

PATRICIANS, NOTABLES, CONSTRUCTION OF THE CITY

Building and Preservation of Palazzo
Magio Grasselli in Cremona



the city: many of the cited personages published in his magazines and he printed various works and pamphlets of them.

¹⁹ Cremona, 1793. So the work was reviewed in the *Giornale della letteratura italiana*, compiled and published by Leopoldo Camillo Volta: "Non è questa una Storia dell'antica illustre Famiglia di tal nome; ma una diligente raccolta di tutte quelle antiche Iscrizioni, nelle quali si fa menzione della Gente Magia, vale a dire di tutti coloro, che in vari tempi, e in luoghi diversi si chiamarono Magi. Il dotto A. è andato cercando negli Storici Romani anche le memorie di alcuni di essi, e le ha qui registrate molto a proposito prima di riferire di suddette Iscrizioni, che sono in numero 99, ed altre ne ha aggiunto in fine [...]. Ha dato occasione a quest'opuscolo l'idea del sig. Marchese Giuseppe Maggi, egregio Cavalier Cremonese, di formare nella sua villa del Whò una Galleria, dove, oltre i fatti de' Magi Romani, venissero espresse le Iscrizioni quà e là scolpite sulle antiche Lapidi atinenti ai medesimi [...]" (*Giornale della letteratura italiana*, I, Mantova 1793, pp. 114-115). For Isidoro Bianchi's biography cf. VENTURI 1968.

²⁰ *Raccolta di camèi 1727*.

²¹ In manuscript A.A.3.12 of the State Library of Cremona a long "letter of antiquary" is preserved (ff. 108-277) in which Biffi declares his own interest in cameos and engraved stones (f. 114, lines 12-16: "da qualche tempo ho posto la mente e l'animo a raccogliere camèi, e pietre incise d'ogni fatta; e mi sono appassionato a quest'oggetto"), dividing his dealings by subject (f. 121-v: "1. Quali siano le belle 2. Quali siano le antiche ed a che indizi si distinguano 3. Con quali mezzi si possano spiegare ed interpretare 4. Se convenga dividerle in classi per conoscerle meglio, e come 5. Quale uso facevano gli antichi degli anelli, quali, di che metalli, e quali le gemme che incidevano e quali ordini di persone si distinguevano dalle altre p[er] gli anelli 6. I Nomi degli artisti più celebri dell'antichità 7. La lista dei Famosi incisori moderni, e specialmente del decimo quinto secolo") and proposing a classification (ff. 197-26v). Biffi mentioned some important sources: the connoisseur "[f. 18r, lines 12-18] deve avere famigliari la Dattigloteca Kristiana, il Museo del Gorlai, il Gori, il Passeri, lo [...], il Kirkmian, il Montfaucou, e quant'altri scrissero in questa Materie nel pedantesco seicento, nell'erudito cinquecento, e nel secolo nostro". A letter follows them "Al Sig. Paolo Manfredini Pittore sulle pietre incise" (f. 281-v), a summary of the above-mentioned classifications (*Summarium Classes*, ff. 291-32r), a list of the names of stones and gems in alphabetical order (*Gli-topographic Historiae*, ff. 331-34v).

²² BIFFI, ms. A.A.3.12, f. 281, lines 4-9 ("I know less than you believe, my dearest Manfredini: I would say almost nothing, even though you want me to write to you about stones engraved by the ancients, cameos and connoisseurs and to enlighten you on how to put them into categories and to speak to you of sculptors more accredited in this field and finally you want me instruct you [...]"). The relationship between Giambattista Biffi and Paolo Manfredini is confirmed by the commission for the refacing of the altar of San Rocco in the cathedral of Cremona in 1799 when Biffi was prefect of the building (TASSINI 1988, p. 150).

²³ In fact, with the large hall and other works of a similar chronology, the intricate venture of the participation of his sons in the paternal business and the reconstruction of the working personality of the manofian workshop begins. Along with his sons, there were certainly among Giovanni's pupils, numerous artistic personalities of the successive generation as well as the painter and set designer, Francesco Ferrarini (De' BONI 1840, p. 1032; AZZOLINI 2001, p. 12).

²⁴ *Ibid.*, pp. 82-87; BIANCHI 2009b, p. 135.

²⁵ Without conducting archival research and cross-referencing all the data including stylistic data, it becomes very hard to distinguish the enterprises and attribute them to a particular member of the family. For the activities of Giuseppe Manfredini we refer, in particular to TANZI 1985; BELLINGERI 1995; FOLCANI 2006; BIANCHI 2009b; MANDER 2007.

²⁶ A commemorative pamphlet was published for the funeral of Giuseppe Magio: *Ne' solenni funerali 1824*.

²⁷ ASCR, Archivio del Tribunale di Cremona, b. 182, doc. 3 May 1824, see in this volume, Landi, *Architectural Transformations...*

²⁸ After Paolo's (1805) and Giuseppe's (1815) death, between 1824 and 1829 the only son of Giovanni Manfredini still living is Serafino, still active at least until 1827 according to Grasselli who testifies to his activity as a restorer of paintings: "Su studio particolare è quello di ripulire, senza aggiungerci cosa alcuna di suo, i quadri di que' più eccellenti maestri, che il tempo distruttore, o la trascuratezza de' nostri maggiori non hanno saputo conservare. Fra questi dipinti nel 1823, contansi quelli nella cappella della B.V. del popolo, nel 1825, quelli nella cappella del S.S. Sacramento, e nel 1826, la pala dell'altare dell'Annunziata del Malosso, tutti esistenti nella cattedrale" (GRASSELLI 1827, pp. 163-164; BELLINGERI 1995, p. 31).

