of them. (see Fig.27, detailed discussion in Chapter IV 4.2)

Besides these sets of windows, there is another dominant element on the façade of Collegio dei Nobili, which are the delicate orders. Unlike other brick facades, the spacing between the windows of the Collegio dei Nobili is so small that the orders in between appear to cling to the windows on most parts of the façade. The order of the ground level is very unique, since it introduces frustum-shaped components into its decorative language. Those of the first and second level are Baroque variations of the Ionic order and Corinthian order, with a slight difference in brickwork. The capitals of the orders on the ground and first level are most possibly made out of stone, covered with stucco. Interestingly, the language of the three classical orders - the Doric, The Ionic, and the Corinthian are successively used in the three orders. (see Fig.27, details in Chapter IV 4.3)

There is also a great early nineteenth-century portal on the front (eastern) façade of the academy building, framed inside a portico composed of four classical Doric columns. The portal

Fig.30 The portal and Doric orders on the eastern facade of the Collegio dei Nobili

and the orders are all made of stone, unlike the exposed brick facade. (see Fig.30). The north-eastern corner and the south-eastern corner of the building are also clad in stone blocks, dealt with by the method of quoining. (Fig.28)

The academy building is well preserved in terms of its facade. The windows have gone through many interventions. Many of the keystones of the windows on the southern and eastern façade were replaced by concrete ones. Iron bars are easily found on the façade to strengthen the wall structure, especially in the columns and on the sides of the windows. A few doors are opened at the place of primitive windows, integrated with the original structure of the window, mainly fulfilling practical needs, such as providing independent entrances to shops, etc. (Fig.29)

3.5 Quartieri Militari

Fig.31 The view of the western facades of the Quartieri Militari. (image: Archivio Storico della Città di Torino)

The Quartieri Militari was a pair of barracks built between 1716-1728, made on a project by the First Architect Filippo Juvarra and commissioned by the sovereign Vittorio Amedeo II. The realization of this complex largely relies on the unfinished program of redefining the perimeter of the fortification of Turin, by engineer Michelangelo Garove, first architect of the duke, then king, Vittorio Amedeo II. The Quartieri Militari represented the western access to the capital city (Porta Susina), redefined at the same time with the forecast of the third expansion. Different from Garove's idea of an urban gate that represented a monument straddling the fortification, Juvarra proposed vice versa an urban space that is also a door, as an open parade ground, defined by two massive blocks of barracks, the Quartieri Militari designed as permanent barracks equipped with all services. The Quartieri Militari went through a significant intervention in the second half of the century, from 1768, when an attic storey was added by the architect Ignazio Birago di Borgaro[13]. [14]

The Quartieri Militari, consisting of two blocks named santi Celso and santi Daniele, is a complex on the east-western axis of old Turin and equipped with large continuous porticos. The buildings which have four main levels are built of brick masonry, and each block is divided into two parts, the one equipped with the portico and the unadorned rest of the building. The portico covers two sides of the barrack, supported by colossal pilasters rising from the base to the lower cornice (Fig.32). The barrack adopts a Doric-resembling order as its language, of which the capital is decorated with grooves shaped by specially moulded bricks. The pilasters are made of bricks with a thickness of 60mm, unlike the rest of the building where 55mm-thick bricks are dominant, and it shows two different brickwork of bonding. Only headers are used on some pilasters, while on the other pilasters, both headers and stretchers are used as in the "Flemish bond" brickwork (see Fig.117 in Glossary). Another elaborate structure is the arch with a large span, decorated on the crown with a large wedge-shaped keystone.

The brickwork of the window frames on the portico resembles one type of the window frames of the Ospedale di S.Giovanni, with pointed bricks sticking out around the window, drop-shaped bricks decorating the bottom, and a rounded pediment on the top, that connects to the corbel

[13] Ignazio Renato Birago di Borgaro (13 September 1721 - 2 January 1783), was an Italian architect.
[14] This paragraph is realized by the author's adaptive translation of the description on museotorino.it, "Quartieri Militari - ex caserme negli isolati dei Santi Celso e Daniele".

Fig.32 The portico of the Quartieri Militari seen from the south-west

Fig.33 The window partly filled with bricks above the portico of the Quartieri Militari

Fig.34 The unadorned facade on the western facade of the Quartieri Militari, next to the portico

of the lower cornice. An exclusive double cornice can be seen at the top since the attic level was added almost half a century later than the original structure. In the lower cornice, specially moulded bricks are used to form the corbel, supporting a stone slab that supports the upper courses of the cornice. While in the higher cornice, corbels are nowhere to be found, and instead, small brick pilasters are supporting the cornice which has a similar structure as the lower one. Some of the windows were modified over time, with the size of the opening cut down and filled with bricks, causing a smaller window embedded in the unchanged window frame (see Fig.33).

The other part of the facade is less rich in brickwork, and is only divided by a set of string courses between the ground and first level. The facade is characterized by modern windows, which are the replacement of primitive ones, embedded in the remaining frames with a brick lintel and a relieving arch on top of each. The brickwork in the vertical space between windows is different (not always) from that of the regular wall, possibly due to the removal of original lintels. The wall itself shows regularity, in that, mostly headers are used for facing (see Fig.34). In some places, window openings are just enclosed with bricks.

3.6 Chiesa di Santa Pelagia

The Chiesa di Santa Pelagia was built between 1769 and 1772, on the ruins of an older church for a convent for the Augustinian nuns[15], based on a design by the Turin architect Filippo Nicolis di Robilant[16]. It was consecrated on 21 September 1772 by Archbishop Francesco Lucerna Rorengo of Rorà. In 1800, during the French occupation, following the suppression of the Order, the church and monastery were sold to the “Regia Opera della Mendicità Istruita” [17] (later “Opera Munifica Istruzione” [18]) and used as the site of the "school of charity" for the poor. [19]

The church is located at the crossing of Via S.Massimo and Via Santa Croce, facing Via Santa Croce, only displaying its western façade (seen in Fig.35). The church has a central plan

Fig.35 The western facade of the Chiesa di Santa Pelagia

[15] Augustinian nuns are the most ancient and continuous segment of the Roman Catholic Augustinian religious order, of which women live according to a guide to religious life known as the Rule of St. Augustine.
[16] Filippo Giovanni Battista Nicolis di Robilant (Torino, 10 March 1723 – Torino, 12 January 1783) was an Italian architect, whose main works were in Turin, Nizza, Saluzzo,etc. in Piedmont.
[17] Regia Opera della Mendicità Istruita was an institution which provided elementary education in particular for women in Turin in the first half of the 19th century, firmly in the hands of private religious education.
[18] Opera Munifica Istruzione is an IPAB (Public Institute of Assistance and Charity), established in Turin in the mid-1700s, which has always dealt with training initially addressed to beggars, then addressed to the management of professional and elementary schools free.
[19] This paragraph is realized by the author's adaptive translation of the description on museotorino.it, "Chiesa di Santa Pelagia"; cittaecattedrali.it, "Chiesa di Santa Pelagia".

consisting of a circular cupola on which four elliptical rooms are grafted, intended to house the presbytery, the two side chapels and a choir in the back. The light source for the church is the semi-oval windows on each chapel and the entrance, framed by large brick arches spanning between columns. On the front, there is a portico crowned by a colossal triangular pediment, supported by four columns with Ionic capital. Inside the portico is a magnificent Baroque stone portal. On the two sides of the portico, delicate pilasters are featuring an elaborate assemblage of bricks with round bricks arranged vertically as decoration (seen in Fig.36). At two sides of the portico, there are also a pair of rectangular windows with two rounded ends, on top of which two relieving arches are built together with one layer of brick in between. The church façade is made of brick masonry, while the portico and the portal are either plastered (column shafts) or in stone (portal, capital). On the façade except for the triangular pediment, headers and stretchers are used alternatively on the columns and raised surfaces, while only headers are used for filling in the wall between columns. On the pediment, brick stretchers are mostly used, inserted with a total of four relieving arches, three of which are one-brick length thick and another are one and a half brick length thick. Bricks cut or moulded in the shape of the parallelogram are arranged as decoration for the pediment.

There is evidence of unfinished work, both on a corner of the front facade and on the curved chapel wall above, which possibly indicates an unfinished extension to the chapel room. (see Fig.37)

Fig.36 The pilaster, capital and entablature on the corner of the Chiesa di Santa Pelagia, making an elaborate assemblage

Fig.37 The remaining of the unfinished extension to the chapel room of the Chiesa di Santa Pelagia

3.7 Chiesa di San Michele Arcangelo

In 1675, the duchess Giovanna Battista di Savoia Nemours called the Barefoot Trinitarians of the "Ordine della Santissima Trinità e redenzione degli schiavi"[20] to Turin, granting them the use of the church of San Michele at Porta Palazzo, subordinated to the Sacra di San Michele[21]. The mission of the monks was, through the collection of alms, to redeem the Christians reduced to slavery by the Turkeys and barbarians. The fathers were forced to abandon the church, in 1729, to allow the building and urban planning rearrangement of the area, according to the project carried out by Filippo Juvarra.

From that date until 1781-1784 the headquarters was in Casa Ropolo, between the streets of San Francesco da Paola and Santa Croce. In 1784, The fathers obtained from Vittorio Amedeo III[22] part of the small and irregular block of San Pasquale, near the rampart. Here the architect Pietro Bonvicino[23] was building houses and laboratories for the Velvet Masters of the Guild of

Fig.38 The northern facade of the Chiesa di San Michele Arcangelo

[20] Ordine della Santissima Trinità e redenzione degli schiavi: a Catholic religious order
[21] The Sacra di San Michele: sometimes known as Saint Michael's Abbey, is a religious complex sitting at the foot of the Alps, in Turin, Piedmont
[22] Victor Amadeus III (Vittorio Amadeo Maria; 26 June 1726 – 16 October 1796) was King of Sardinia from 1773 to his death. Although he was politically conservative, he carried out numerous administrative reforms until he declared war on Revolutionary France in 1792. He was the father of the last three mainline kings of Sardinia.
[23] Pietro Bonvicini (about 1741 - Turin, 1796), was a Swiss architect. He was an assistant to the Turin architect Nicolis di Robilant, and then designed the Chiesa di San Michele Arcangelo with the adjacent convent and houses of the Trinitarian fathers. The project of the Chiesa di Santa Pelagia is attributed to him, but there are conflicting opinions on this, as it is considered by some to be the work of Robilant.

Master Manufacturers of gold, silver and silk who had purchased a portion of the same block. The Fathers purchased the entire lot. The foundation stone of Chiesa di San Michele Arcangelo was laid on August 21, 1784. Between 1784 and 1788, the church was built by Pietro Bonvicino, who in subsequent years also built the entire block of which the religious building is part. [24]

The church is connected to adjacent buildings to the west and south, which means only the northern and eastern facades are on display. It has a hexagonal central space, on which sits a hexagonal drum, a cupola, and a plastered lantern at the top. Each side of the hexagonal drum has a large curving window, framed by a widely spanning brick arch, on which prominent bricks are distributed as some kind of decoration. On the facades of the church, there are two portals facing north and east. The main portal is framed by a pair of circular columns, and an arched pediment where half-thickness bricks are used as decoration, altogether surrounded by circular twin columns as well as a larger pediment projecting from the facade of the church. The larger pediment functions also as a projecting roof, with corbel bricks seen here instead of the other cornices on the façade of the church (see Fig.38). On the eastern façade, there is a smaller doorway, with the same circular columns and arched pediment as the northern doorway. At the top of these circular columns are elaborate capitals, with rubbed bricks composing a ring of bricks at the head, decorated with

Fig.39 The capital of the twin column on the northern facade of the Chiesa di San Michele Arcangelo

[24] These two paragraphs are realized by the author's adaptive translation of the description on museotorino.it, "Chiesa e convento di San Michele".

vertically placed round bricks and a pillow-shaped moulded brick resembling an abacus, forming a unique style of order together (see Fig.39, details in Chapter IV, 4.3).

The facades are made of brick masonry, except for the base, staircases, and the lintel over the doors, which are made from stone. The north-eastern and south-eastern walls are curved, which is a common language in baroque architecture. Mostly brick headers are used for facing on these walls as well as the drum. At corners, both headers and stretchers are used in the pilasters, where the round bricks are also used as a decoration of the capital as the twin column does. On each curved wall is a small round window and a rectangular window (see Fig.40). The brickwork of the small round windows is very delicate. Multiple courses of bricks are arranged axially around the round window, interrupted by horizontal brick courses of the wall, making it a stable and elaborate structure. The northern façade also features a pair of niches symmetrically located on both sides of the portal, with a triangle pediment on top of each (see Fig.38). Bricks are arranged orthogonally around the frame of the niche, with rubbed brick headers forming the inner surface of the niche.

Fig.40 The eastern facade of the church connecting to the existing building, with two curvilinear walls facing north-east and south-east

CHAPTER IV
The elements of the brick facade and their brickwork

4.1 Wall

As was discussed in Chapter I, in the expansion of Turin, exposed bricks had been used only for cladding of the fortification and the buildings of the ducal family. This had a large impact on the facade design of the buildings, which aimed not only to fit in the planned frame of the expansion of the city proposed by Carlo Emanuele I and his successors, but also to emphasize the significance of these specific buildings to the city by means of an elaborate brickwork language rarely seen in private construction.

Castello del Valentino was originally a private dwelling, then bought by Emanuele Filiberto and renovated into a royal villa. It reveals a quality of roughness in terms of its brickwork and choice of bricks it uses, which is well displayed on the eastern facade. First of all, the thickness of pointing between bricks is relatively large, with a thickness of 2 centimeters, while the brick is 5.5 centimeters in height. Secondly, on the surface of walls except for the main building, headers and stretchers are used randomly, probably at the bricklayer's will, under the guidance of a general

Fig.41 The 17th-century brick wall of the Castello del Valentino

Fig.42 The "rusticated" brickwork on the eastern facade of the main building, enphasizing the portals and the corners

principle (see Fig.41). Thirdly, the protruding eastern façade of the main building with the portal features a “rusticated” appearance on the entire three floors (see Fig.42). "Rustication" is a technique that was used first in ancient times, and prevailed in the Italian Renaissance architecture and that of subsequent periods. It achieves its visual effect by emphasizing blocks of bricks on the ground floor, highlighting the size and placement of them on the facade, in contrast with the relatively smoother facade above. In the Castello del Valentino, this technique was used on the entire facade of the main building, in correspondence with the protruding volume, which became one of the most distinguished features of the brickwork of the Castello del Valentino.

The wall of the Ospedale di San Giovanni is an interesting mixture of a great variety of brickworks. Built in a long stage of eighty years and then extended in the nineteenth century, the brick used in different parts of walls is clearly distinguished from others. There are altogether three types of bricks on the facade of the building. The first type is the 245mm× 115mm× 55mm brick used at the first stage of construction for the northern, eastern and western wing of the first-stage construction. The second and third types are slightly different in size, measured 230mm× 110mm× 55mm, and in color, used for two extended wings built to the east and west successively. On the main parts of the facade, headers and stretchers are used irregularly, but on the two extended wings, only headers are used. (see Fig.43)

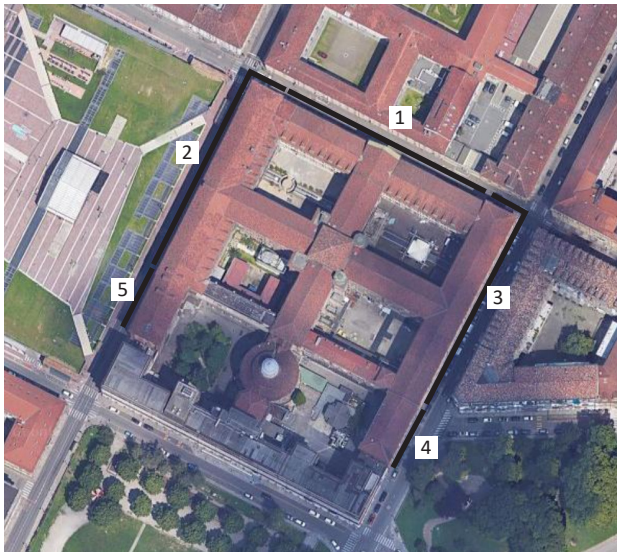
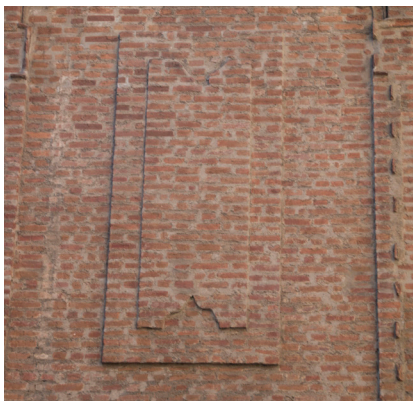


Fig.43 The location of use of the three types of bricks on the facade of the Ospedale di S.Giovanni, and their examples

Facades of the Ospedale:
1. The northern wing facade;
2. The western wing facade;
3. The eastern wing facade;
4. The eastern extended wing facade;
5. The western extended wing facade

Brick by the date of use from left to right:
a) the brick used on the western wing;
b) the brick used on the extended eastern wing;
c) the brick used on the extended western wing



a)

b)

c)

Raised panels on the facade are achieved by offsetting bricks, presenting a decorative language carried out on the whole facade, along with ornaments of projecting bricks. (see Fig.44) The similar “rusticated” brickwork with that of the Castello del Valentino can be found at the base of the building and the corners.(see Fig.45,46)

Fig.44 The ornamental projecting bricks on the facade of Ospedale di S.Giovanni

Fig.45 The rusticated brickwork at the base of the Ospedale di S.Giovanni

Fig.46 The rusticated brickwork at the corner of the Ospedale di S.Giovanni

Fig.47 The curvilinear front facade of the Palazzo Carignano

Fig.48 The framing of curved bricks on the facade of Palazzo Carignano

Fig.49 The sculpted bricks on the courtyard facade of Palazzo Carignano

Fig.50 The framing of curved bricks on the facade of Collegio dei Nobili

The walls of the Palazzo Carignano and the Collegio dei Nobili show a common characteristic of Baroque architecture, first introduced by Guarini in his design of the palace and then carried on by Garove in the completion of the nearby noble academy. The Palazzo Carignano features a curvilinear wall on its front, the middle part of which is broken by a gigantic gable, a niche and a loggia above the entrance (Fig.47). The walls are usually decorated with blocks of bricks framed by curved bricks, both on the facade of the Palazzo Carignano and the Collegio dei Nobili, with slightly different brickwork (see Fig.48,50). The courtyard wall of the Palazzo Carignano continues the delicacy of the front wall, with a different type of brickwork. A great variety of moulded bricks are used here to form the enormous decorations that have defined the wall. Instead of "bricklaying", the brickwork of the courtyard wall is more of a sculptural language. (Fig.49)

Both built in the 18th century, the walls of the Chiesa di San Michele Arcangelo and the Chiesa di Santa Pelagia had adopted even more Baroque language in their brickwork. The former features curved walls on its eastern facade (see Fig.53) and a hexagonal drum wall (see Fig.51). The latter is defined by a curved drum wall following its oval cupola (Fig.52). Sunk blocks of bricks also

dominate the walls, both on the main body and the cupola. No particular type of brick bond is found on both churches, except for the drum wall of Chiesa di Santa Pelagia, where headers are mostly used on the facade.