²⁹ See in this volume, Landi, *Architectural Transformations...*

³⁰ On this pictorial decoration - given its fragility and the complexity of the analysis - samples were not taken. The interlacing between the two phases risks rendering invasive a programme of works to distinguish them.

³¹ In the inventory of the goods of Carlolina Tarsis, compiled in 1864, the room is described as a "gabinetto" with walls painted in oils, see in this volume Landi, *Architectural Transformations...*

³² As was brought to our attention by Angelo Landi, the decoration of the front room on the top floor of the western wing of Palazzo Ala-Ponzone seems to lead back to the same executor. The sophisticated taste and the details of flowers and animals would find in these years in Cremona a skilful representative in Carlo Pozzi, described by Historiography as diligent calligrapher and designer (GRASSELLI 1827, p. 214), expert in miniating natural flowers, fruit and topographic maps. A group of watercoloured drawings are kept in the Ala-Ponzone Civic Museum. Two examples of this type with regard to mural painting and its continuation during the second half of the 19th century are the decorations of the vault in the dining room of Palazzo Barbo-Mainardi in Cremona (AZZOLINI 2001, pp. 130-131) and those realized in 1889 by Lodovico Pogliaghi in Villa Pallavicino in Cicognolo (*ibid.*, pp. 74-77).

³³ A similar example can be found in Palazzo Ala-Ponzone in Cremona where Gallo Gallina intervened on marmoring stucco in a situation similar to that described here for Palazzo Magio Grasselli. Regarding these decorations we do not know on which analytical basis it was indicated "A Cremona, Gallo Gallina finiva con un'encastizzazione un ambiente al piano terra di palazzo Ala-Ponzone, decorato con figure di Muse su fondo marmoreo e con un'alta zoccolatura a finto marmo. In questo caso la parete era stata preparata a gesso e polvere di marmo e completata a marmoring lucidato, e dopo un leggero disegno a grafite e a matita azzurra, erano state dipinte le figure delle Muse con una prima stesura di tempera grassa e una seconda di tempera più oleosa, infine le superfici avevano ricevuto una finitura generale a cera o a sapone" (GHEROLDI 1995, p. 46). An analytical test would be interesting for both these types of superimposition in order to clarify the tendencies of the patrons and operators and the solutions adopted by them to resolve a notable technical problem which gave poor porosity and difficulties of adhesion on a polished surface such as marble.

³⁴ *Relazione di stima della Casa posta in Cremona, in Contrade di S.ò Gallo all'ingegnere n.º 26 ed in mappa della soppressa Parrocchia di S. Gallo ai n.º 9 e 8 in ASCR, Archivio Grasselli, b. 12, doc. about 1864, see in this volume, Landi, *Architectural Transformations...**

³⁵ ASCR, Archivio Grasselli, b. 12, doc. 15 August 1865, see in this volume, Landi, *Architectural Transformations...*

³⁶ ASCR, Archivio Grasselli, b. 12, doc. about 1871, see in this volume, Landi, *Architectural Transformations...*

Materials and Techniques of the Pre-Industrial Building Sites of Cremona: an Exercise in Architectural Archaeology on the Façade of Palazzo Magio Grasselli

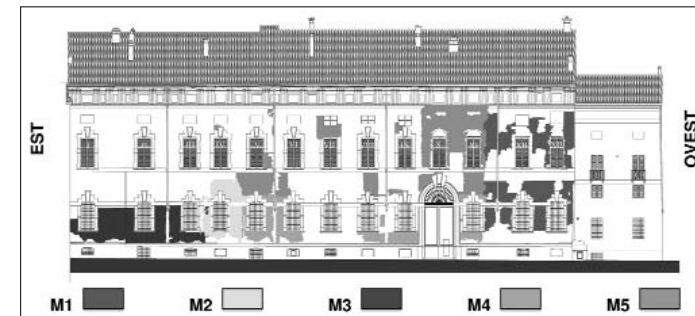
DAVIDE DEL CURTO

This text¹ presents the results of the research carried out on the façade of Palazzo Magio Grasselli using methods of façade stratigraphy, an effective instrument of archaeological derivation which was also used in the analysis of historical architecture to study building techniques² since the 1970s.

The investigation was carried out utilising repeated observation directly from the ground up to the top of the building, thanks to the presence of scaffolding installed for maintenance work on the roof. The observations were then compared with what gradually emerged from the examinations on the interior surfaces and spatial layout, the detection of stratigraphic units and the recognition of relative chronology.

The stratigraphic examination was carried out parallel with, and to support, the more general study of the building with a painstaking piecing together of the history of the building and it is uses via documented research comparing it with the contemporary building,³ immediately verified thanks to the examination of the finishes and interior ornamentation.⁴ The stratigraphic investigation of the façade represents a further verification of the hypothesis that matured with regard to the construction history of the complex, in particular with the formation of the building parallel to the road and on the work plan undertaken by Camillo Magio for the unification of the lots and the formation of the Palazzo and continued by Giovan Clemente Magio up until 1703. For this reason, the results are presented diachronically, as illustrated by the stratigraphic evidence relative to each one of the construction nuclei which were united progressively during the second half of the 1600s. The relative chronology refers to the phases suggested by historical and archive records and the spatial examinations of the structure.

As well as the "autopsy" carried out on the exterior, instruments were used to scrutinise surfaces where simple observation was not leading to sufficiently convincing hypotheses or was not verified by the hypotheses already formulated. In particular, I.R. thermography was used actively and passively for the non-destructive surveying of the plaster on the interior walls, allowing for localised discontinuity of weaved brickwork which is



124. At least five typologies of brickwork make up the façade of Palazzo Magio Grasselli, both concealed and emergent, under the 19th century faux brick finishing.

indicative of particular moments or construction activities. The mortars and plasters were categorised analytically, identifying the similarities and differences useful for defining the relationships of relative chronology.⁵

Repeated examinations on the façade progressively highlighted the density and richness of the construction techniques and finishes: the plasters and above all the apparatus and treatment of the brick façade constitute an ensemble of important documentary value. It was also possible on the same façade, thanks to the protection provided by the 19th century plaster during the last 150 years, to recognize and compare the techniques and work which took place from the 1500s to the 1800s. Thus, the construction work undertaken by Camillo Magio during the second half of the 1600s, to his involuntary merit, can be considered a small atlas of the construction work of Cremona during the period from the Renaissance to the industrial era (fig. 124).

THE 1500S: THE FAÇADE OF *CASA LOTICA* IN EXPOSED TERRA COTTA BRICK

The tract running between the west end of the façade and the west shoulder of the window next to the carriageway or “bochirale”,⁶ presents a brick facing of accurate execution which is still exposed from street level up to 7.6 metres, corresponding with the first floor. This is the brickwork of *casa Lotica*,⁷ bought by Nicolò Magio in 1646. Here, we are dealing with brickwork constructed with well-formed bricks of a regular size (approximately 28 cm x 7 cm)⁸ with constantly paced head-fascia in non-aligned, alternating rows and Gothic weaving.⁹ The bricks are laid with a clay-like mortar with an orangey-red hue and form joints about 1 cm high of a powdery consistency on the surface, almost “greasy” to the touch and pastier the more you penetrate the surface. This brickwork (M1) is finished with a lime mortar joint covering and sealed well with a concave towing only just protruding to cover the upper edge of the brick.

A tenacious top stratum with a slightly variable shade between rosy, red, and brown covers both the surfaces of the bricks and the jointing mortar. The fine rosy stratum on the concave bottom of the joint covering takes on a better consistency and a dark red tone in the raised parts where the mortar covers the edge of the brick. The surface of the brick is slightly brown and darker compared with the natural shade of “stones”¹⁰ of a uniform colour and size which have been employed for this brickwork (M1). The samples taken from the surface of the brick and from the mortar of the joint covering demonstrate the limited thickness of this stratum, its compactness and uniformity. Here, we are dealing with a very thin stratum containing calcite, gypsum, clay-like minerals and calcium oxalate,¹¹ in the form of weddellite in the proportions shown below. The presence of any other natural or artificial pigments was not detected (fig. 125).

It is possible to speak about the protective treatment of the brick curtain wall at the completion of accurate execution, sometimes defined as “sagramatura” and here consistent in a semi-transparent stratum applied onto

the already prepared facing and distended, probably by rubbing the already dry surfaces with a brick wetted with limewater and coccopesto and with the addition of an organic binder, flaxseed oil, or more probably milk, taking into account its lower cost and the size of the façade.¹²

The term “sagramatura” is used above all to describe construction in the region of Emilia and refers to a finishing and protection technique for brick facing which is an alternative to plastering and consistent in the treatment of the curtains of new construction activities which renders surfaces smoother and more compact with a two-fold aesthetic and protective function. This treatment gives the surfaces of the wall a homogeneous and almost monolithic look, enabling one to read in its transparency the subtle imprint of the grid of

	MALTA DEL COPRIUNTO (SUPERFICIE)	MALTA DEL COPRIUNTO (PORDO)	MATTONI (SUPERFICIE)
CaCO ₃	33 %	25 %	6 %
SiO ₂	41 %	24 %	50 %
CaSO ₄ 2H ₂ O	4 %	10 %	9 %
CaC ₂ O ₄ (H ₂ O)	22 %	41 %	35 %

125. The protective finishing coat covers both the surfaces of the bricks and those of the covering joints which form the brickwork (M1). The components (calcite, quartz, gypsum, weddellite) present different concentrations on the surfaces of the ceramic brick facing, on the concave bottom of the joints and the relevant portions of mortar that protect the edges of the bricks.

the bricks. This was carried out immediately after bricklaying was concluded with bedding mortar protruding slightly from the plane of the façade. This was then polished and rubbed manually with a softer brick than those used for bricklaying. The operation was carried out by wetting the surfaces with a solution of limewater, thickened with gypsum and an organic binder (milk, casein, serum, oil, and so on...). The calcium carbonate of the joints was mixed with brick dust from the rubbing, forming a very thin hydraulic plaster causing the calcite to crystallize again and resulting in an effective layer of protection for both the brick facing and joints. This gave a certain uniformity of coloration and, unlike plaster, preserved the character of the brick surfaces.

Research carried out on pre-industrial building sites and historical construction techniques in the region of Emilia describes “sagramatura” as the variety of tinting and the characteristic elements of coloration in the city during the late Middle Ages before the diffusion of sandstone in the façades of the town centre, characterized by the uniform tone of brick curtains¹³. “Sagramatura” is sometimes described as being synonymous with “arricciatura”, that is a thin, transparent plaster with a calcium hydroxide and coccopesto base, or in other words “arrotatura” grinding or towing via rubbing, without the addition of other materials except those obtained from the abrasion of the base. The coincidence between semantic and chronological evolution, for which “sagramatura-arrotatura” would be a more archaic practice, derived maybe from an operative analogy with the corresponding treatment for terra cotta floors. However, the idea that “sagramatura-arricciatura” were carried out together from the 1700s only remains a hypothesis at the moment.¹⁴