Fig.51 The hexagonal drum of the Chiesa di San Michele Arcangelo

Fig.52 The curvilinear drum of the Chiesa di Santa Pelagia

Fig.53 The curvilinear wall of the Chiesa di San Michele Arcangelo

4.2 Window

The window is an essential part of the brick masonry facade, and usually the most elaborate element on it. The definition of a window in this discussion is not just an opening on the wall, but an assemblage of different components framing the opening, serving the building both structurally and architecturally.

In this part, we are going to take a close look at the windows on the facade of three buildings, each with distinctive characteristics, which are the ground-level windows of the Ospedale di S.Giovanni, the ground-level window of the Castello del Valentino, and the ground-level window of the Collegio dei Nobili. From the modeling and breakdown of these windows, we can try to understand the ideas behind the brickwork of windows in Turin during the seventeenth and eighteenth centuries.

1) The ground-level windows of the Ospedale di S.Giovanni

Fig.54 The 17th-century ground-level window on the eastern wing facade of the Ospedale di S.Giovanni

Fig.55 The 18th-century ground-level window on the eastern extended wing facade

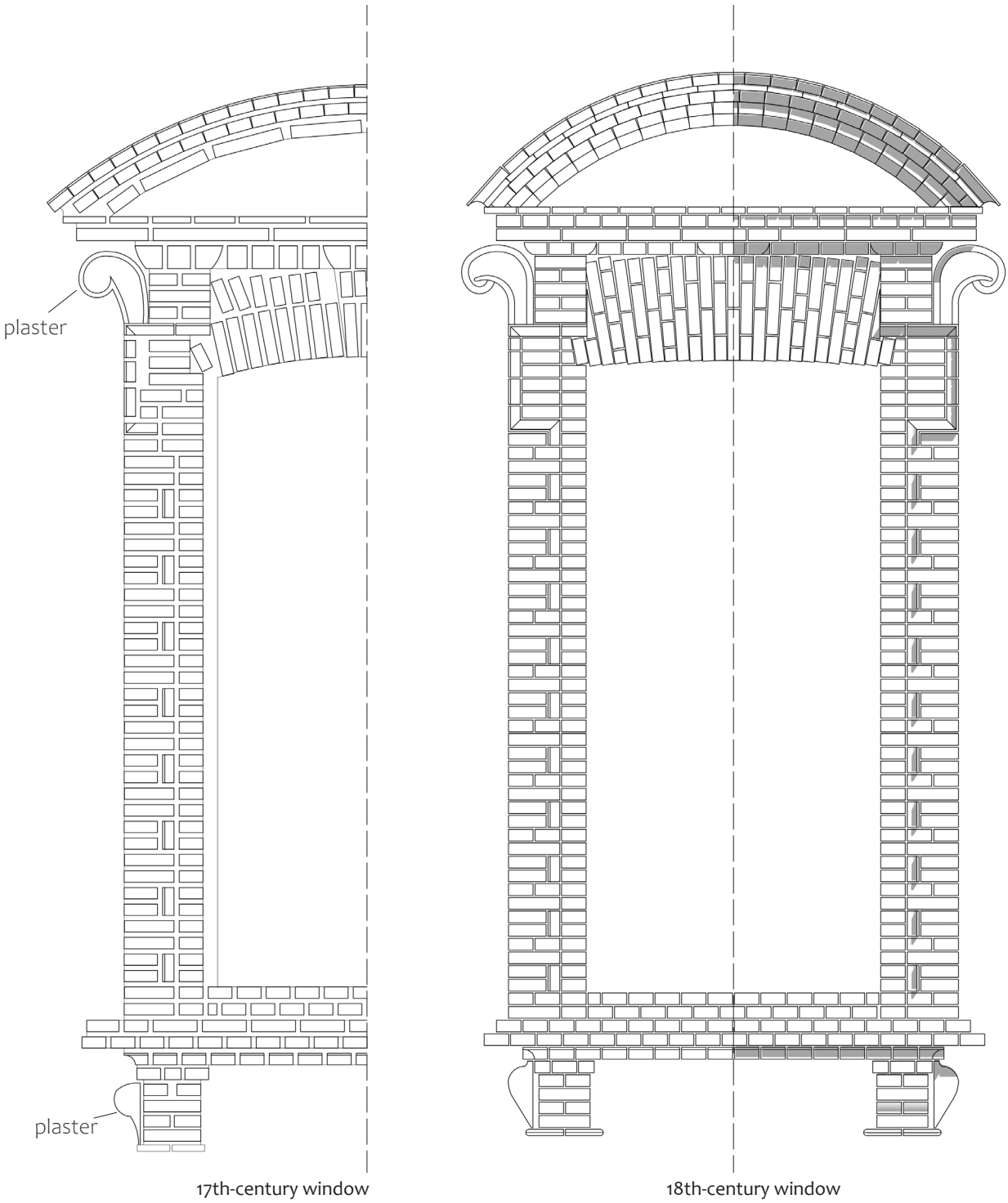


Fig.56 The elevations of the 17th-century and 18th-century ground-floor window of the Ospedale di S.Giovanni

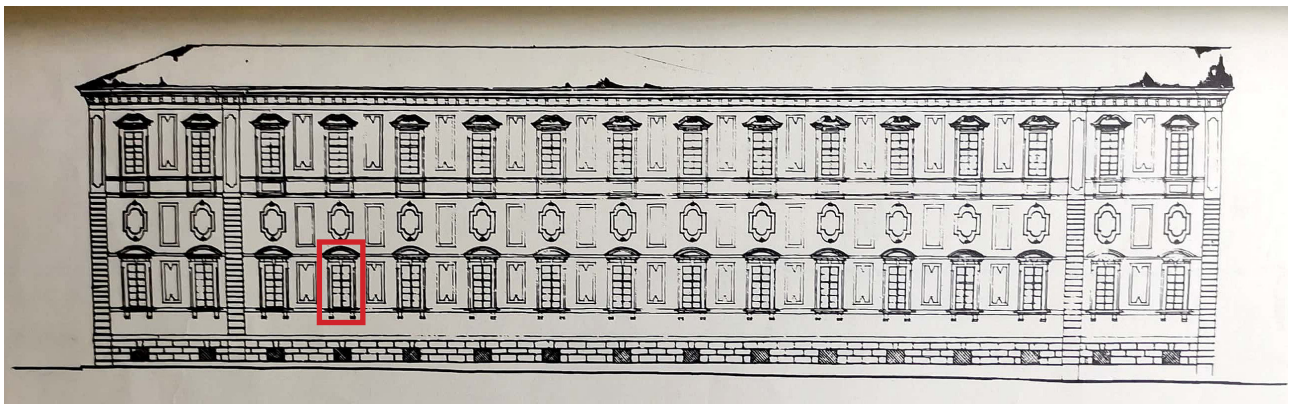


Fig.57 The western facade of the Ospedale di S.Giovanni (without the eighteenth-century extension), and the location of the 17th-century window discussed about
Giovanni Brino, Attilio De Bernardi, Giovanni Gardano, etc, L'opera di Carlo e Amedeo di Castellamonte nel XVII secolo (Torino: Edizioni Quaderni Di Studio, 1966), 151

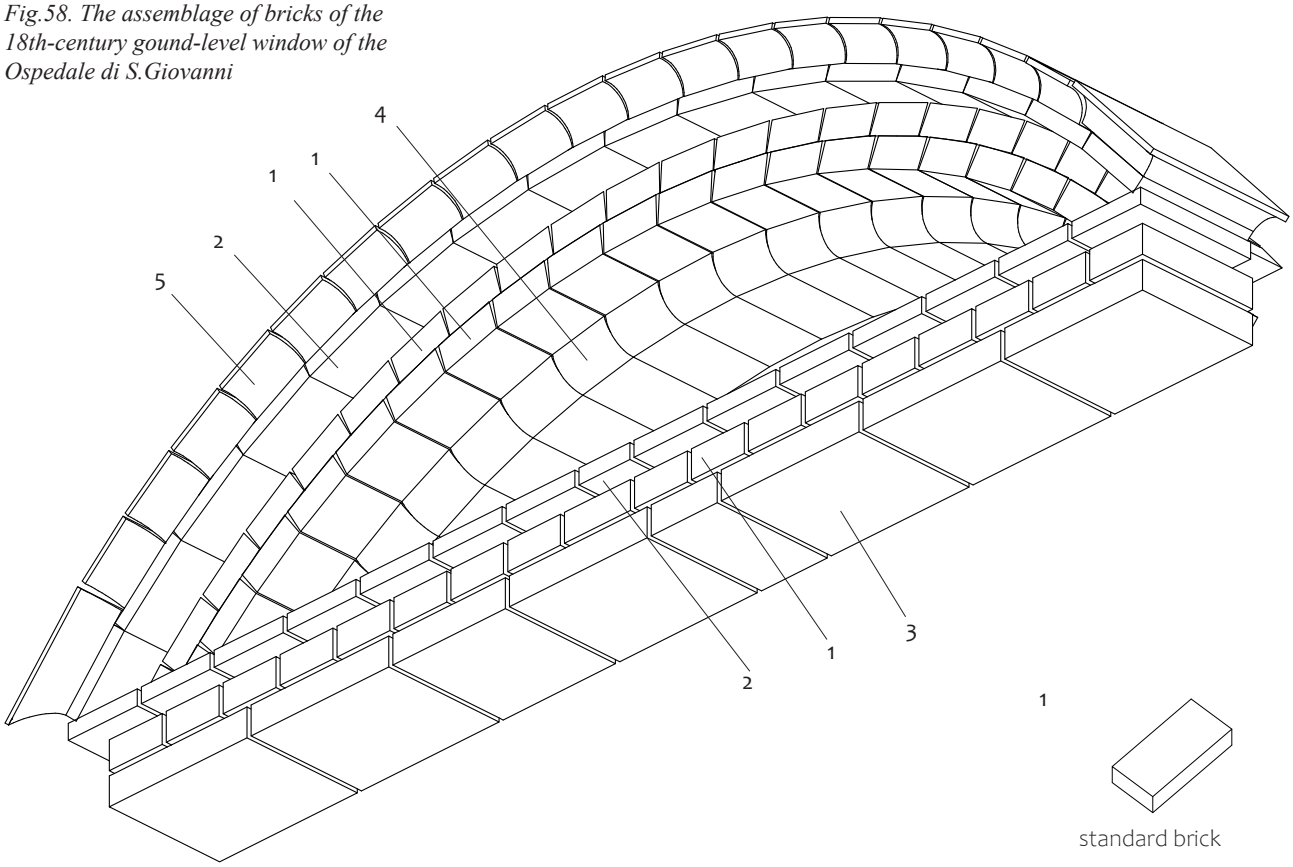
Shown in Fig.54 is the ground-level window on the eastern wing facade of the Ospedale di S.Giovanni, and in Fig.55 is the imitated work of the original one on the late eighteenth-century facade, which was built as an extension to the wing. These two windows share almost the same appearance, achieving almost identical sizes using two different kinds of brick. It is obvious to see from the elevations in Fig.56 that the 18th-century window is the same in height, but has more courses of bricks than the 17th-century one it imitated, with narrower joints. Since the two windows share similar brickwork, we will examine here the 18th-century, more recent window, by breaking it down to basic elements. (Fig.58)

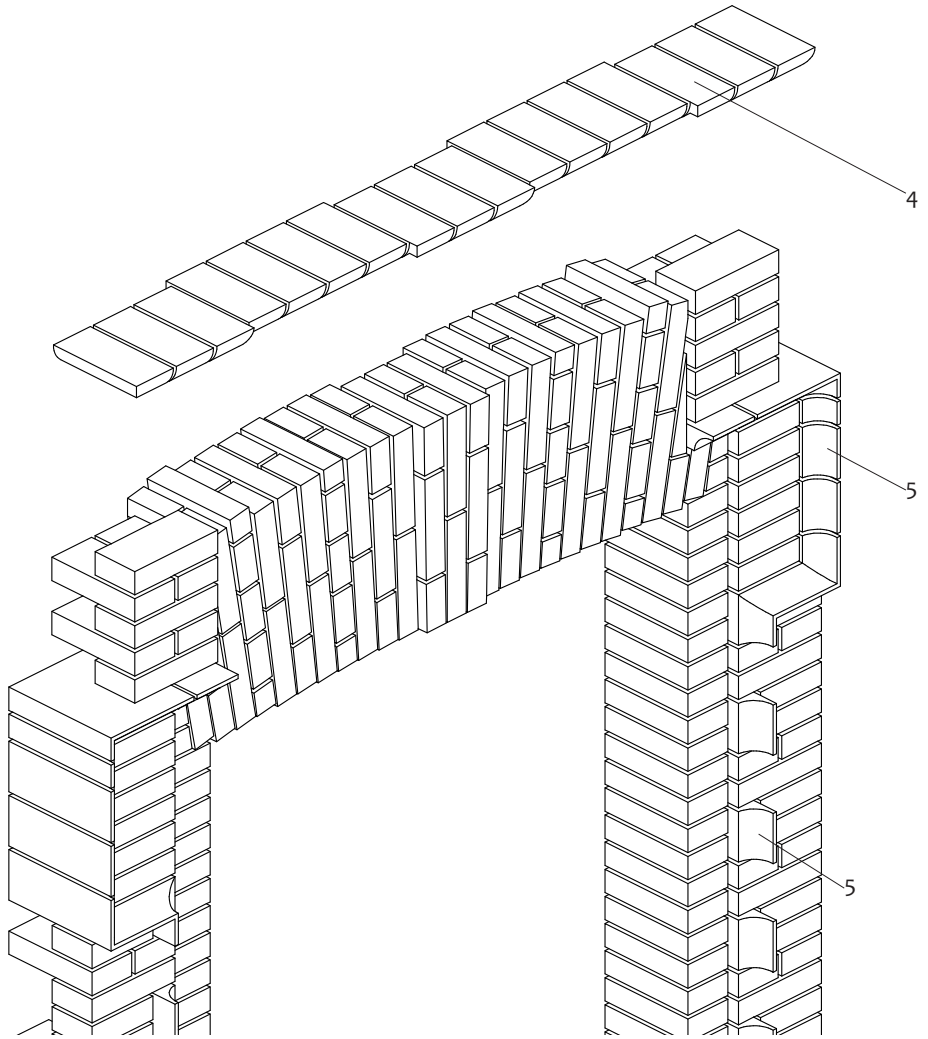
From top to bottom, the window frame features a curved pediment[1], a brick arched lintel[2], projecting ornamental bricks on two sides, a brick sill and two corbels, with an "ear" brick arranged next to each corbel as well as two "flower" brick components at two sides of the lintel. While in the 17th-century window, the "ear" and "flower" components were not made of brick, but plaster.

The pediment is a traditional Greek curved pediment. A total of five types of bricks are used in the pediment, forming five courses in the rounded part and three courses in the horizontal part. The bricks are cut for joining at the two ends of the pediment. The same curved bricks used in the pediment are also used at two sides of the frame, pointing out, surrounding the window. Similar brickwork is also seen in the northern and western-facade windows of the Ospedale di S.Giovanni and those of the Quartieri Militari (seen in Fig.59, 60). The corbelling bricks under the sill are cut for the curving appearance as seen in Fig.61. On the western facade windows of the building, triangular bricks are found under the foot of corbels to form a characteristic "guttae"[3], an ornamental detail that is rarely seen on other facades (see Fig.62).

[1] For more types of pediment and their definition, see Fig.118 in Glossary
[2] For more types of lintel and their definition, see Fig.119 in Glossary
[3] A gutta (Latin pl. guttae, "drops") is a small water-repelling, cone-shaped projection used near the top of the architrave of the Doric order in classical architecture.

Fig.58. The assemblage of bricks of the 18th-century gound-level window of the Ospedale di S.Giovanni

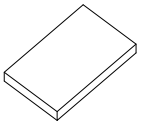




1

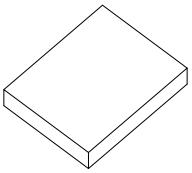
standard brick

2



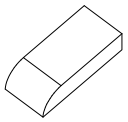
half-thickness brick

3



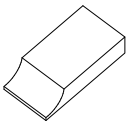
thick flat brick

4



bullnose brick

5



curved brick

The brick arched lintel is composed of brick headers and stretchers alternatively, with the bricks in the center offset as a keystone-shaped ornament. This "keystone" technique was quite common during that period and can be found on all three windows illustrated in this chapter.

Due to the long construction duration of the building (approximately eighty years), even the duplicates of windows do not have exactly the same brickwork. Most of these variations occur at the brick arch part. The first-floor window on the northern facade replaces the original thick brick arch with a segmental arch and a relieving arch, filled with brick headers in between (see Fig.63). The ground floor window on the western facade, however, used a flat arch connecting the projecting bricks on the top and support the pediment with horizontally laid bricks (see Fig.64). Aside from this, the windows share the same size and similar brickwork.