This treatment¹⁵ was carried out on the fifteenth and sixteenth century walls of *casa Lotica* probably by “rubbing” the wall with a brick rather than with a brush or a rag, something that would have favoured the deposit above all of clay-like fragments on the bottom concave of the joints where, on the contrary, elements are distributed uniformly. The concentration of quartz and calcite are higher on the parts of the mortar in relief suggesting the use of a softer brick compared to those used for bricklaying. As a result, rubbing with a red brick against the already hardened, rough surface of the joints favoured the transfer of coccopesto from the brick-utensil to the surface, giving shape in this way to a “sagramatura” as a contribution of material instead of a removal of the powdered clay from the walls by rubbing with a more tenacious brick.¹⁶ The operation certainly took place by wetting the surfaces with calcium hydroxide, contributing in this way to the formation of a thin, surface film with the characteristics of almost complete transparency and non-permeability to water and permeability to vapour. Furthermore, on the surfaces of the bricks neither scratches nor direction marks resulting from the circular motion extending from one brick to another can be detected, otherwise indicative of rubbing with a more tenacious tool.¹⁷

This façade (M1) was executed, and materials chosen, with care. The work started, leaving the facing exposed and giving ornamentation and protection, extends to the tract of the façade comprising the western edge where



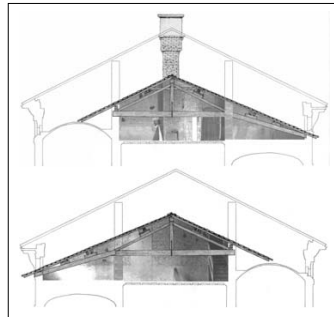
126. Corresponding to the western edge, the brickwork of the façade turned back to divide the adjacent lots. Although the bricks are of an irregular size, the attic sidewall shows the same working of the joints as that on the principal façade (M1) with clay mortar for the bottom joint and finishing mortar for the cover joint and facsimile in lime mortar.

it remains well sheltered by overhanging eaves. The finishing described is perfectly integral along with the limits detected from the western shoulder of the first window west of the carriageway, apart from the damage occurring during the construction of the windows with frames and vertical traces of brick infill for the insertion of the drain pipes. Other localized discontinuity, due to alterations and small repairs, was also detected (pl. XLIV).

Above, the brickwork (M1) extends to the height of the frames (excluded). To determine the quota and direction of the roof of *casa Lotica*, it is necessary to consider the large amount of stratigraphic evidence visible in the attic. The brickwork (M1) described for the principal façade continues to form the brief tract perpendicular to the street and proceeds to form the wall that separates the main part of the palazzo from the far western tract, i.e. *casa Ramonda*, purchased by Camillo Magio in 1666 to extend the property towards the direction of the cathedral. The plastered façade of this building rests against the perpendicular wall, without toothing, forming at least for the last two storeys an unmistakable relationship of "anteriority-posteriority" (fig. 126).

The sidewall that separates the two buildings at the height of the attic presents the same working of the joints as already described on the principal façade: clay mortar for the bottom joint, lime mortar for the finishing cover joint and the facsimile in lime mortar. The bricks are of a more variable and irregular size compared with those chosen for the brick facing. This process extends over the whole wall of the attic except for the tract corresponding to the depth of the loggia built during the second half of the seventeenth century which is clearly distinguishable for its weaving and the presence of a precise perpendicular discontinuity. The absence of damage in the area where the support of the ridge beam rests confirms that the one of *casa Lotica* was of a height equal to approximately 14.9 metres, similar to the present ridge beam of *casa Ramonda*.

The opposite, eastern façade of the same wall which separates the attic of the Palazzo¹⁸ from that of *casa Ramonda* allows us to determine with greater precision the quota and direction of the roof of the sixteenth century *casa Lotica*. The weaving is regular and was probably made uniform during the second half of the seventeenth century. This was followed by the raising of the roof towards the courtyard with no noticeable traces of a lower roof than the present one. Weaving discontinuity is clearly visible on the surface to the bottom of the great flue which is built at the base with recycled bricks and "bazzana" mortar and completed in the upper tract with an "external" facing finished with a protective plaster for the bricks and joints. A trace of mortar with an inclination of 25°/30° is an evident residue of a lower, older roof and separates the two sections. Going along this tract towards the south, it is possible that the structure of the roof was treated in the Lombard style, with a double pitch and structure in which the trusses support the ridge beam and purlin beams. The trusses with widths of approximately 11.2 m (compared to the present 16 m) rested on the perimeter wall towards the courtyard to the south of *casa Lotica* and to the north on the median wall parallel to the façade. On



127. The direction of the pitches and structure of plastering of *casa Lotica* before the renovation of the late 1600s which altered the direction of the pitches, height of the ridge beam and eaves (eastern wall of the attic, western wall of the attic 5,02).

the street to cover the loggia or the access balcony to the main floor according to a layout not unknown to the builders of palazzos in Cremona during the second half of the fifteenth century. On the southern walls of the same attic,²⁰ a perfect solution of the horizontal continuity in the brick weaving, compatible with the direction of the hypothesized pitches can be witnessed (fig. 127). The raising and shift of the line of the ridge beam, in order to cover the augmentation of the building width due to the construction of the loggia, necessitated the raising of the façade of *casa Lotica* with brickwork which was very different from the M1 bricklaying, formed with recycled bricks and only mortar of "bazzana" without cover joints and probably finished with a plaster with a clay-like base. Thus, the height of the long curtain of Corso XX Settembre dates to the second half of the seventeenth century and reflects the need to maintain the height of the apartment of the equivalent wall or greater than the already significant height of the "piano nobile" of *casa Lotica* and, above all, comprising the Italian Hall.

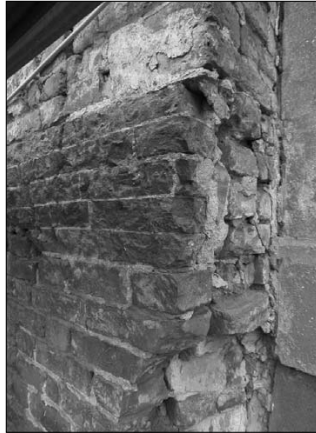
The height of the cornice and the design of a semi-volute of the lower cornice should, therefore, be attributed to the first phase of works conducted by Francesco Pescaroli, whilst the execution of the lengthening during the course of the long season of renovations took place between 1670 and 1703 (pls. XLI-XLII). The corbels are formed with fifteen courses of recycled bricks shaped to determine a double curvature of the profile and inserted into the irregular brickwork of the cornice proceeding with the weaving. The first five courses at the bottom are shaped with shattered elements and simply placed against the wall. Above the sixth course, the bricks are mostly not shattered and inserted well, determining the desired shape even if not really toothing into the brickwork, sustaining it to compensate for static moment. The lower cornice is, therefore, in phase with the brickwork of the frame and both date from the late seventeenth century. A couple of bricks laid on edge above the eighth course lend resistance to the section of the semi-volutes, compensating for shearing stress and momentum at the point in which these are strongest. This construction skill is present in the first fifteen semi-volutes from the east end of the façade, the tract corresponding to the *domus magna* of Magio and to the *domus* belonging to the branch of the second son; lacking in the rest towards the east, which corresponds with *casa Lotica*. This difference signals the resumption of construction work and confirms how renovation work and the raising of the *domus magna* and Ferrante Magio's house, including the cornice and the eaves, anticipated the corresponding repairs of *casa Lotica* and was completed before 1692 when the interiors were not yet finished. However, the bricks on edge identify a limit not altogether coinciding with the boundaries between the passageway, and the construction of the relative vault would determine the necessity of altering this tract completely and rebuilding a fascia corresponding to the width of the barrel vault of the entrance corresponding with the regular weaving of brickwork M1 which is interrupted both on the ground floor and the "piano nobile" (fig. 128).

A horizontal demarcation is visibly in phase with the brickwork (M1) and is a little under the height of the present sills of the "piano nobile", approximately 8.6 metres long and at a height of five "heads". The bricks which form them are of similar dimensions to those employed for the wall (about 28 cm x 7 cm) although placed as flat laid bricks rather than with Gothic weaving, head-fascia alternate courses. This deals most probably with the demarcation of a tract of a string-course which enriched the brickwork of *casa Lotica*, completing the image of a well-formed and proportioned façade with a couple of double windows, respectively



128. The semi-volutes of the cornice were formed with 15 courses of bricks. A couple of bricks placed on edge above the eighth course give resistance to the section, compensating for the forces of momentum and shearing stress at the point in which they are at a maximum. This skill is present in the first fifteen semi-volutes from the eastern end of the façade, facing in the rest towards the west and signalling a return to construction work and confirming how the renovation work and raising of the *domus magna* and of Ferrante Magio's house, including the cornice and the eaves, anticipated the corresponding alterations of *casa Lotica* which were completed before 1692 when the interiors had not yet been finished.

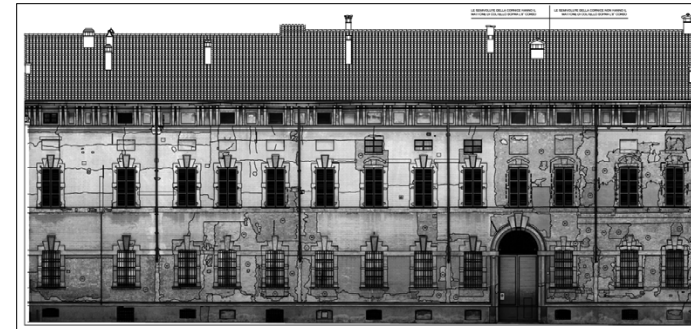
at a centre distance of approximately 3 metres.²¹ The joint mortar has a very limited, regular thickness, suggesting a very accurate working of decorative details in terra cotta with perhaps a decorated façade or silhouette. A solution was proposed which was widespread in the city, rare examples of those surviving date back to the late 1400s, for example Palazzo Cortesi.²² Today, only the crushed bricks remain after their reduction in thickness in line with the façade preliminary to plastering at the beginning of the 1700s. This is easily seen at the western edge where this string-course ends. The string-course extends from this edge as far as the brickwork (M1) corresponding to the west wing of the entrance wall (fig. 129).



On the "piano nobile", damage caused to the brickwork (M1) of the seventeenth century building site, during the continuation of the uniform series of the great windows, is noticeable. Controlled breakage of the brick façade of *casa Lotica* was carried out in order to build the frames, inserting a series of bricks on edge protruding from the plane of the façade and thanks to which the external margins of the overhang were defined, bolstering the thickest stratum of plaster. A wide profile, approximate-

129. The rest of the string-course in phase with the brickwork (M1). Before distending the plaster at the end of the 17th century building work, the protruding bricks were reduced in line with the façade.

130. On the 17th century building site a uniform series of great windows was continued on the façade of *casa Lotica* by inserting a series of bricks on edge, out of flush with the façade thanks to which the external margins of the overhang were defined, supporting the greatest thickness of plaster. Thus, a profile approximately as wide as the palm of a hand was obtained with a slight relief at the perimeter equal to the thickness of a flange.



ly as wide as the palm of a hand, was achieved with a light perimeter relief equal to the thickness of a flange. The architrave was animated at the centre of a trapezoidal key which was smaller and simpler than the present one.²³

Observation of the weaving of the brickwork around the window frames on the "piano nobile" from the ground does not allow us to fully gather the chronological relationship between the brick fascia and those on edge to form the perimeter of the frames which also, under careful observation, seem to be perfectly inserted and in phase with the brickwork underneath. Only close observation from the scaffolding enables us to localize the discontinuity in the curtain obtained via the breakage of bricks already placed and inserted in the vertical elements. The operation was carried out with expertise, determining pending surfaces without chipping so that the new bricks were laid protruding from the existing façade, then reduced to the plane of the façade in the most recent removal of the plaster which is embedded in the brickwork, with a limited use of mortar but without the use of shims²⁴ (fig. 130).