Fig.59 The 17th-century window on the northern facade of the Ospedale di S.Giovanni, with pointing out bricks surrounding the frame

Fig.60 The window above the portico of the Quartieri Militari, with pointing out bricks and guttae

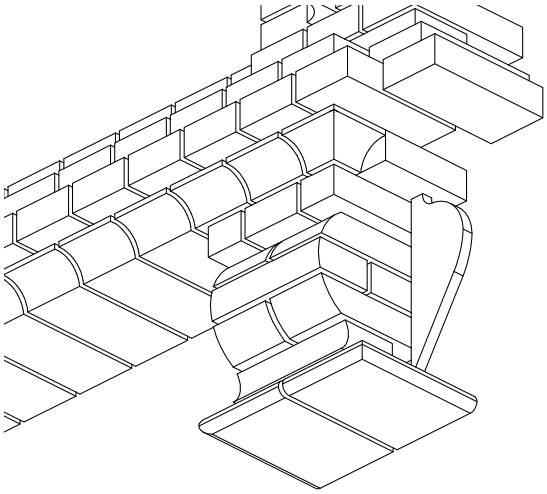


Fig.61 The illustration of the corbel on a typical window of the Ospedale di S.Giovanni

Fig.62 The triangular ornamental "guttae" at the window corbel on the western facade of the Ospedale di S.Giovanni

Fig.63 The segmental arch and relieving arch on the first-floor window on the northern facade of the Ospedale di S.Giovanni

Fig.64 The flat arch on the ground-floor window of the western facade of the Ospedale di S.Giovanni

2) The first-level window of the Castello del Valentino

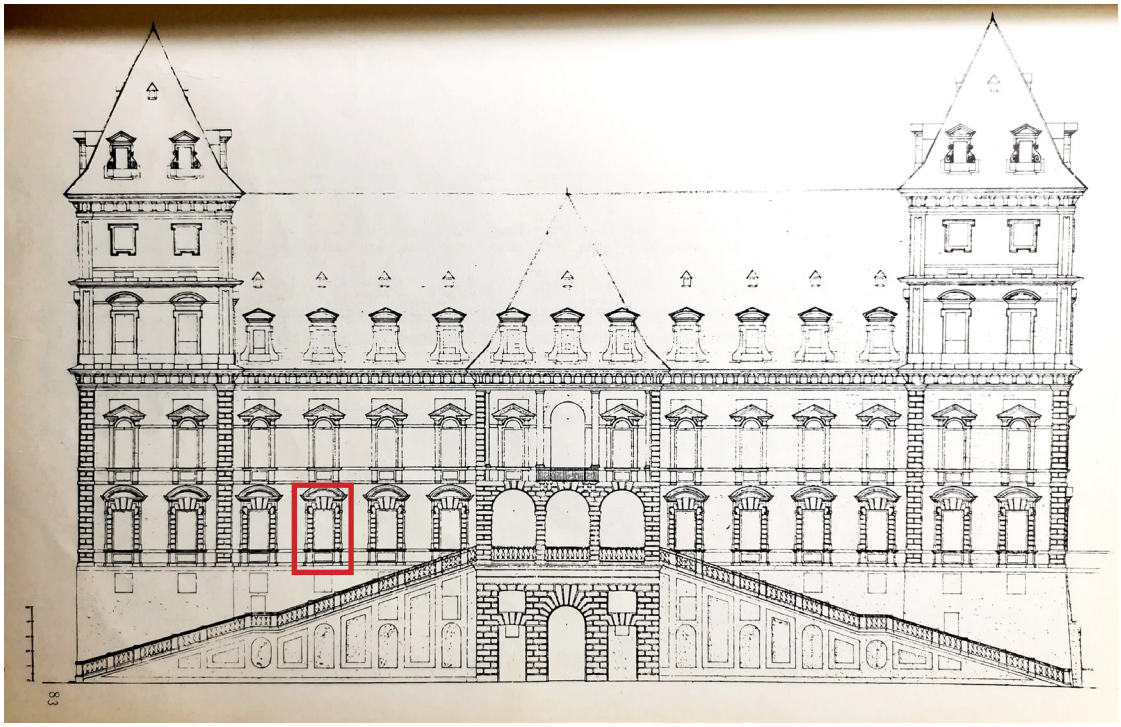


Fig.65 The eastern facade of the Castello del Valentino, and the location of the window discussed below
Giovanni Brino, Attilio De Bernardi, Giovanni Gardano, etc, L'opera di Carlo e Amedeo di Castellamonte nel XVII secolo (Torino: Edizioni Quaderni Di Studio, 1966), 83

Fig.66 The original 17th-century window on the eastern facade of the Castello del Valentino

Fig.67 The 19th-century window on the southern wing facade of Castello del Valentino

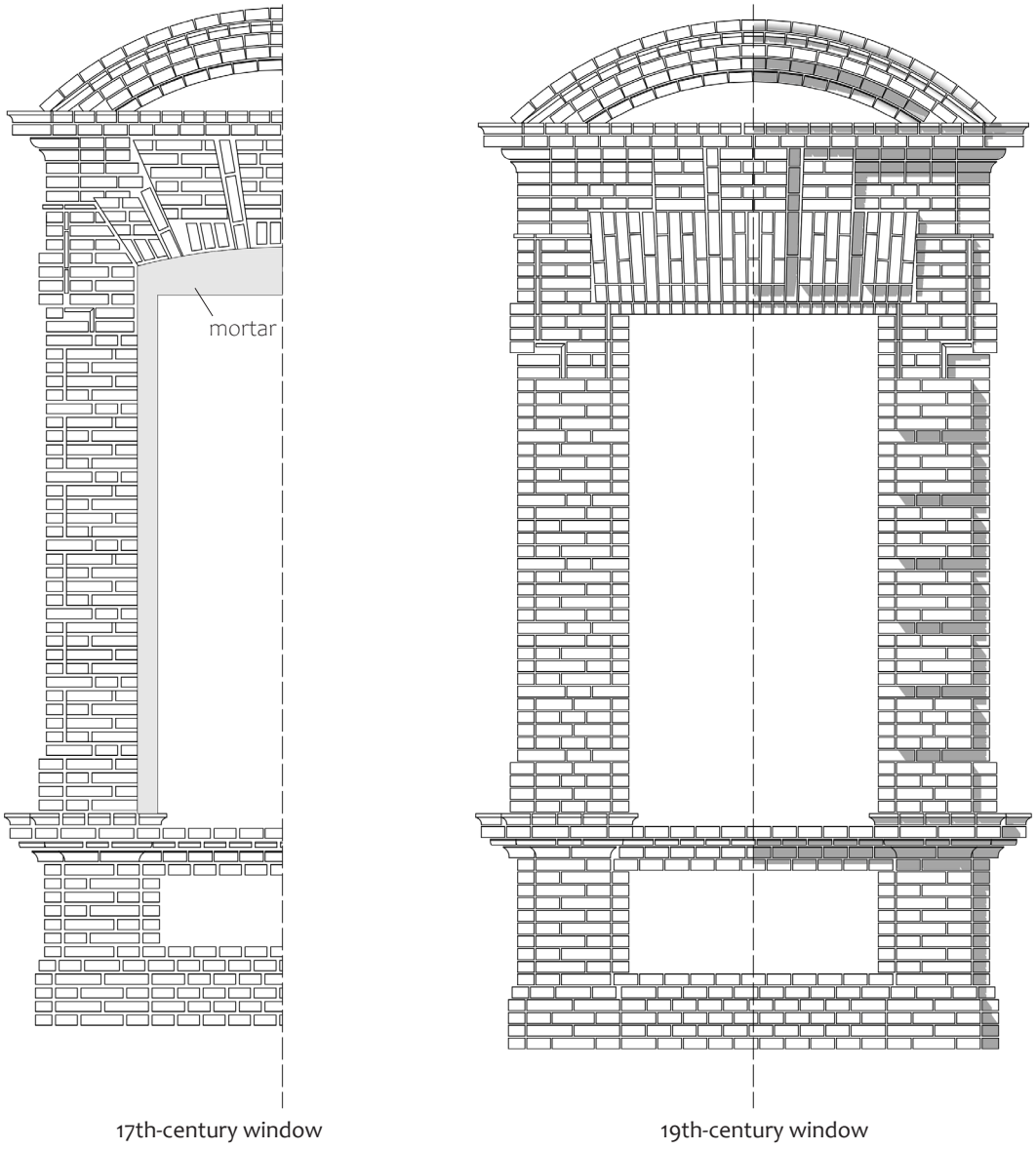


Fig. 68 Elevation of the 17th-century and 19th-century first-level window on the eastern facade of the Castello del Valentino

Like the Ospedale di S.Giovanni, the Castello del Valentino is also a building that went through different stages of construction, featuring a seventeenth-century main building facade and a nineteenth-century southern wing facade. Although some parts of the original windows are covered with modern re-pointing, the brickwork shows itself clearly at the later windows as they are the imitation of the original ones. (see Fig.66, 67) We will examine here the 19th-century window, therefore we can speculate the brickwork of the 17th-century one even though the bricks are covered partly by modern pointing.

The ground-level window of the Castello del Valentino features a curved pediment, a brick lintel and a base, with the most elaborate ornamental brickwork - the "rusticated" brickwork with raised blocks of bricks on its two sides and the lintel. The pediment of the window is a traditional Greek curved pediment, with a similar brick assemblage to that of the Ospedale di S.Giovanni.

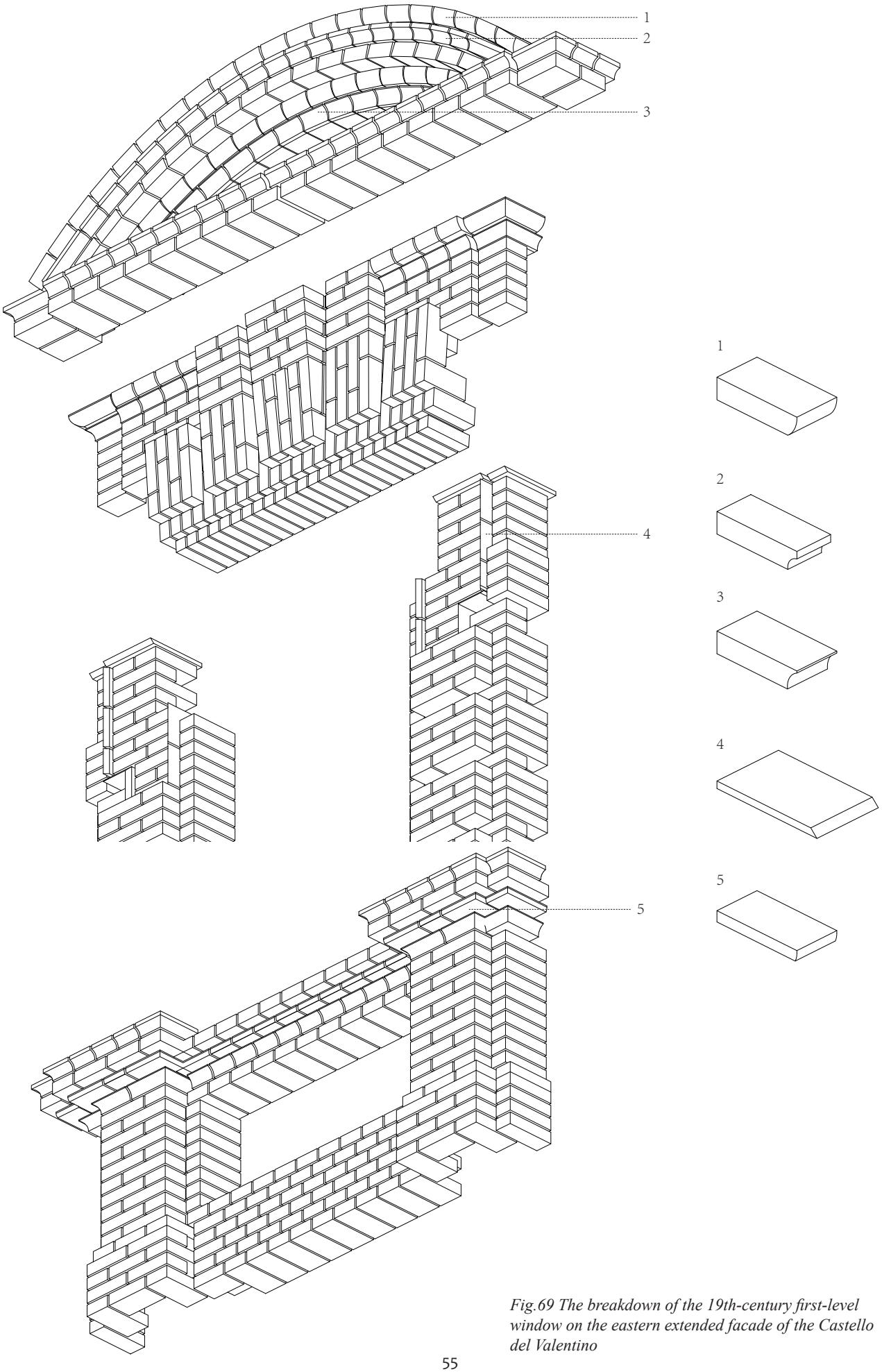


Fig.69 The breakdown of the 19th-century first-level window on the eastern extended facade of the Castello del Valentino

At the lintel, bricks are arranged as a flat arch and trimmed as a rectangle. On the raised blocks of bricks are laid horizontally several courses of bricks, supporting the pediment above, shaping a "keystone" structure over the lintel. Similar brickwork also exists at the northern facade window of the Ospedale di S.Giovanni (see Fig.70).

The window also features a relatively large base which keeps harmony with the string courses of the facade. Bases are widely seen where the window needs to connect with the string courses, both at the Castello del Valentino and the Ospedale di S.Giovanni (see Fig.71).

Fig.70 The "keystone" brickwork of the northern facade window of the Ospedale di S.Giovanni

Fig.71 The large window bases integrated with string courses of the first-level windows on the northern facade of the Ospedale di S.Giovanni

3) The ground-level window of the Collegio dei Nobili

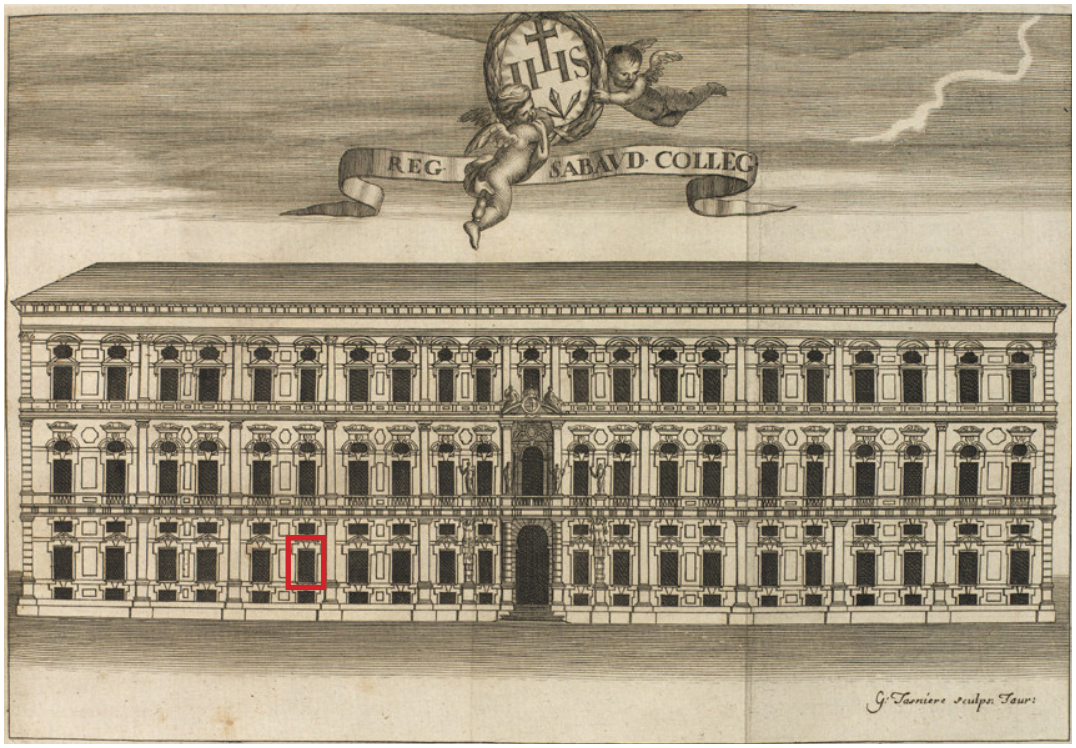


Fig.72 The eastern facade of the Collegio dei Nobili and the location of the window discussed, image by Georges Tasnière, Archivio Storico della Città di Torino

The Collegio dei Nobili features three levels of magnificent windows that distinguish themselves with a very rich, Baroque brickwork. Through the modeling and breakdown of the ground-level window, it is easier for us to understand the ideas behind these delicate window brickworks.

The Collegio dei Nobili features three levels of magnificent windows which distinguish themselves with typical baroque brickworks. Through the modeling and breakdown of the ground level window, it is easier to understand the ideas behind these delicate window brickworks. We will examine the ground-level window, and analysing the composition of this elaborate Baroque window here as an example.

The most elaborate brickwork of the ground-level window of the Collegio dei Nobili is the hollowed cylindrical brick framing achieved by combining two rows of specially shaped bricks. It ends at the top of the window, where a curved "keystone" structure is projecting from the lintel, supporting a cornice (see Fig.73-75). The ground-floor window sits between two small rectangular windows above and below, therefore, a cornice is installed instead of a commonly seen pediment.

As in the Ospedale di S.Giovanni, the ground-level windows of the Collegio dei Nobili are not uniform in terms of brickwork. Several variations can be found at the eastern and southern facade windows. The bricks used at these windows are clearly in a different color than the ones on the northern facade. The "keystone" ornament is apparently made in one piece, possibly with a stucco finishing, instead of an assemblage of bricks shown in Fig.76. There are also two mortar framings at two sides of the cylindrical brick framing, serving as an enhancement to the cylindrical brick frame (Fig.74). The assemblage of bricks differs from window to window as well, which

Fig.74 The mortar framing at both sides of the cylindrical brick frame

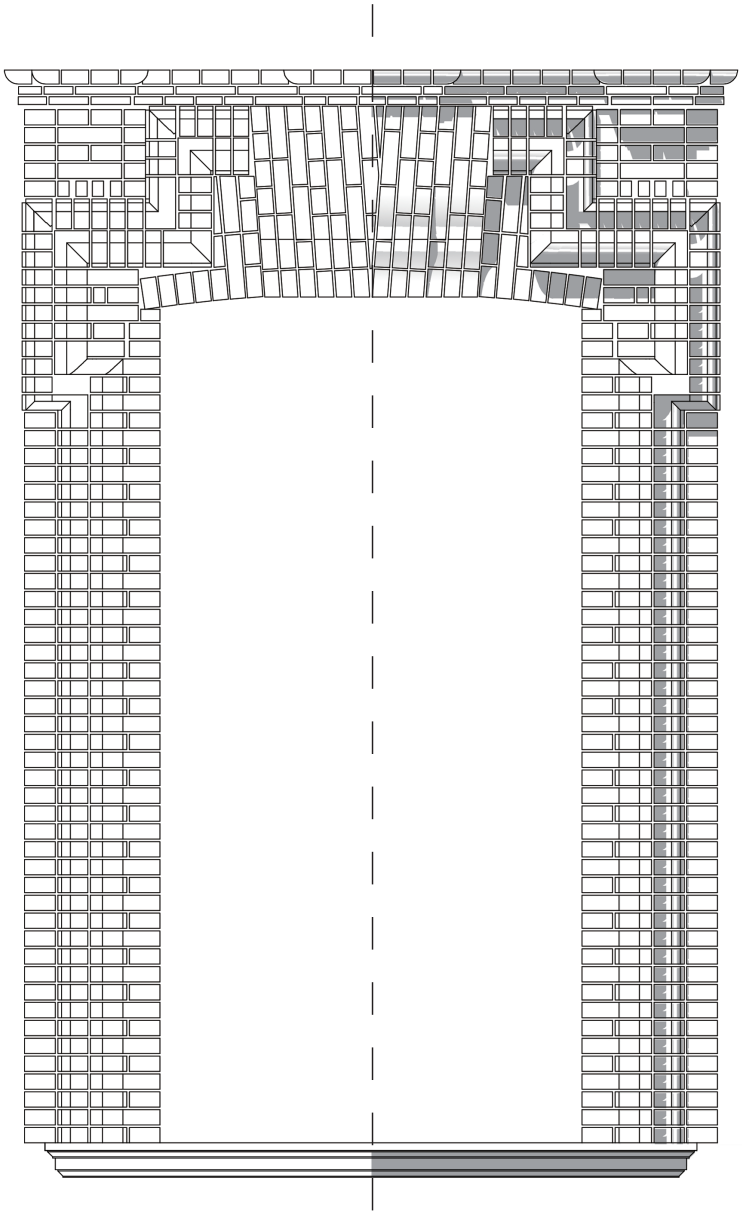


Fig.73 The elevation of the ground-level window of the Collegio dei Nobili

Fig.75 The ground-level window on the northern facade of the Collegio dei Nobili

indicated a project as well as the later intervention in the hands of a group of bricklayers with different techniques. However, unlike the previous two buildings discussed in this section, despite the different brickworks at the windows, the size of the bricks seems to be the same on all three facades.