131-132. Map of the stratigraphic units of the façade of Palazzo Magio Grasselli: a general table and details of the twelfth and thirteenth windows on the "piano nobile".

The recognition of the uniformity of the façade and its stratigraphic relationship, compared with similar evidence in the complex of the building, allows us to define with precision the limits of the brickwork (M1) and, consequently, the extension of the silhouette of *casa Lotica*. This included the entire portion of the façade between the present carriageway and the western edge to the confines of *casa Ramonda*. The same brickwork continues up to the cornice (excluded) so that *casa Lotica* had to be raised to this height with a double façade of the overhanging string-course corresponding to the height of the floor already in existence (figg. 131-132).

THE 1600S AND THE ENLARGEMENT OF THE DOMUS OF THE MAGIO: PHASE RELATIONSHIPS AND COMPARISONS BETWEEN BEDDING MORTARS

Close examination of the exposed brickwork with faux brick in the median tract of the façade allows us to integrate, via direct observation, the hypotheses relating to the planimetric and volumetric extension of the *domus magna* before this was affected by the seventeenth century transformation preceding the purchase of the



133. Ten bricks placed head to head illustrate the location of a semi-circular arch, between the third and fourth windows on the ground floor. Extending the arch illustrated by the bricks, the shape of a barrel vault can be seen with a width of a little less than 3.8 metres and 5.3 metres high, equal to approximately 7 x 11 Cremonese "braccia", corresponding to the passageway of the house belonging to Ferrante Magio.

contiguous lots by Nicolò Magio: his cousin's house bordering the Regazzi's property in 1645; *casa Lotica* in 1646, *casa Ramonda* in 1666, immediately further west. The plan of the basement is a witness to this additional process with three embankments, corresponding to as many carriageways as there were in *domus magna*, the house already belonging to Ferrante Magio and *casa Lotica*. The first embankment, from east to west, measures approximately 4 x 11 m on the plan and corresponds to the fourth window counting from the east wing of the façade today. Ignoring the minute discontinuity of weaving and materials on the brickwork façade between the third and fourth windows on the ground floor, the setting up of a semi-circular arch, of which ten bricks are placed head to head, is still visible. Extending the arch illustrated by the bricks, there is a silhouette of an opening 3.8 metres wide by 5.3 metres high, equal to approximately 7 x 11 Cremonese "braccia".²⁵ The passageway served the house of the second son of the Magio family who occupied the plot which today corresponds to the apartment with the great stairs with a small courtyard which is still in existence. The passageway was found to the far west of the building lot, at the boundary with the *domus magna*. The dividing wall was demolished to make way for the great stairs and its position can still be seen from the joints in the cellar vaults of the wing leading onto the courtyard (fig. 133).

Today, the arched barrel vault in this carriageway is filled in with brickwork and lime mortar (M₂) with a joint protruding from the surface of the terracotta which is not sealed. The limits of this wall are easily noted due to the difference in weaving, both towards the west, the brickwork and lime mortar of the *domus magna*, and towards the east, the brickwork of the house of the branch of the second son. The facing of the latter (M₃) is formed with recycled bricks laid with "bazzana" mortar, unsealed and without a cover joint with pick-axe marks and ready for further plastering. Given the loss of plaster due to the faux bricks, this type of brickwork is very noticeable in the tract of wall between the filled-in passageway and the eastern end of the façade where it is interrupted by damage caused by the insertion of three windows with ashlar masonry frames and a drainpipe. This brickwork is of a far superior construction and very far from the older brickwork (M₁) in its fineness of execution and choice of materials and was evidently destined to be finished with plaster. The first ten to twelve courses above ground (considering that the level of the road in front of the façade of the palazzo was higher by approximately 20 cm before being reduced in 1831)²⁶ are laid with lime mortar, maybe Piacenza hydraulic lime according to the documented custom that foresaw its use rather than a mortar with a clay base. The basement brickwork continues above ground, for which the same prescription was valid.²⁷ This difference from the first course is very noticeable on sight and confirmed by the examination of the ingredients. A comparative analysis was undertaken on both the sample and a scrutinised sifting²⁸ which contained calcium carbonate, differing appreciably between samples taken from the joints at the base of the wall and those tak-

en at a height of 1.2 metres from the present level of the street. The calcite is present in a minimum percentage in the first sample (1%), with a more relevant percentage in the second one (9.9%). The corresponding percentage of alpha quartz plus muscovite varies symmetrically (46% + 49% in the mortar taken from the façade, 40.6% + 42% in the mortar taken from the first course above ground). Besides the integral samples, the measurement was repeated on the finely sifted sample, obtained from sifting the entire sample. The results also confirm the proportions in tiny fractions: the percentage of calcite doubles in the "earthy" mortar but does not exceed 2%, confirming the fact that we are dealing with a mortar with very little lime in it: in the fine fragment of base mortar there was a concentrate of the lime binder, present in a percentage of 47%.

The second embankment corresponds with the first window east of the present carriageway and indicates the passageway of the *domus magna*. The third extends towards the west and belongs to *casa Lotica*, which was chosen as the entrance to the palazzo. Considering the tract of the façade relative to the *domus magna*, the first six windows east of the present carriageway present a constant centre distance equal to approximately 3.35 metres. The first five have frames in phase with the brickwork. The sixth window is in phase with the fill-in brickwork of the carriageway of Ferrante Magio's house.