The brickwork of cylindrical brick frame also characterizes the first and second level windows of the Collegio dei Nobili (see Fig.77,78). Instead of two rows of bricks, one row of rounded bricks is used at these windows to frame the opening, as well as the small window on the pediment of the second-floor window. The first-floor window features two hollowed pilasters

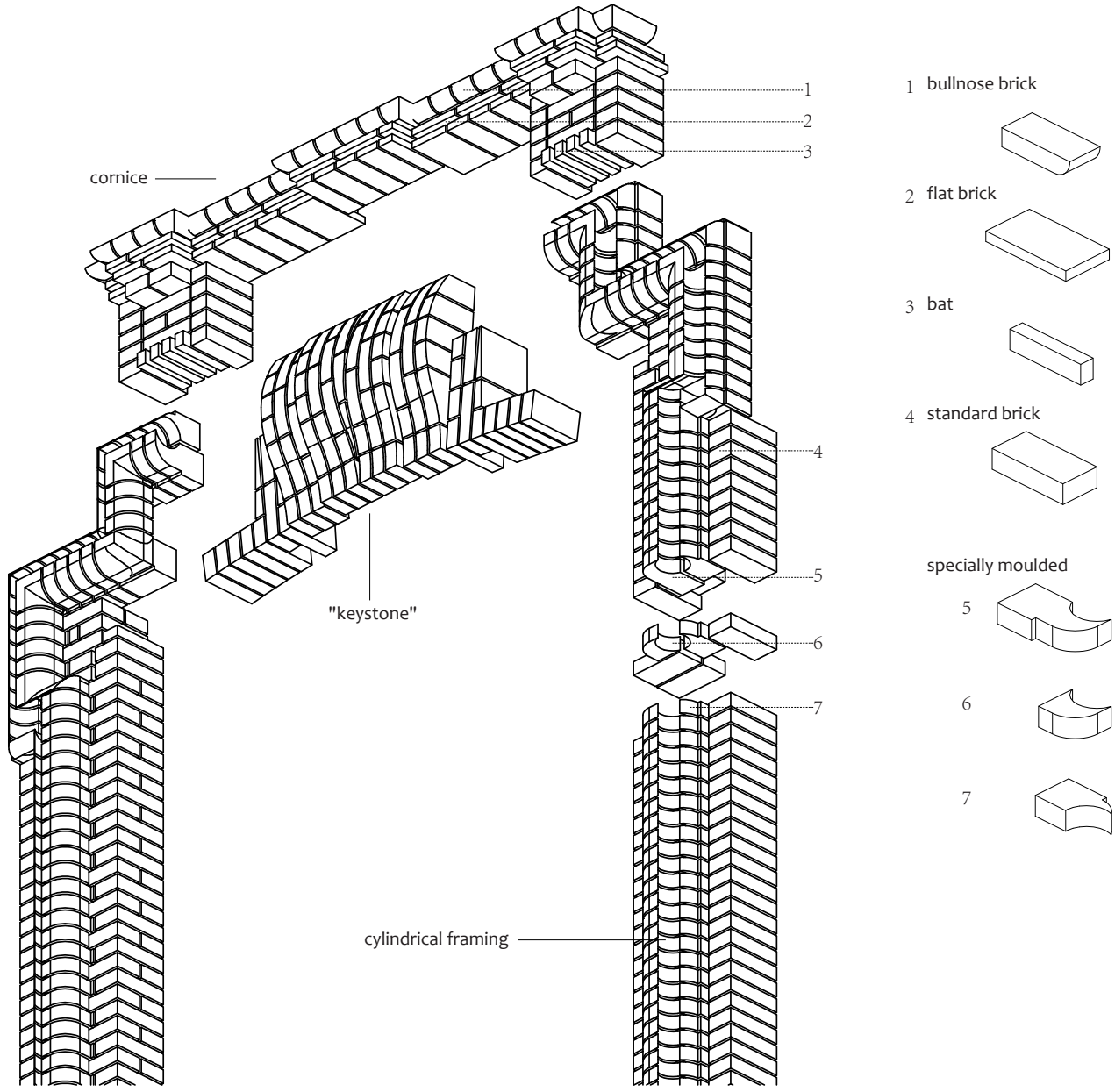


Fig.76 The breakdown of the ground-level window frame of the Collegio dei Nobili

and a composite pediment framing the window, with an elliptical window frame embedded into the pediment. The second-floor window features two pilasters and a broken pediment, having an irregular shaped window embedded into it.

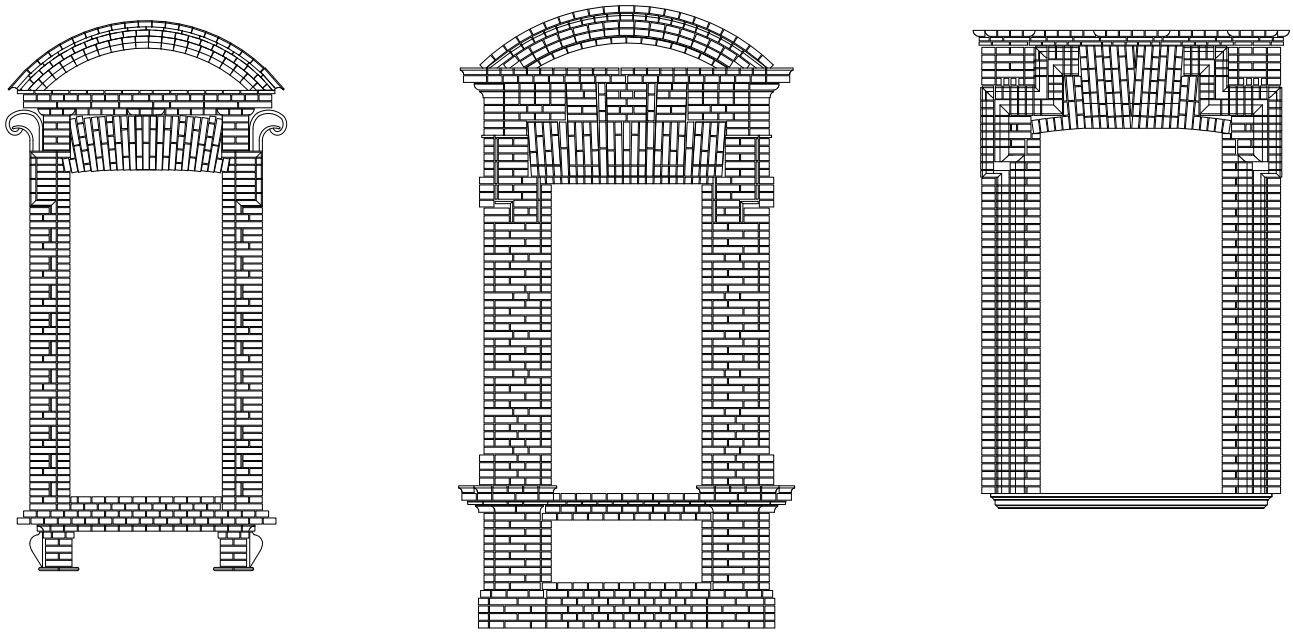
Fig.77 The first-level window on the northern facade of Collegio dei Nobili

Fig.78 The second-level window on the northern facade of Collegio dei Nobili

4) the commonalities among the three windows

There was a large variety of window brickworks on the brick facades from the seventeenth century to the eighteenth century in Turin, ranging from a language of simplicity, to angular "rustication", to elegantly curved, Baroque profiles. Nevertheless, the idea behind the brickwork of individual windows has some basic principles to follow:

i. headers and stretchers are used alternatively at both sides of the frame
ii. only headers are used at the pediment and sill
iii. bricks are mostly arranged vertically at the lintel
iv. at the center of the lintel, a keystone is usually installed
v. a brick framing is always prominent surrounding the window, in the form of raised surface, pointed bricks, etc.



Ospedale di S.Giovanni Castello del Valentino Collegio dei Nobili

Fig.79 The comparison of the three windows discussed in this chapter, on the same scale

5) other windows

Aside from the three windows discussed in this chapter, there are also a variety of other windows. The brickworks of most of the windows follow the basic principles discussed in the last paragraph, however, some other elaborate elements are introduced.

The second-level window on the eastern facade of the Castello del Valentino features an open pediment[4], accompanied by a niche cap, which is exclusive in this building (see Fig.80). A swan-neck pediment[5] is found on the second-level window on the eastern facade of the Ospedale di S.Giovanni (Fig.81). As a masterpiece of the Baroque architecture, the Palazzo Carignano distinguishes itself with magnificent Baroque windows on the exterior and courtyard facade, where specially moulded and sculpted bricks are arranged together to shape a complicated structure surrounding the window (see Fig.82,83).

Fig.80 The open pediment and niche cap on the eastern facade of the Castello del Valentino

Fig.81 The swan-neck pediment on the eastern facade of the Ospedale di S.Giovanni

Fig.82 The baroque window on the western facade of the Palazzo Carignano

Fig.83 The baroque window on the courtyard facade of the Palazzo Carignano, with the curtain-like frame on its sides, made of moulded and sculpted bricks

[4,5] For types of pediment and their definition, see Fig.118 in Glossary

4.3 Orders

"An order in architecture is a certain assemblage of parts subject to uniform established proportions, regulated by the office that each part has to perform."[6] The presence of the orders comes down to the ancient Greek and ancient Roman civilization, being the major elements in classical architecture. Among the earliest written description of orders was that of Vitruvius's book *De Architectura*, in which he describes three of the orders - Ionic, Doric and Corinthian, and gives notes on another – Tuscan.[7] Indeed, so comprehensive was Vitruvius that he became a kind of yardstick for the early Renaissance writers. There is no doubt that the first great Renaissance treatise, *De Re Aedificatoria*, written by Leon Battista Alberti[8], is very much modelled on the style and content of the Roman work. But the first comprehensive illustrated handbook of the orders, however, is that of Sebastiano Serlio[9], which laid down a thorough foundation for the later treatises on the orders of architecture, including *Regole delle Cinque Ordini d'Architettura* by Giacomo da Vignola[10] and the famous *I Quattro Libri dell'Architettura* by Andrea Palladio[11]. [12]

A full order always consists of the pedestal, the column, and the entablature. It does not have to have a pedestal and often does not in many cases. However, it must have an entablature (columns are meaningless unless they support something) with the cornice represents the eaves of the building finishing off the slope of the roof.

Here let us take a look at the three orders on the facade of the Collegio dei Nobili, Palazzo Carignano, and the Quartieri Militari. The three pilasters are all engaged columns, which means they are partly embedded in the wall and partly projecting from the surface of the wall. The orders of the Palazzo Carignano and the Quartieri Militari are giant orders encompassing two storeys, which is commonly seen in Italian Renaissance and Baroque architecture. Built at almost the same time, the orders of the Collegio dei Nobili and the Palazzo Carignano share many similar characteristics. For example, they have an almost identical pedestal consisting of 12 courses, they both have a shaft

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[6] Gwilt Joseph, Papworth Wyatt, *An Encyclopædia of Architecture: Historical, Theoretical, and Practical*. (London: Longman, Brown, Green, and Longmans), 680

[7] John Summerson, *The Classical Language of Architecture* (The M.I.T Press), 9

[8] Leon Battista Alberti (14 February 1404 – 25 April 1472) was an Italian Renaissance humanist author, artist, architect, poet, priest, linguist, philosopher and cryptographer; he epitomised the "Renaissance Man".

[9] Sebastiano Serlio (6 September 1475 – c. 1554) was an Italian Mannerist architect, who was part of the Italian team building the Palace of Fontainebleau. Serlio helped canonize the classical orders of architecture in his influential treatise variously known as I sette libri dell'architettura ("Seven Books of Architecture") or Tutte l'opere d'architettura et prospetiva ("All the works on architecture and perspective").

[10] Giacomo Barozzi da Vignola (1 October 1507 – 7 July 1573) was one of the great Italian architects of 16th century Mannerism. His two great masterpieces are the Villa Farnese at Caprarola and the Jesuits' Church of the Gesù in Rome. He was one of the three architects who spread the Italian Renaissance style throughout Western Europe, along with Serlio and Palladio.

[11] Andrea Palladio (30 November 1508 – 19 August 1580) was an Italian Renaissance architect active in the Venetian Republic. Palladio, influenced by Roman and Greek architecture, primarily Vitruvius, is widely considered to be one of the most influential individuals in the history of architecture. While he designed churches and palaces, he was best known for country houses and villas. His teachings, summarized in the architectural treatise, The Four Books of Architecture, gained him wide recognition.

[12] Robert Chitham, *The Classical Orders Of Architecture* (Oxford: Architectural Press, 2005), 19-20

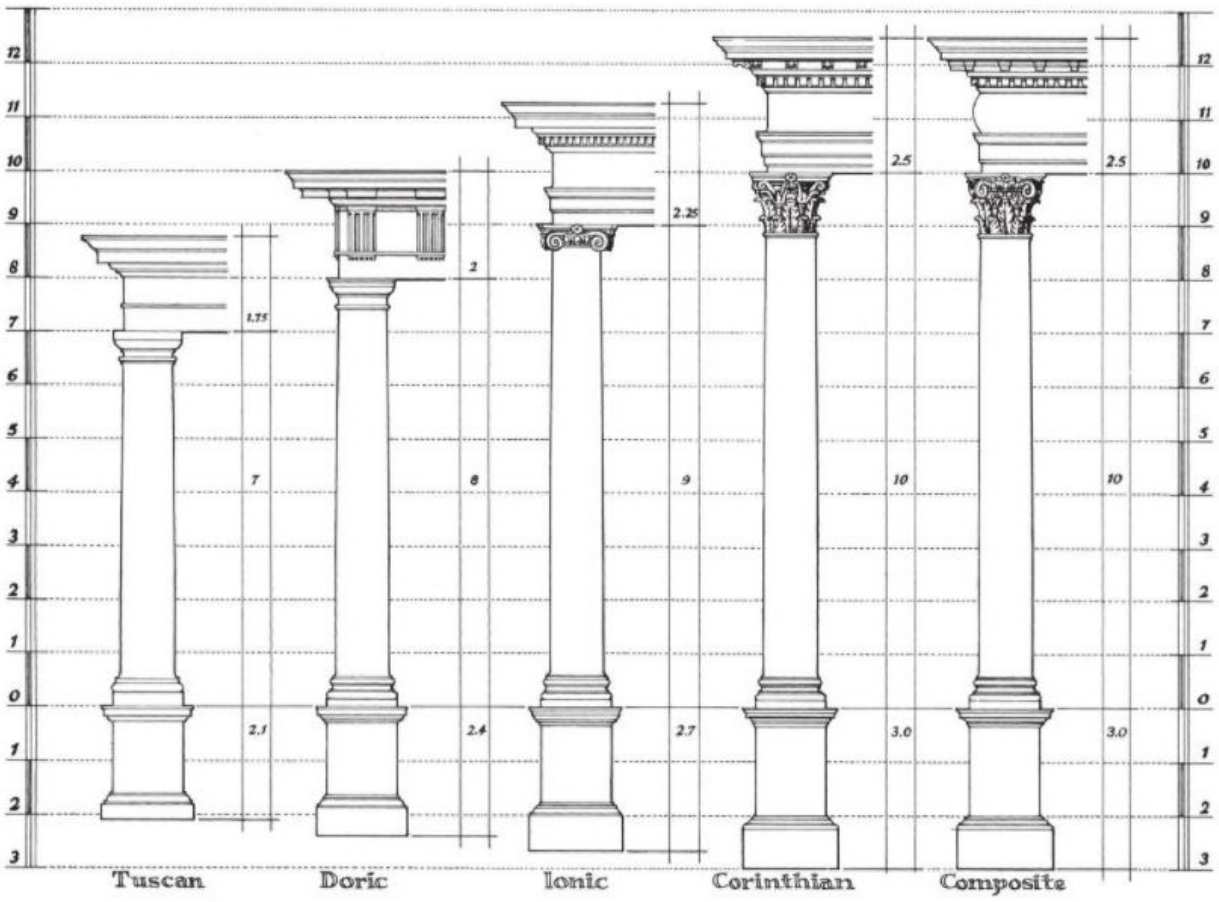


Fig.84 The five orders of classical architecture
Robert Chitham, The Classical Orders Of Architecture (Oxford: Architectural Press (Elsevier), second edition), 55

where a sunk block of bricks is laid out in the middle, surrounded by headers, and they both hold a distinguished Baroque capital on top of the column (Fig.85-88). The entablature of the order on the Palazzo Carignano is a sophisticated and elaborate assemblage of bricks, integrated with the continuous top cornice, which we will examine in detail in "4.4 Cornice".

Unlike the first two orders, the order of the Quartieri Militari has four stone panels distributed over the shaft, in order to increase the overall structural strength of the colossal composition. The shaft alone has 115 courses (nearly nine meters in height), making possible a giant portico dominating the facade of the barracks. (Fig.89)

We are more or less familiar with the capitals of the five orders of classical architecture (see Fig.84). The capitals of the brick facades we are examining here are none of these, however, they evolve from the classical capitals and inherit the key elements and regulations in measurements. For example, the capital of the Collegio dei Nobili is a Baroque successor of the Ionic capital, while the one of the Palazzo Carignano is the Baroque presentation of the combination of the Ionic and Corinthian capitals. It is an interesting fact that the capital of the Palazzo Carignano is made out of terracotta (see Fig.87), while that of the Collegio dei Nobili is apparently a stone product (Fig.84).

Fig.85 The first-level order of the Collegio dei Nobili

Fig.86 The stone capital on the first-level order of the Collegio dei Nobili

Fig.87 The terracotta capital on the giant order of the Palazzo Carignano

Fig.88 The giant order rising from the first floor of the Palazzo Carignano

No regular capital is found at the Quartieri Militari but a composition of bricks on the head of the pilaster, resembling a triglyph[13] usually seen in Doric entablatures (see Fig.89). It is interesting to notice that the assemblage of this "composite capital", following the language of the Doric order, used only brick to achieve the appearance of triglyphs (see Fig.90). The absence of a regular capital in this order can be interpreted as a design language coming from the Doric order which is mostly used at fortifications and barracks, and in this case at the gigantic barracks designed by Filippo Juvarra.

It is easy for us to connect the Quartieri Militari with the Palazzo dei Capitanio, the work of Andrea Palladio in Vicenza. Not only the giant orders are used in a similar way to form a three-arch portico, but also the language of the windows and attic floor of the barracks are delicate continuity to the work of the 16th-century masterpiece. (Fig.91,92)

In Fig.93, the illustrations of the three orders examined above are put together on the same scale, from which we can come to a general idea of the brickwork of the orders on brick facades in early modern Turin, at least the most featured ones. Like the classical orders illustrated in Fig.84,

[13] Triglyph is an architectural term for the vertically channeled tablets of the Doric frieze in classical architecture, so called because of the angular channels in them.

the essential parts that made up a classical order: the pedestal, the column (composed of the base, the shaft and the capital) and the entablature (composed of the architrave, the frieze and the cornice) also exist in these orders. Most of these structures are made of brick, with some exceptions: the capital of the order of the Collegio dei Nobili, some corbels of the Quartieri Militari are in brick, while the Baroque capital of the Palazzo Carignano is in terracotta.

Fig.89 The upper structure on the pilaster of the Quartieri Militari, with the composite capital displaying triglyph-like vertical channels.

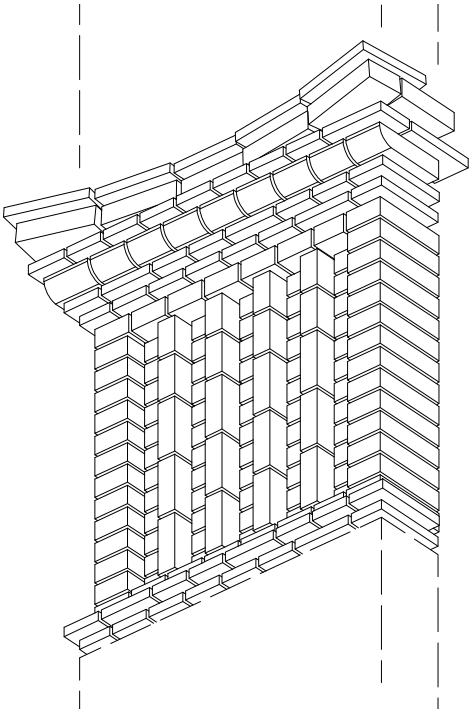


Fig.90 A hypothesis of the assemblage of bricks in the "composite capital" of the Quartieri Militari

Fig.91 The portico of the Quartieri Militari, showing the giant orders and the windows above the portico

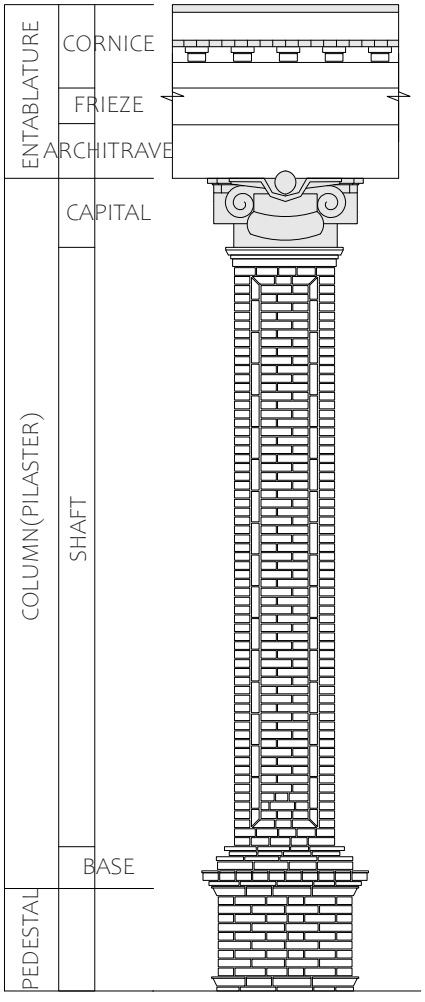
Fig.92 The portico of the Palazzo dei Capitanio by Andrea Palladio, in Vicenza (photo from Wikipedia)

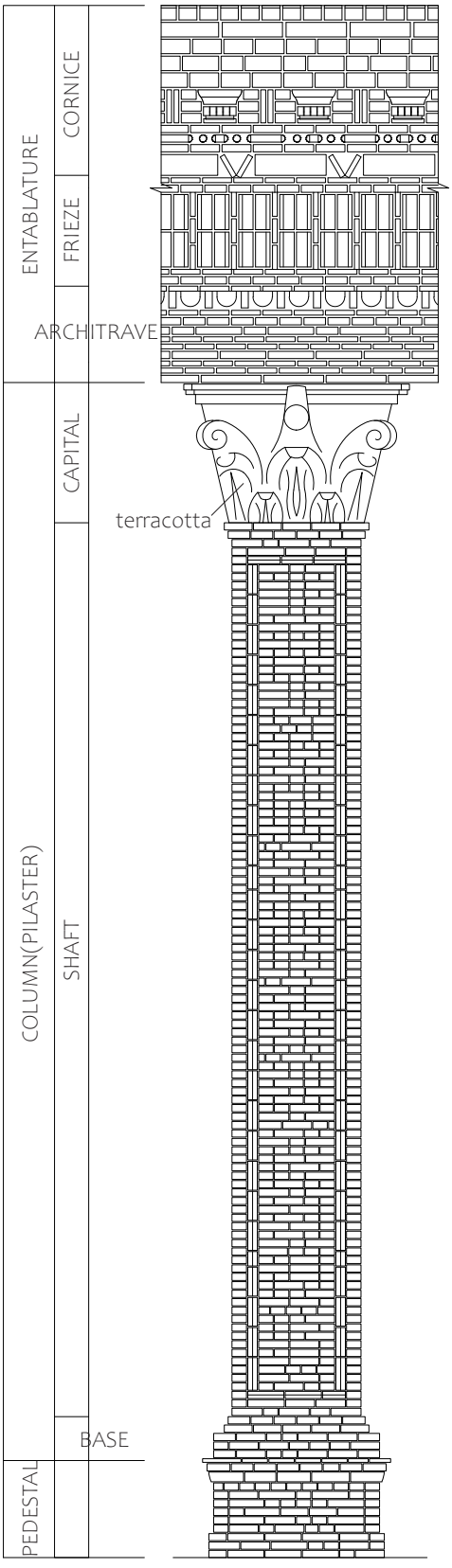
Fig.93 The elevation of the three orders on the facade of the Collegio dei Nobili, the Palazzo Carignano, and the Quartieri Militari on the same scale, and their plan of pilasters

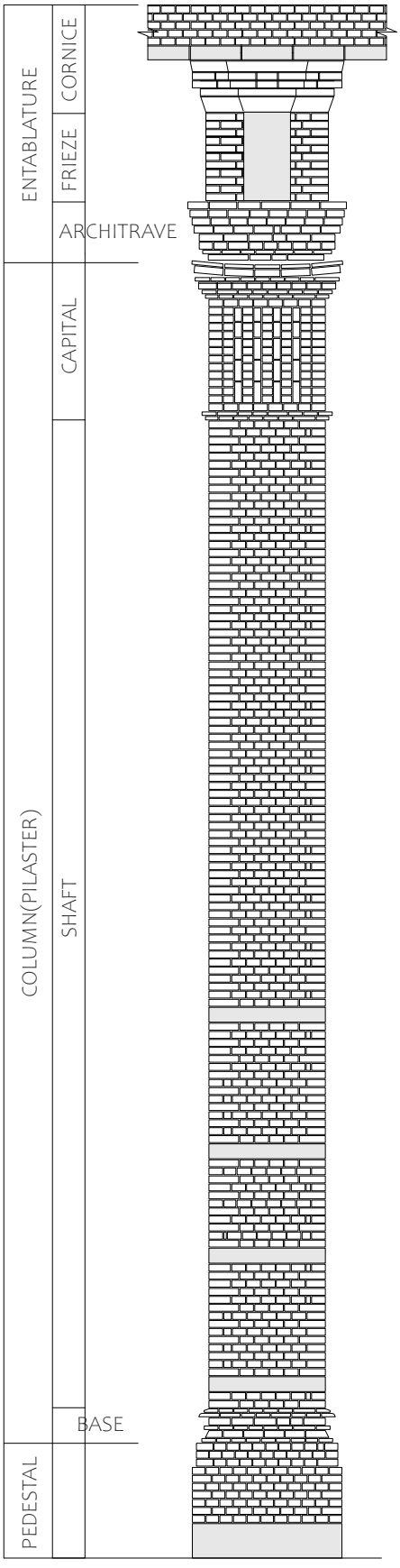
(we have assumed the same size for bricks and mortar joints; components made of stone are colored in grey)

brick

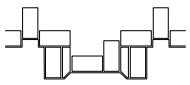
stone



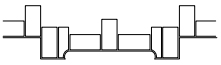




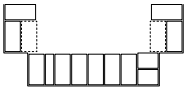
PLAN OF PILASTER



Collegio dei Nobili



Palazzo Carignano



Quartieri Militari

Then we shall take a look at the orders of the two churches- the Chiesa di Santa Pelagia and the Chiesa di San Michele Arcangelo, both built in the eighteenth-century successively (Fig.94,97). The two orders share some common characteristics, for example, the round bases sitting on a long continuous stone pedestal supporting the rounded column and the similar brickwork on the entablature. The brick circular double columns of the Chiesa di San Michele Arcangelo are partly embedded into the wall, while the ones of the other church are departing from the wall forming a colonnade, covered with plaster. The capital on the order of the Chiesa di San Michele Arcangelo features a four-course superstructure with four round ear-shaped bricks embedded at four diagonals (Fig.95, hypothesis of its brickwork in Fig.98). The capital on the Chiesa di Santa Pelagia is a Baroque deviation of the Ionic capital, resembling the one of the Collegio dei Nobili, also sculpted in stone. At the shaft, moulded bricks are laid out centripetally where headers and stretchers are both used according to the decreasing diameter of the column from bottom to top (see the hypothesis of the brickwork in Fig.98).

The bedding course of the architrave of both churches is made with one whole stone panel, increasing the structural strength of the order. In the case of the Chiesa di Santa Pelagia, in particular, in order to support a giant gable on top of the entablature, three brick relieving arches

Fig.94 The double circular column of Chiesa di San Michele

Fig.95 The capital of the order of Chiesa di San Michele

Fig.96 The capital of the order of Chiesa di Santa Pelagia

Fig.97 The circular column of Chiesa di Santa Pelagia

are embedded in the entablature, spanning from the first order to the last one. (see the illustration in Fig.98)

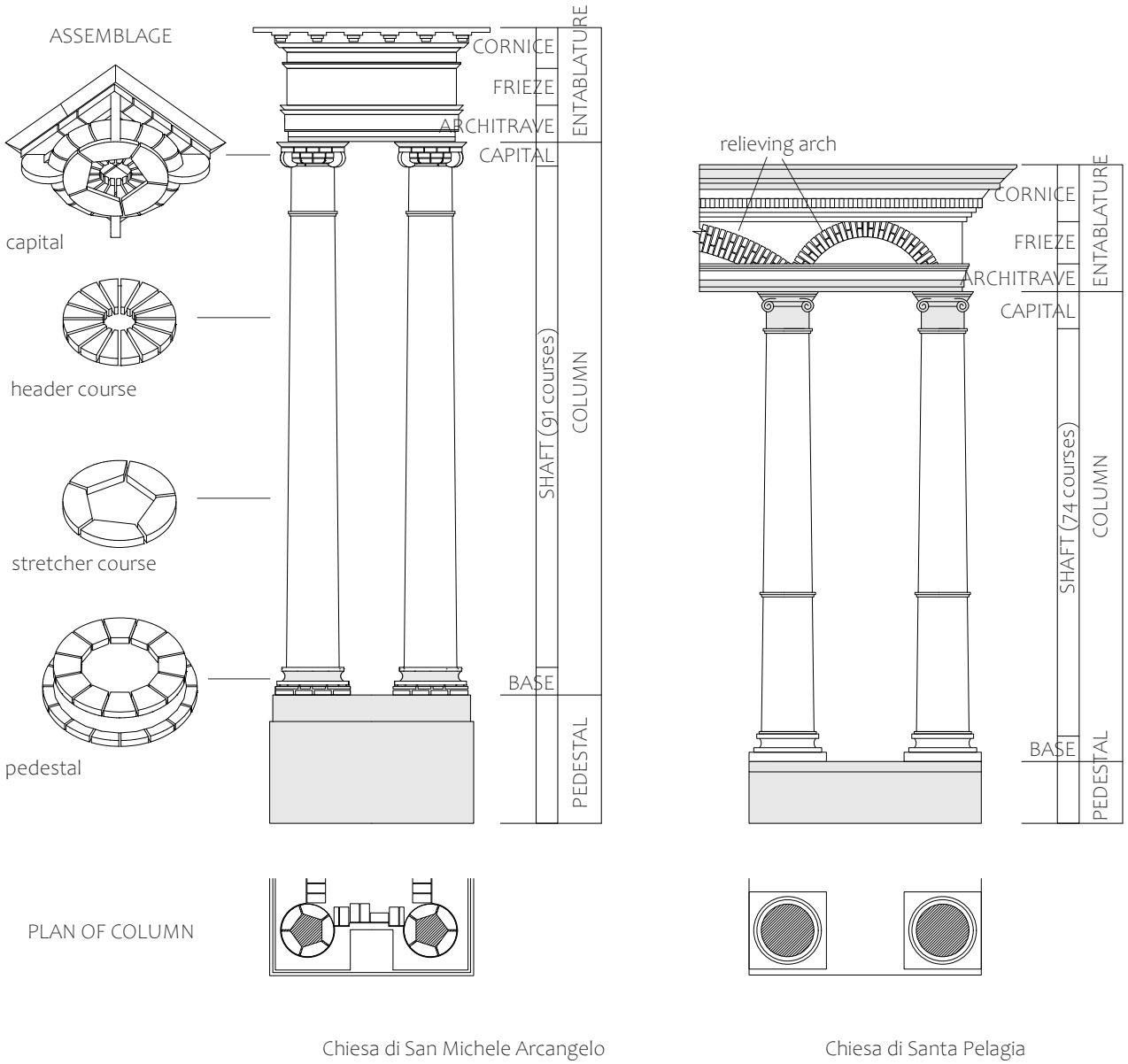


Fig.98 The elevation of the orders of the two churches on the same scale, the hypothesis of the assemblage of the column of the Chiesa di San Michele Arcangelo, and their plan of columns (we have assumed the same size for bricks and mortal joints; components made of stone are colored in grey)

4.4 Cornice

1) Traditional cornice

In Ancient Greek architecture and its successors using the classical orders in the tradition of classical architecture, the cornice is the topmost element of the entablature, which consists (from top to bottom) of the cornice, the frieze, and the architrave. Generally speaking, in the brick wall façade, the cornices are the composition of bricks carried out upon the top of the walls and orders, having a large projection, crowning the building, in order to throw off the rain.

It is not surprising to realize that the brickwork of the cornices on the facades of classical architecture is following the almost same principle, only with some variations on the shape of the corbelling. It is reasonable to assume that some guidance and instructions for the construction of cornices were implied into the work of the bricklayers in Turin from the seventeenth century on. For further explanation, we can take a look at the cornices of the Ospedale di S.Giovanni, the Castello del Valentino and the Collegio dei Nobili (Fig.99-101).

Fig.99 The 17th-century cornice on the northern facade of the Ospedale di S.Giovanni

Fig.100 The cornice on the facade of the Collegio dei Nobili

Fig.101 The cornice on the facade of the Castello del Valentino (the left part being the 19th-century terracotta corbels)

Taking the cornice on the eastern façade of the Ospedale di S.Giovanni as an example, the brickwork of the cornice is quite easy to recognize. From bottom to top are corbellings, stone bedding course and crown moulding. (Fig.103)

The corbellings are laid out with moulded bricks, accompanied by one layer of bricks both above and below it. There exist two variations of corbels on the facades of the Ospedale di S.Giovanni, with a different number of moulded bricks used for the shape (see Fig.102). The stone bedding course, which functions as the layer connecting the corbelling part and the crown part, is stone panels with water grooves on the edge of them for keeping water away from the wall. The crown moulding is a composition of several courses of different types of bricks, the

brickwork of which can be traced on the window pediments on the same façade.

It is an interesting fact that stone is commonly found as the material for the bedding course, instead of brick. The explanation for this may be that the bedding course holds the responsibility to carry the weight of the projecting superstructure over it, and the structural strength of a stone slab is much higher than that of a brick one. In addition, stone is more resistant to the rain and freezing in comparison to brick. However, on the cornice of the Palazzo Carignano, we can notice that thick and long bricks are used for the bedding course, in which case the structural strength is achieved also considering the coherence of material.