The present-day main door entrance frame is in phase with the brickwork that surrounds it and so is the frame of the window immediately to the west of this. Here, the relationship with the brickwork is now towards the east, below and above with damage that is behind, with the successive tract of the brickwork towards the west corresponding to the already described brickwork (M₁) relative to the surviving structure of *casa Lotica*. The entire portion of the façade that comprises these windows is in brick and a mortar made with lime and clay²⁹ in proportion and with joints not worked and protruding from the surface of the bricks. Here, we are dealing with a mortar of a medium consistency, more compact than those that are only made of clay mortar comparable with the depth of the joints of M₁ and M₃, but softer and more friable than the mortar that covers the joints of M₁. Except for two breakages due to the insertion of some drainpipes, the brickwork (M₄) is present in all the tracts on the ground floor corresponding to the *domus magna* from which the wall bay brickwork takes shape between the windows and extends vertically up to the height of the ashlar lintel of the window. This is also in phase, together with the fascia which connects the frames. To the east and west of this median tract, the fascia is applied to the underlying brickwork, as can be seen between the third and fourth window from the east (this is the house already belonging to Ferrante Magio) where this is formed with a "rincoccio" secured to the underlying brickwork (M₃) with nails, in part still visible (fig. 134).

The simple, visible and tactile comparison detected similarities between the M₄ brickwork and the M₂ brickwork which was used to fill in the passageway of Ferrante Magio's house: here we are dealing in both houses with recycled bricks bound with a grey (tending towards brown) clay mortar with a slightly earthy consistency which powders under pressure from one's nails. The brickwork was compared analytically (granulometric curve, ratio binder/aggregate and type of binder, expressed as a percentage of CaCO₃) with samples taken from mortars used on the ground floor to form the following brickwork: the frames of the first window to the east of the passageway (C₀₄); the wall of the *domus magna* (C₀₈); the frames in phase with the same *domus magna* (C₁₀); the brickwork to fill in the passageway (C₁₁); the frames of Ferrante Magio's house (C₁₅). These mortars are similar to the parameters considered and are of the same modality of manufacture on site as the same raw materials and the same unique building phase (fig. 135).

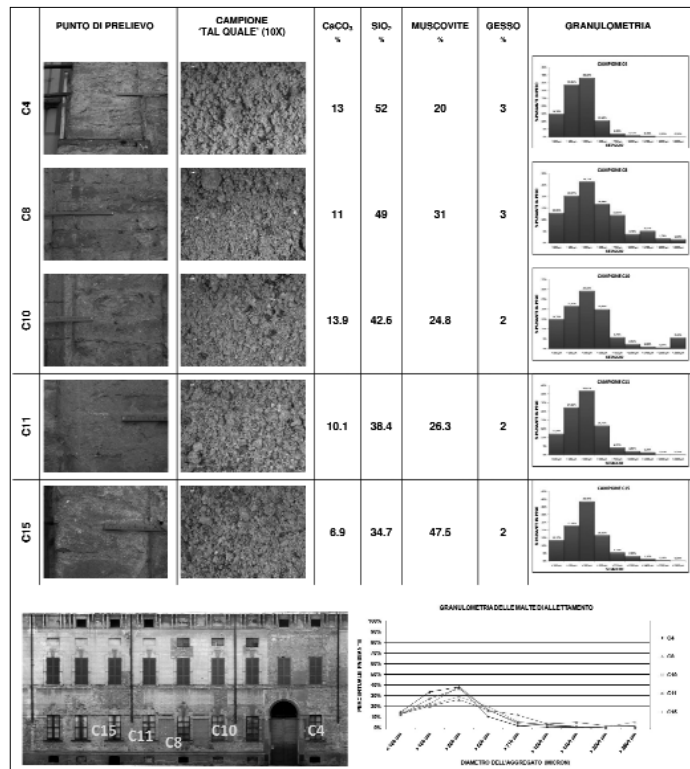
This circumstance merits ulterior confirmation of how, contextually to the reconstruction of the façade of the



134. The fascia which connects the window frames to each other on the ground floor is realized in brick limited to the median tract of the façade. In the lateral tracts corresponding to *casa Lotica* and the house belonging to Ferrante Magio, the fascia is formed with a "rincoccio" and secured to the underlying brickwork (M₃) with nails which are still partly visible.

domus magna, the remodelling of the window frames on the first floor of *casa Lotica* and the amplification of the barrel vault at the entrance reassume the same profile centring in a unique, coherent design. The mortars described above present a granulometric distribution which is also comparable with the bedding mortar of the brickwork (M₃) of the façade of Ferrante Magio's house. This bedding mortar is, however, clearly different from the previous one for the almost completely clay-like composition and minimum percentages of carbonate (2%) and gypsum (3%).

Above the keystones of the ashlar lintels of the windows on the ground floor, uniformly brickwork proceeding to the "piano nobile" laid with mortar of "bazzana" (M₅), which is distended both to the east and the west of the present-day carriageway, overlaps M₄. This was verified thanks to the presence of areas devoid of plaster. In both situations the weaving of the architraves is easily visible with regard to the fourth, fifth and eighth windows to the west which are all similar in manufacture, size of elements and presence of the relieving arches. These architraves are in phase with the brickwork (M₅), further confirmation of the fact that the windows were formed during construction work at the end of the 1600s with the same shape and dimensions



135. Comparison of the bedding mortars of the median tract of the façade.



136. In the median tract of the façade, a solution of horizontal continuity distinguishes the brickwork in brick and lime mortar with window frames in phase with the ground floor of the overhanging brickwork and mortar of "bazzana" which forms the "piano nobile" and the frames. The same discontinuity is also found on the two courtyard façades, suggesting an intentional construction choice rather than a contingent heterogeneity of materials during the 17th century building site.