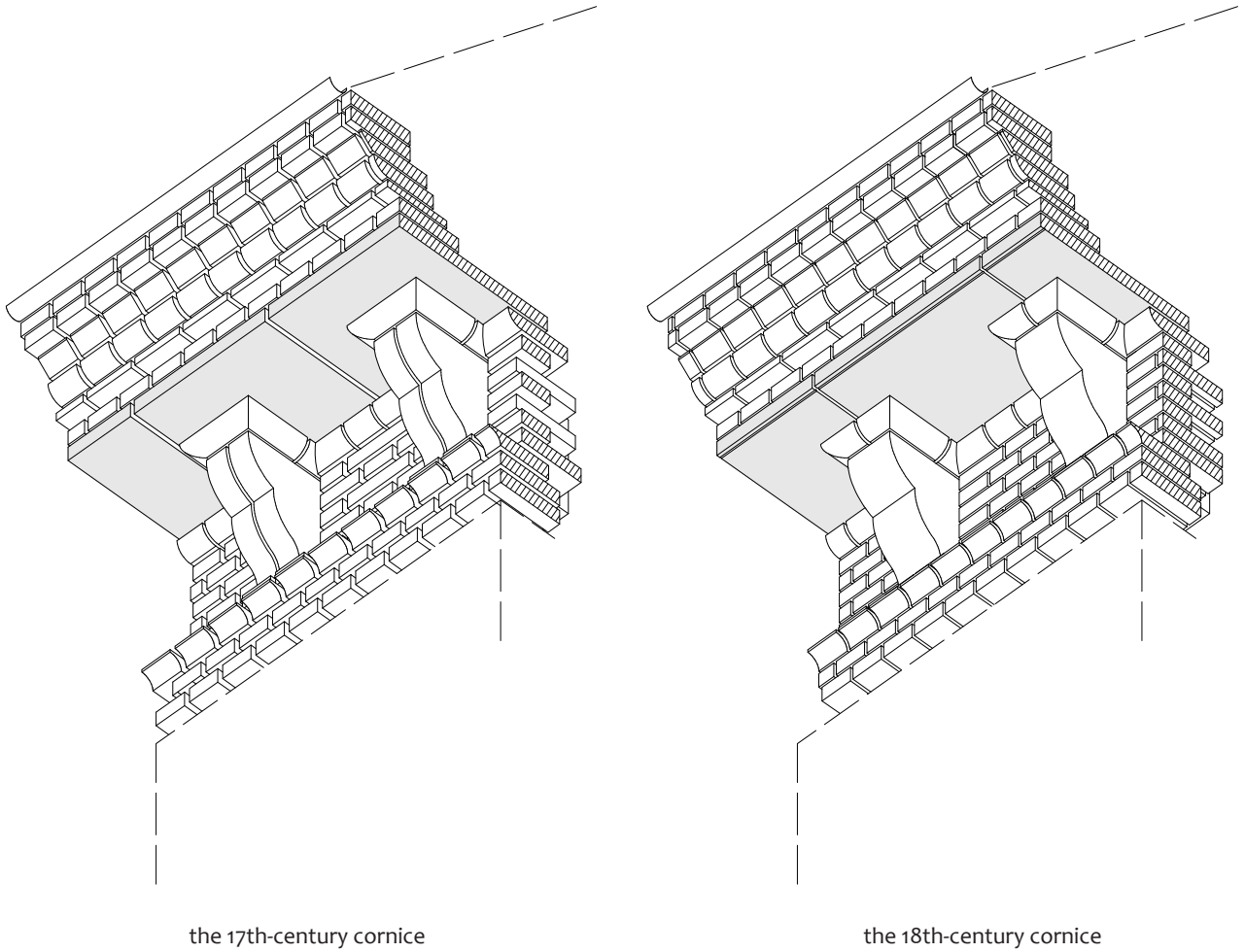


Fig.102 The illustration of the 17th-century and 18th-century cornice on the eastern facade of the Ospedale di S.Giovanni

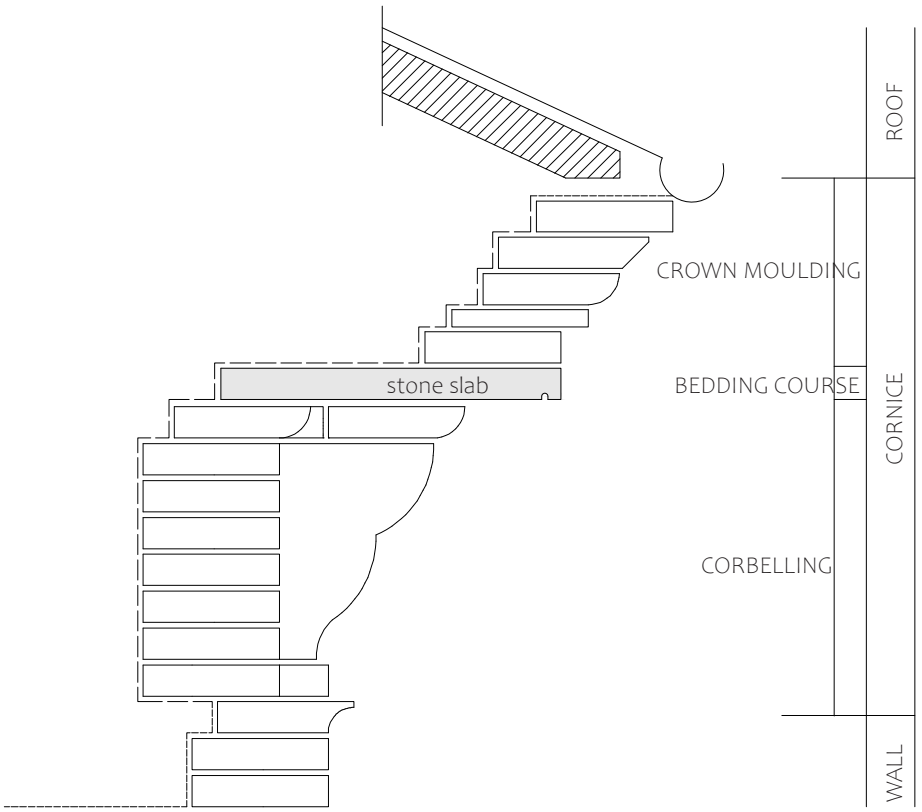


Fig.103 The section of the 18th-century cornice on the eastern facade of the Ospedale di S.Giovanni

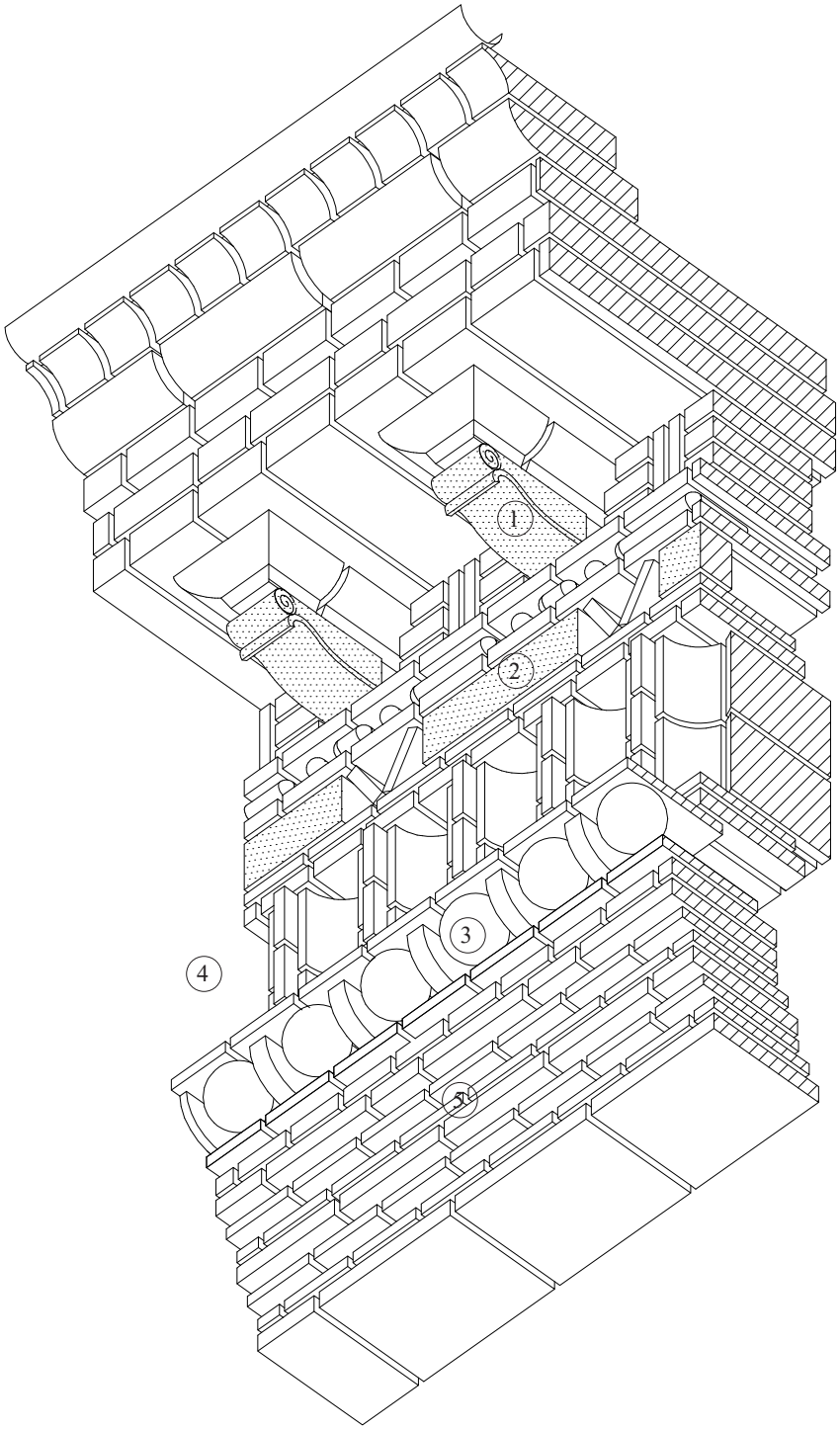
2) Baroque cornice

Unlike the simplicity these cornices represent, the cornice of the Palazzo Carignano, as an elaborate example of Baroque architecture, shows an extraordinary complexity of brickwork. It reserves the entire structure composing a classical entablature - subdivided into the architrave, the frieze and the cornice. The entablature is the superstructure of mouldings and bands which lie horizontally above columns, resting on their capitals. In these cases, the entire entablature is positioned right below the roof, serving as the cornice of the façade.

The modillion is a type of corbel used mostly under a Corinthian or a Composite cornice. In this cornice, the wave-shaped modillion supports a bedding course composed of long thick bricks and the crown moulding on top of it. The frieze features a variety of vertically laid bricks, large cast bricks and flat bricks arranged in the “V” shape. Elaborate oval windows are also located in the frieze, aligned with the main windows on the façade. The architrave is the lowest part in the delicate entablature, sitting on capitals, arranged with several courses of bricks, as well as the "egg and dart"[14] motif exclusively seen in mouldings (see Fig.104,105). It is interesting to notice that

[14] Egg-and-dart, also known as egg-and-tongue, egg and anchor, or egg and star, is an ornamental device adorning the fundamental quarter-round, convex ovolo profile of moulding, consisting of alternating details on the face of the ovolo—typically an egg-shaped object alternating with a V-shaped element (e.g., an arrow, anchor, or dart).

the bedding course for this cornice is not made of stone slabs like in the other cornices, but of brick, which makes the facade of the Palazzo Carignano almost one hundred percent brick (terracotta can be seen as a relative to brick).

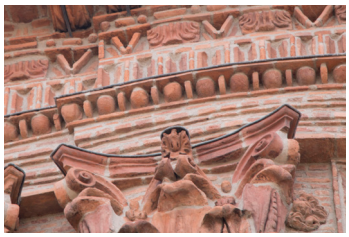


1 modillions under the brick bedding course

2 moulded/cast brick

3 vertical channeling over "egg and dart" motif

4 oval window on the frieze



5 the architrave lying above the terracotta capital

Fig.104 The axonometric diagram of the cornice on the facade of the Palazzo Carignano (moulded/cast bricks are marked in dots)

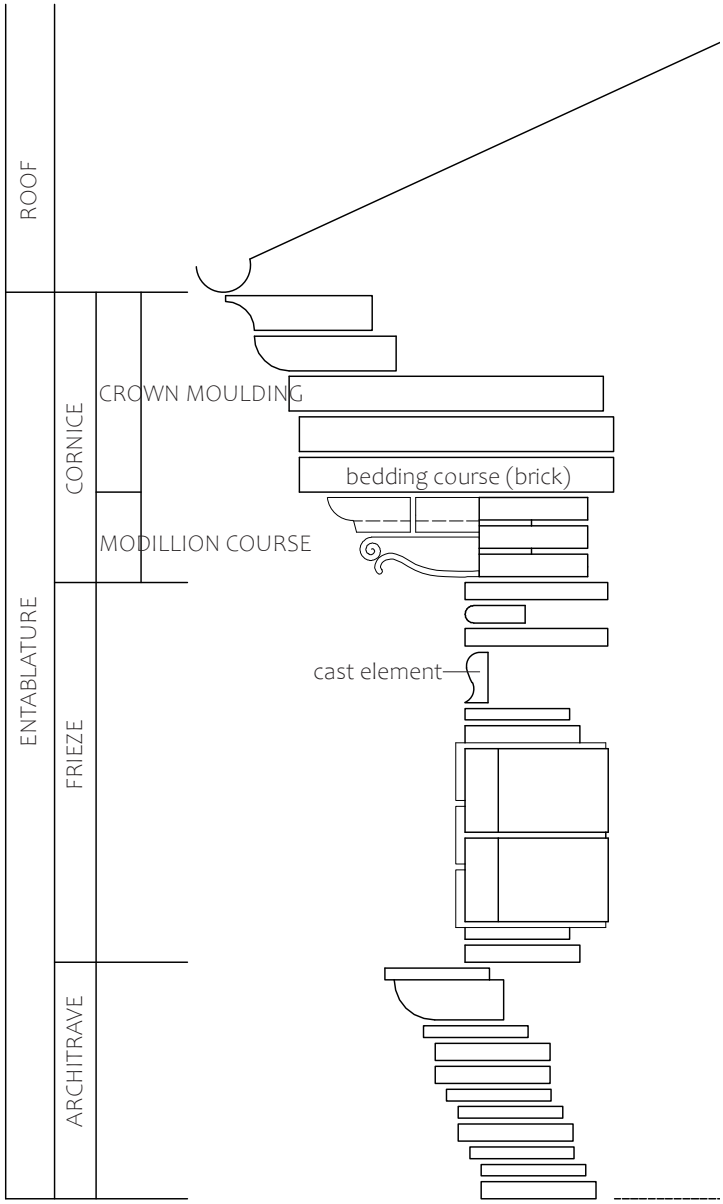


Fig.105 The section of the cornice on the western facade of the Palazzo Carignano

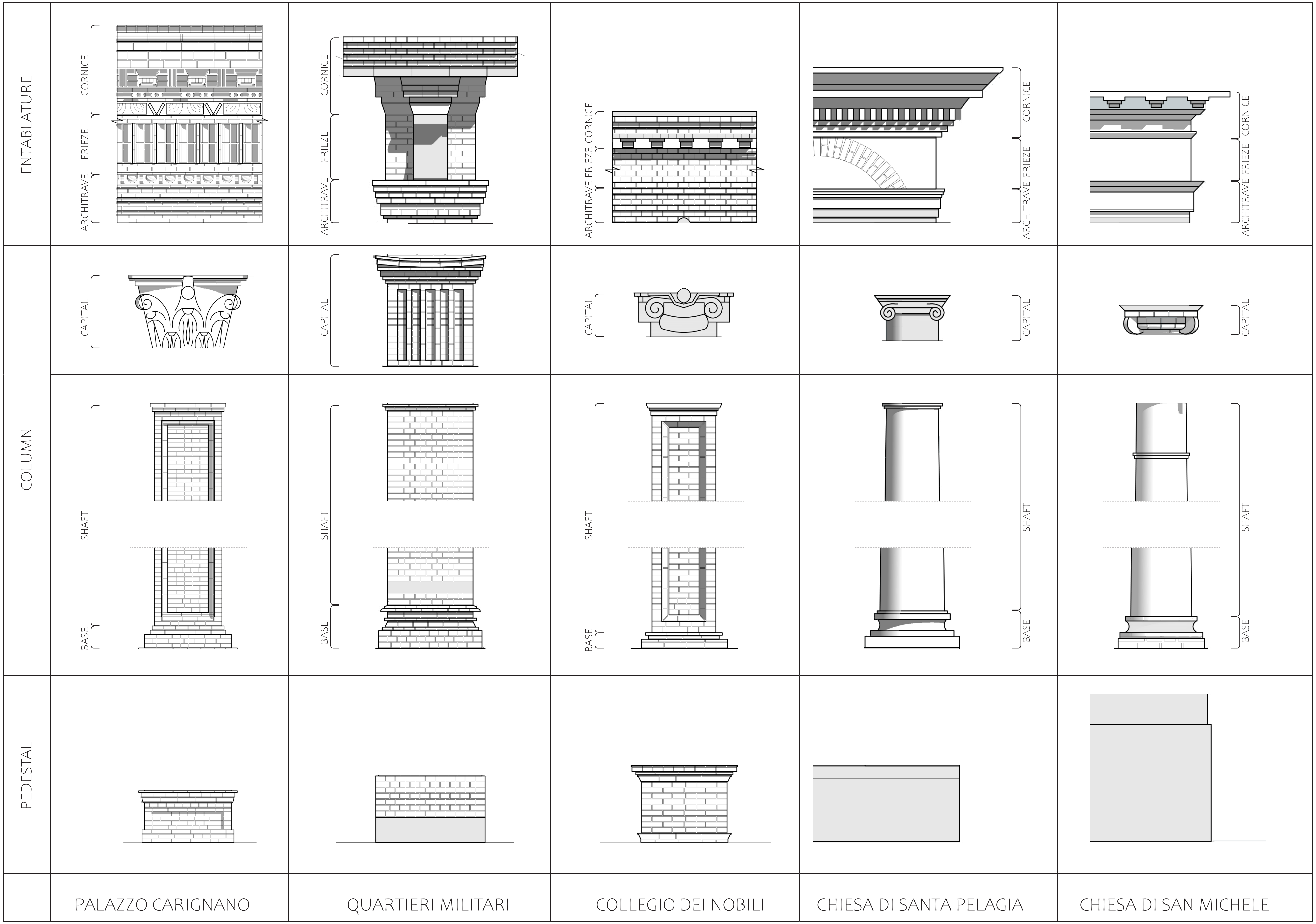
3) Corbelling variations

The principle of brickwork of the cornices varies from one to another, while the most obvious characteristic remains at the corbelling. Usually corbelling has two variations called modillions and dentils. A dentil is a small block used as a repeating ornament in the bedmould of a cornice. On the façade of the Palazzo Carignano, the modillions show the decorative characteristic of Baroque elements, while on the cornices of the two churches, the Chiesa di San Michele Arcangelo and the Chiesa di Santa Pelagia, the cornices tend to be more traditional: rectangular bricks (in Santa Pelagia) or sculpted stone blocks (in San Michele) are used for corbelling and support for the projecting stone panel (Fig107,108). Meanwhile, on the lower cornice of the Chiesa di Santa Pelagia, dentils replace corbels, in a brick-only cornice, plastered in its upper elements (see Fig109).

Fig.106 The cornice on the northern facade of the Chiesa di San Michele Arcangelo featuring stone modillions

Fig.107 The cornice on the western facade of the Chiesa di Santa Pelagia featuring rectangular brick modillions

Fig.108 The brick-only lower cornice on the western facade of the Chiesa di Santa Pelagia featuring blocks of brick as dentils



Comparison of the elements of the orders on five buildings in early modern Turin, 1600-1800 (stone components are filled in grey)

4.5 Reinforcement

In masonry buildings, the reinforcement system consisting of the "chains" or "tie-rods" (usually referred to in Italian treatises, as “la catena”) with their vertical anchoring systems (rods or "anchor plates") plays an important role in the structure of a building. The chain is a structural element made out of a material with high tensile strength, for example, iron, steel and wood. It consists of a metal bar crossing the building, usually near or in correspondence with the floors, anchored to the wall by means of a key head and a metal bar, or anchor plate. The anchor is a component used on the exterior wall of a masonry building, usually a metal bar or plate with a decorative style. They are generally located symmetrically on both walls to evenly distribute the tension, thus stabilizing the wall, keeping it from collapsing (see Fig.108). Sometimes the chain is exposed, which can be seen on balconies and porticoes.

In the Piedmontese palaces of the seventeenth century and eighteenth century, the vault system was widely applied, which encouraged the widespread use of reinforcements integrated into the process of construction. In masonry buildings, the chains were usually penetrating the vault, connecting to the anchor plates on the exterior surface of wall. Within the buildings we have considered here, examples of visible ties and anchors can be found on the facades of the Castello del Valentino, the Ospedale di S.Giovanni, the Palazzo Carignano, the Collegio dei Nobili and the Quartieri Militari.

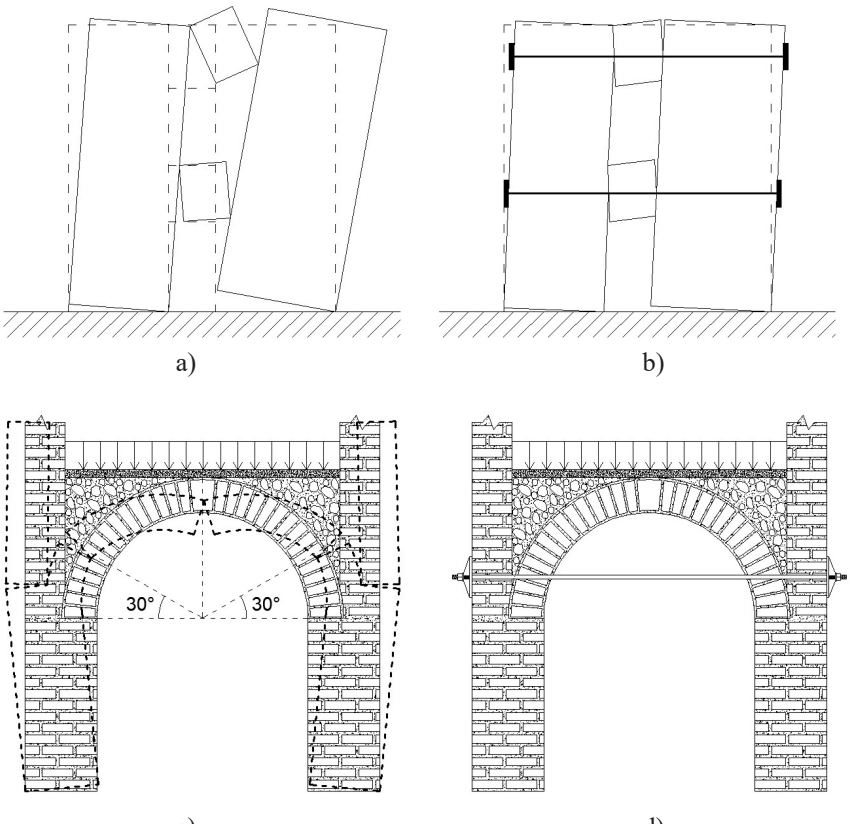


Fig.109 a) Behavior of wall in the absence of tie-rods; b) Behavior of wall in the presence of tie-rods; c) Behavior of vault in the absence of tie-rods; d) Behavior of vault in the presence of tie-rods.
(Michele Vinci, "Dimensionamento di tiranti per edifici in muratura", edificiinmuratura.it)

Fig.110 The visible metal anchor rods on the 17th-century facade of the Castello del Valentino

On the 17th-century eastern facade of the Castello del Valentino, there are visible metal bars distributed mostly near string courses, indicating the chains stabilizing the building at the location of wooden floors on vaults. These metal bars are embedded into the wall, some of which are covered with vertically laid bricks in the gaps they produced. The others are visible on the surface of the wall, breaking the bricks on the surface, indicating that they may have been added after the construction of the wall. (see Fig.110)

On the facades of the Ospedale di S.Giovanni, the anchor rods are placed regularly at the same height, near the first-level floor sitting on the vaults. These are long metal bars placed at the raised ornamental bricks, covered with segmental bricks, only showing two ends. The original brick bond was broken in the middle by the filling bricks, indicating that the metal rods were possibly added after the construction of the building (see Fig.111). The metal bars at the Quartieri Militari are hidden in the wall, plastered after the installation. Nowadays some of them can be seen exposed

after the plaster falling off (see Fig.112). The metal bars at the Ospedale di S.Giovanni and the Quartieri Militari are relatively longer than those of the other buildings. The reason for it is that they have to support not only the tension of the walls, but also the thrust of the vaults. In this case, the tie, or chain, is possibly a composite one, with diagonal elements as illustrated in the Theatrum Sabaudiae (1682) engraving, showing a Gallery project (see Fig.113).

Fig.111 The metal bars located regularly on the western facade of the Ospedale di S.Giovanni, covered by segmental bricks with both ends exposed

Fig.112 The metal bars hidden in the pilasters of the Quartieri Militari, with some exposed due to the falling off of pilaster

Fig.113 The diagonal chain (or tie) of a Gallery, by an engraving from Theatrum Sabaudiae (1682)

Not all of the metal rods are hidden behind the brick. At the Collegio dei Nobili and the Palazzo Carignano, the metal rods are exposed on the wall, with only exceptions on the western facade of the Palazzo Carignano where some of the metal bars are hidden by the covering of bricks. (see Fig.114,115)

Fig.114 The metal bars exposed on the facade of Collegio dei Nobili

Fig.115 The metal bars on the western facade of the Palazzo Carignano

CONCLUSION

In order to realize the explanation of the principle of brickwork on brick facades in Turin, 1600-1800, we have come down to a methodology of two parallel tracks of research going on. The first research is into the history of Turin in the seventeenth and eighteenth century, and the second one is into the brickwork in early modern Turin, led by case studies of chosen buildings in Turin which were built within the given period. By combining the results of two parallel tracks of research, it is easier for us to understand the brickwork of these facades, which was apparently under a specific historical background.

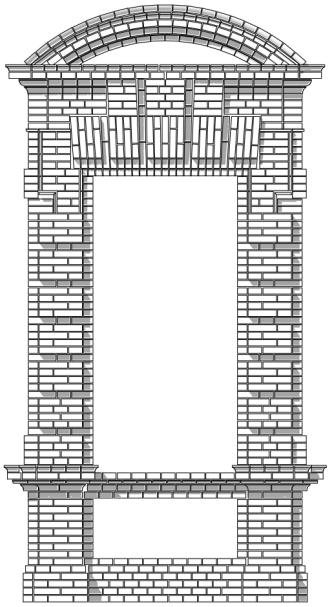
The historical research of Turin is guided by the archival and bibliographical resources both online and offline, which have already achieved success in the narrative and analysis of the history of early modern Turin, especially the book of Martha D. Pollak: *Turin 1564-1680: urban design, military culture, and the creation of the absolutist capital* and the article of John Beldon Scott: *Fashioning a capital: The politics of urban space in early modern Turin*. This thesis tries to present a general idea on the brick facades in early modern Turin, by first tracing a historical timeline of the period, then describing precisely the characters: dukes, regents, architects and engineers, who played an important role in the expansion of Turin and the construction of these brick buildings. We might say that Turin's early modern history was a history of the House of Savoy attempting to realize its political and military pursuits in the former castrum town of the Roman Empire, between the influence of two big European forces, the French and the Habsburg Spain. The unique position of Piedmont and the elusive relations with the French and the Spanish had implied to the rulers of Turin the necessity of turning the city into an unimpeachable fortress. Not only did the first ruler Emanuele Filiberto urge the military consolidation of the city, but he also put interest in military science and military treatises. Many of the engineers who had contributed to the expansion of Turin were cultivated and influenced by this environment of military architecture. Institutions were launched for the supervision of the building industry, first the Consiglio delle Fabriche e Fortificazioni, and then the Consiglio di Finanze since 1666. This led to a standardization of the building materials, especially brick, and to the development of a specific set of rules and procedures for the construction of building facades, which was well interpreted by the common characteristics of the brick façade in our case studies.

The use of brick on facades was not exclusive to Turin, as a fact, it was widely distributed in the Po Valley, in Bologna, Vicenza, Ferrara, etc. The difference between brick facades in Piedmont and those in the other areas of the Po Valley, is a topic that should be subject to further research. In our case studies, to better understand the brickwork, the author did the modeling of some brick elements on the facades (exhibited in Chapter V: Tables). Combined with essential knowledge on bricklaying, largely thanks to the bibliographical resources listed at the end of this thesis, the author could understand some of the principles of the brickwork of all these extraordinary brick

facades, making it possible for the author to try to explain them to the reader in this dissertation, utilizing text and illustrations. However, the work is not done on the observation and analysis of the brickwork of the brick facades in early modern Turin. As is said before, this thesis aims at a first basic presentation of this subject, trying to demonstrate results and hypotheses made from the author's observation.

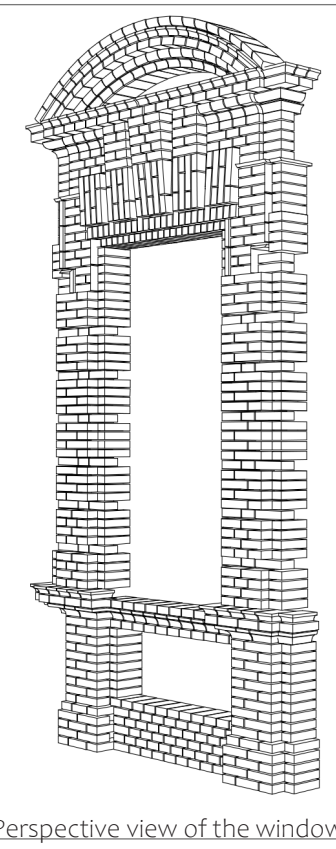
CHAPTER V
TABLES

TABLE i WINDOWS



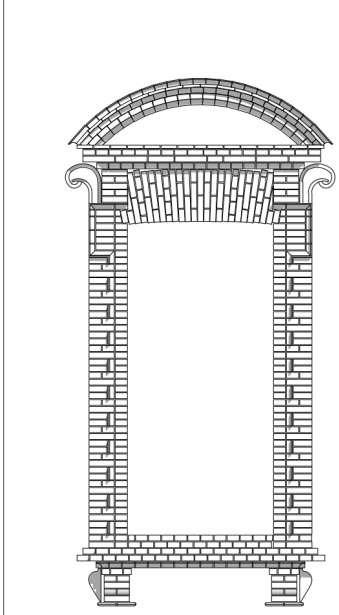
Elevation of the window

Plan of the window

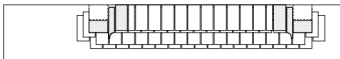


Perspective view of the window

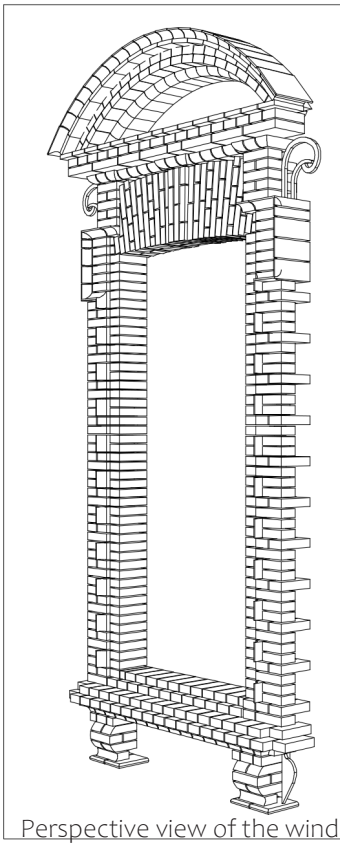
CASTELLO DEL VALENTINO



Elevation of the window

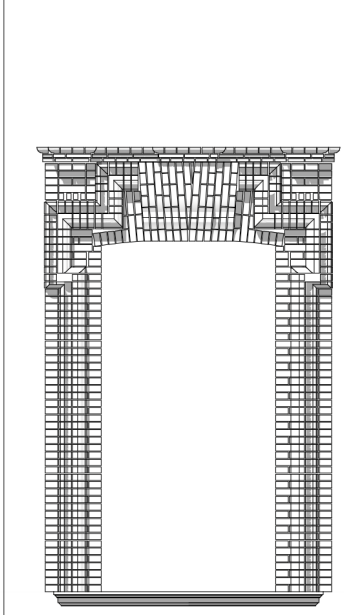


Plan of the window



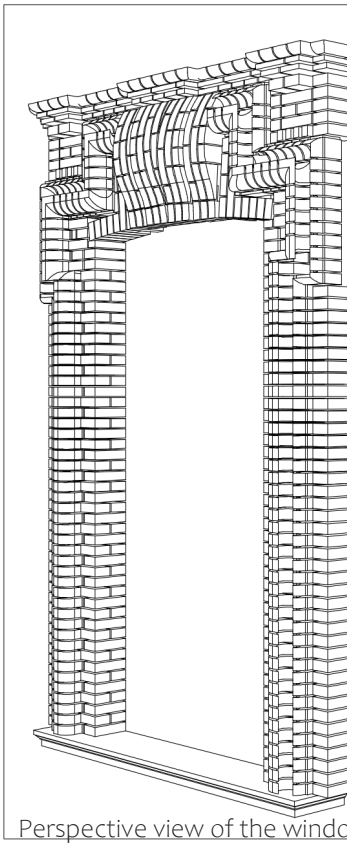
Perspective view of the window

OSPEDALE DI S.GIOVANNI



Elevation of the window

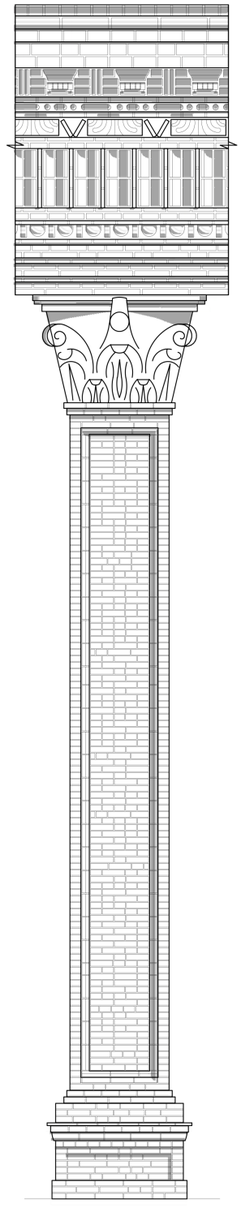
Plan of the window



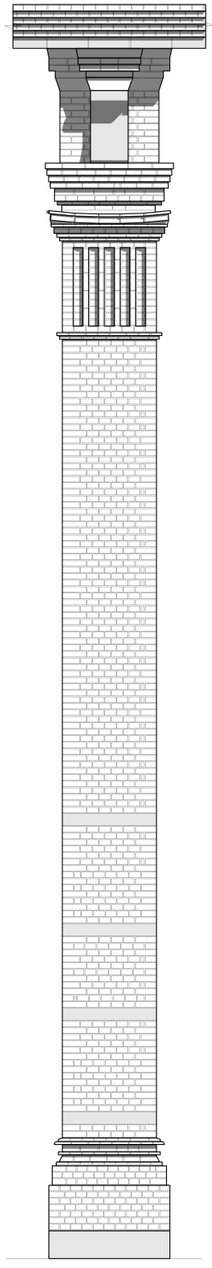
Perspective view of the window

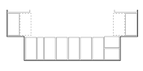
COLLEGIO DEI NOBILI

TABLE ii ORDERS AND CORNICES

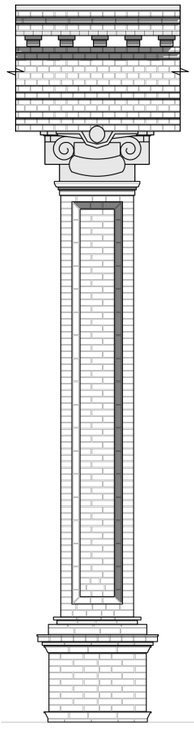


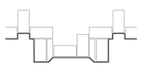
PALAZZO CARIGNANO



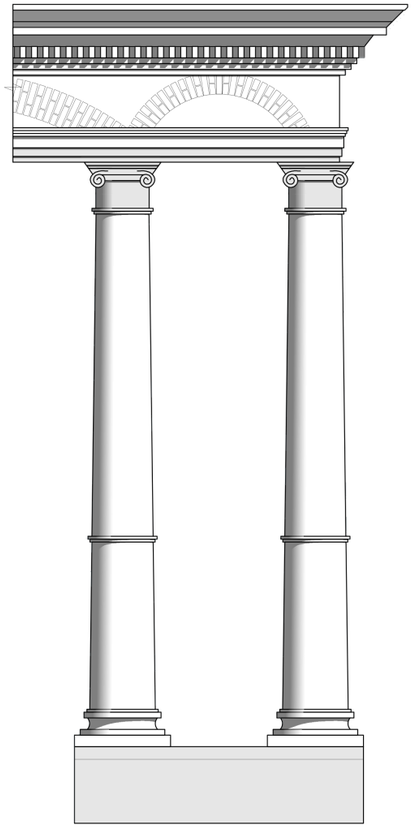


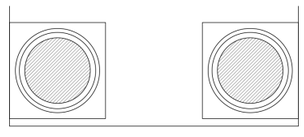
QUARTIERI MILITARI



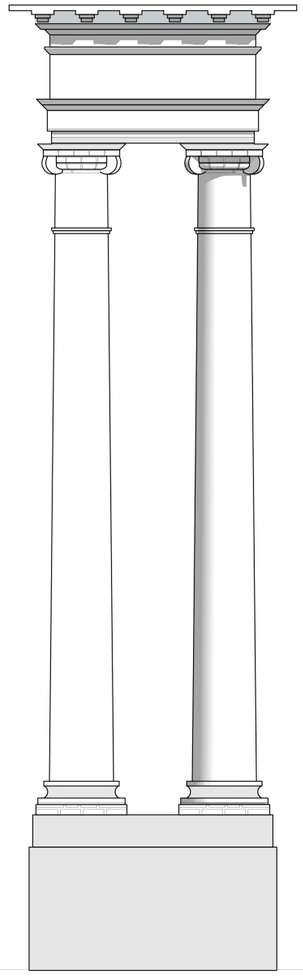


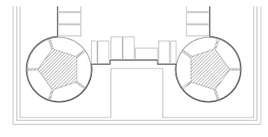
COLLEGIO DEI NOBILI





CHIESA DI SANTA PELAGIA





CHIESA DI SAN MICHELE

GLOSSARY

abacus / *abaco* a flat slab forming the uppermost member or division of the capital of a column, above the bell. Its chief function is to provide a large supporting surface, tending to be wider than the capital, as an abutment to receive the weight of the arch or the architrave above.

arcade / *porticato* / 拱廊 an arcade is a succession of contiguous arches, with each arch supported by a colonnade of columns or piers.

architrave / *architrave* a lintel or beam that rests on the capitals of columns.

ashlar / *concio in pietra* a finely dressed (cut, worked) stone, either an individual stone that was worked until squared or the structure built from it.

bonding / 砌法 the arrangement of the face of brickwork in a pattern for strength and to create decorative effect. Different arrangements have been given names to distinguish them, most of which were only coined by writers in the 19th century, although the patterns they describe all have a longer history. Different types of bonding is listed in Fig.128 as an example.

colonnade / *colonnato* / 列柱 a long sequence of columns joined by their entablature, often free-standing, or part of a building; the space enclosed may be covered or open

corbel / *modiglione* / 墀头 a projection from a wall which sometimes supports (or appears to support) a structural member such as a shaft.

cornice / *cornice* / 檐口 a cornice is generally any horizontal decorative molding that crowns a building or furniture element – the cornice over a door or window, for instance, or the cornice around the top edge of a pedestal or along the top of an interior wall.

course / *corso* a single layer of bricks laid horizontally in a wall

engaged column a column embedded in a wall and partly projecting from the surface of the

wall, sometimes defined as semi- or three-quarter detached.

frieze / *fregio* the wide central section part of an entablature and may be plain in the Ionic or Doric order, or decorated with bas-reliefs.

giant order (colossal order) / *ordine gigante* an order whose columns or pilasters span two (or more) storeys.

gutta a small water-repelling, cone-shaped projection used near the top of the architrave of the Doric order in classical architecture.

Flemish bond one of the basic bonds, where each course is made of headers alternating with stretchers, where each header lies above the middle of the stretcher beneath. The bond has been given many names in different parts of the world.

header / *mattone di testa* / 丁 a brick laid so that the short side is visible

Header bond / 全丁 a bond consisting entirely of headers

keystone / *concio di chiave* / 拱心石 the wedge-shaped stone at the apex of a masonry arch or typically round-shaped one at the apex of a vault.

lintel / *piattabanda* / 过梁 a horizontal architectural member spanning and usually carrying the load above an opening

loggia / *loggia* / 凉廊 a covered exterior gallery or corridor usually on an upper level, or sometimes ground level. The outer wall is open to the elements, usually supported by a series of columns or arches. Loggias can be located either on the front or side of a building and are not meant for entrance but as an out-of-door sitting room

mortar / *malta* / 砂浆 any paste spread between the bricks to both bind them together and to keep them apart.

niche / *nicchia* / 壁龛 an exedra or an apse that has been reduced in size, retaining the half-

dome heading usual for an apse

order / *ordine* / 柱式　　a certain assemblage of parts subject to uniform established proportions, regulated by the office that each part has to perform. The three orders of architecture—the Doric, Ionic, and Corinthian—originated in Greece. To these the Romans added the Tuscan, which they made simpler than Doric, and the Composite, which was more ornamental than the Corinthian.

pediment / *timpano* / 山花　　the triangular upper part of the front of a building in classical style, typically surmounting a portico of columns.Can also refer to a feature similar to a pediment surmounting a door, window, front, or other part of a building in another style.

pilaster / *pilastro* / 壁柱　　an architectural element used to give the appearance of a supporting column and to articulate an extent of wall, with only an ornamental function.

pointing / *stilatura dei giunti* / 勾缝　　cement or mortar used to fill the joints of brickwork or masonry, especially when added externally to a wall to improve its appearance and weatherproofing.

portico / *portico* / 门廊　　a porch leading to the entrance of a building, or extended as a colonnade, with a roof structure over a walkway, supported by columns or even arches.

rampart / *bastione*　　in military architecture, a jacketed embankment that forms the enclosure of a fortress

rustication / *bugnato*　　a term used in stonework for a method of emphasizing the outline of each stone by carving deep recesses at its edges and making the surface rough and primitive. In brickwork it means that the bricks are cut to imitate stones laid in this way.

sill / *soglia* / 窗台　　a shelf or slab of stone, wood, or metal at the foot of a window or doorway.

stretcher / *mattone di piatto* / 顺　　a brick laid so that the longer side is visible

Stretcher bond / 全顺　　a brick bond consisting entirely of stretchers

string course (belt course or band course) / *fascia orizzontale* a horizontal row of masonry, narrower than the other courses, that extends across the façade of a structure or wraps around decorative elements like columns

terracotta / *terracotta* / 陶瓦 a loose term applied to refined earthenware. In the context of bricks it is generally applied to any moulded object which is substantially larger in format than the rest of the bricks in the wall.

triglyph / *triglifo* the vertically channeled tablets of the Doric frieze in classical architecture, so called because of the angular channels in them.

wing / *ala* a part of a building that is subordinate to the main central structure

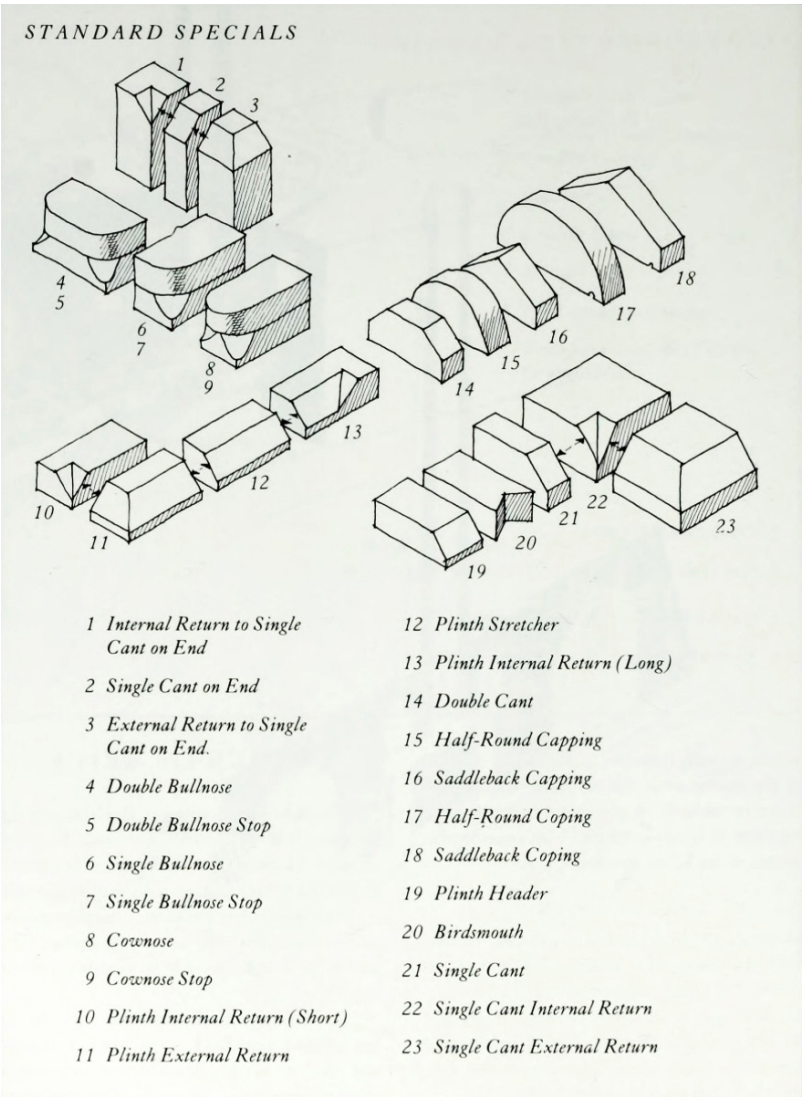


Fig.116 The classification of "Standard Special Bricks" (Andrew Plumridge, Wim Meulenkamp, Brickwork: architecture and design. New York: Harry. N, Abrams, 1993. p.170)

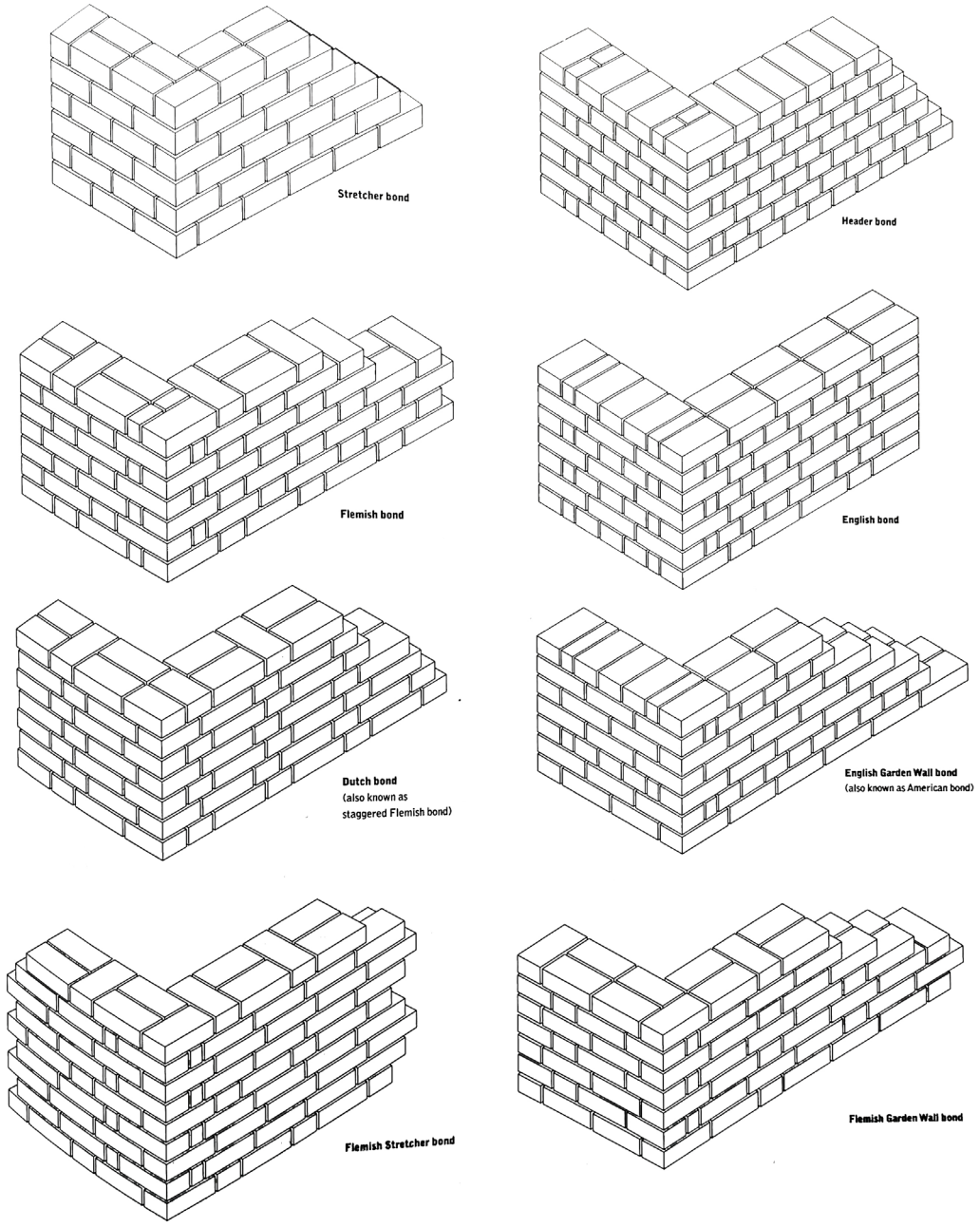


Fig.117 An illustration of eight major bond types. (James W. P. Campbell, Brick: A World History.London: Thames & Hudson, 2016. p.305)

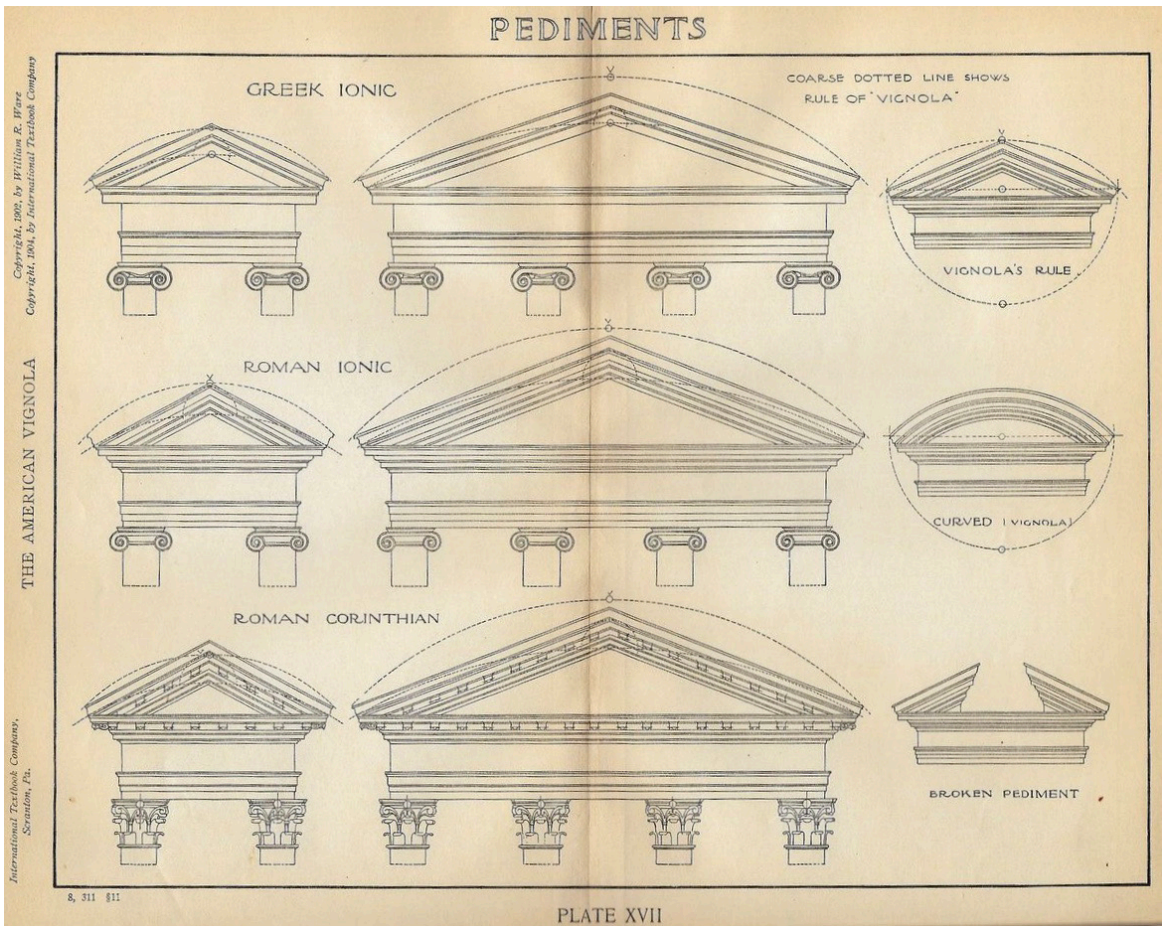
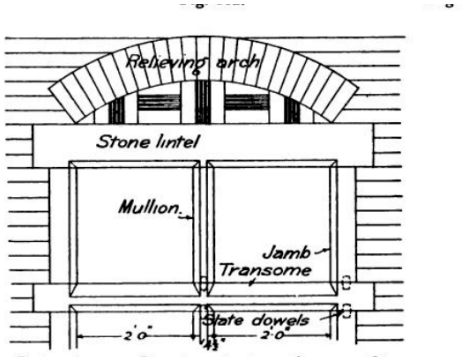
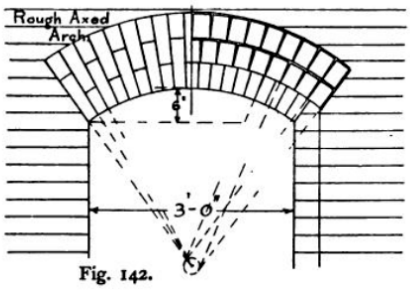


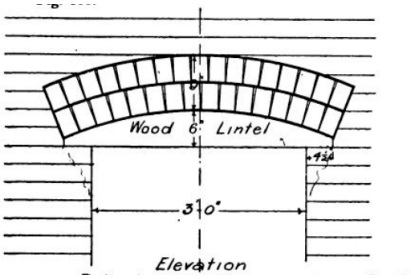
Fig.118 The illustrations of types of pediments (William R. Ware, The American Vignola, Part 1 The Five Orders. Scranton: International Textbook Company, 1920. Plate XVII)



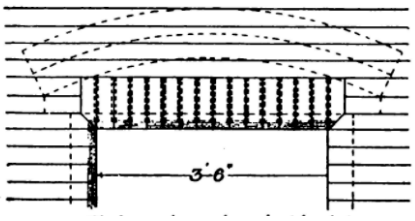
Relieving or Discharging arch (stretchers)



Segmental arch



Relieving or Discharging arch (headers)



Flat arch or Joggled Lintel

Fig.119 The illustrations of types of brick lintels (or arches), inducted from Charles Frederick Mitchell, George Arthur Mitchell, Building Construction and Drawing. London: B.T.Batsford, 1902. 45-56

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