as the present day ones. The small area not covered in plaster between the fifth and sixth windows to the east also presents the same weaving and size of brickwork and window frames in the overhang formed with the same controlled insertion of bricks on edge protruding from the plane of the façade. The solution of horizontal continuity and that of the corresponding tract of the *domus magna* distinguishes the brickwork and lime mortar with frames in phase (M₄) with the ground floor of the overlying brickwork and mortar of "bazzana" (M₅) that continues on the "piano nobile" to the window frame (included) indicating a succession of building phases or building lots during the long-term seventeenth century building site. The same discontinuity of weaving and, above all, the bedding mortar (lime and clay in proportion for the ground floor, "bazzana" for the "piano nobile") are also found on the two courtyard façades and indicates an intentional construction choice rather than a contingent heterogeneity of materials. Similarly, a lime and clay mortar was used to lay the brickwork of the arches of the porch in the courtyard up to the height of the floor on the "piano nobile". The brickwork of the loggia continues in "buona bazzana", reintroducing the same discontinuity described for the façade on the road. Notwithstanding the fact that several interventions and redefinitions of the windows render things less readable, the sequence can be observed in the first tract of the façade east of the courtyard to the fourth window of the corner towards the loggia (fig. 136).

Thus, Camillo Magio intervened radically on the *domus magna* which perhaps needed both maintenance work done and to be brought up-to-date. In the great cellar corresponding to the hall of the "piano nobile", the northern wall under the façade appears to have been shifted towards the street by more than one metre, corresponding to a portion of the barrel vault separated by the pre-existent fabrication joint. The façade of Ferrante Magio's house was almost certainly rebuilt after 1576³⁰ (fig. 137).

The chronological relationship between the windows on the ground floor and the "piano nobile" and the underlying brickwork testifies to a long formation process. The windows on the ground floor, from east to west, have the following chronological relationship with the underlying brickwork:

- i, ii, iii: breakage in the brickwork of Ferrante Magio's house. The cornices are constructed with the same



137. In the great cellar corresponding to the hall of the "piano nobile", the northern wall under the façade seems to have been moved towards the street by more than one metre where a portion of barrel vault is separated from the pre-existing one by a fabrication joint.

bricks (M4) used for the renovation work of the *domus magna* and their realization is therefore connected to the years immediately after 1658;

IV, V, VI, VII, VIII, IX, X, XI: in phase with brickwork during the renovation of the *domus magna*;

X, XI, XII, XIII: breakage in the brickwork of *casa Lotica* with drawings and similar dimensions to preceding ones.

The windows of the “piano nobile” have, from east to west, the following chronological relationship with the underlying brickwork:

I, II, III: breakage in the brickwork of Ferrante Magio’s house;

IV, V, VI, VII, VIII, IX, X, XI: in phase with the brickwork of the renovated *domus magna*. This series of windows also presents the relieving arch in phase corresponding to X and XI, to mean only one, coordinated building plan of action of the windows in the wall of the renovated *domus magna*;

XII, XIII: breakage in the brickwork of *casa Lotica* with drawings and dimensions similar to the preceding ones, although only in XII is the relieving arch also depicted.

Further comparisons of adjustment operations on the façade of the late medieval building lots are deducible from the examination of the hopper fronts and the stratigraphic relationship that the relative nails demonstrate with regard to the cellar vaults: these are only in phase in the tract corresponding to *casa Lotica*, while all the remaining apertures demonstrate noticeable signs of damage, adjustment and tampering, witnessing to the fact that it was, above all, the houses already belonging to the Magio family that underwent most alterations during the second half of the 1600s while *casa Lotica* was an already consolidated articulation of the façade. The windows occupied the same positions as today and were contained there, along the same axis as the hopper fronts. The alterations during the seventeenth century only concerned the ashlar moulding. This was rather taken as a reference for imposing quotas and the positioning of the apertures on the new façade. The result was, therefore, a façade of windows with an almost constant centre distance in the median tract (from the fourth to the tenth window) with measurements deriving from the extremes (first, second, third, eleventh and twelfth). In this sense, the large seventeenth century cornice takes the merit in a certain way for the uniformity of this composition, lessening the perception of the irregular positioning of the openings in the top fascia and forming a plastic element able to characterise the broad development of the façade. Finally, due to a lack of full stratigraphic evidence, it is difficult to think that the brickwork using “bazzana” mortar (as in Ferrante Magio’s house) laid with mixed mortar (the *domus magna*) was intentionally left without plaster for years and that the surfaces resisted erosion under the action of atmospheric agents up to its completion in 1876. It is more likely that in order to guarantee the protection and ornamentation of the new palazzo, the aligned façades were unified with a clay-based plaster and protected with a yellow ochre-tinted lime mortar of which only a small trace remains around the windows on the “piano nobile”. The tract of the façade towards the cathedral, corresponding with *casa Ramonda*, was realized between 1780 and 1830 (an interval defined essentially by the gaps in the archives). This tract was in the same perfect shape it is in today.

A reference that orientated the project of the façade is certainly that of Palazzo Affaitati which is characterised by a central hall of a double height on the “piano nobile” and on the same axis as the entrance hall.³¹ This resulted in a façade with three central, square windows and a faux mezzanine to be replicated on the two sides with as many other faux windows. The shape of the cornice in terra cotta under the exuberance of the anthropomorphic herm was not changed, nor was the sequence of small, rectangular windows surrounded by a frame in relief inserted into the sequence of the cornice. The semi-volutes were a widespread solution in the city (mostly demolished) or on the façade of Palazzo Cattaneo in Contrada Sforzosa³² (which still exist). The ashlar frame of the windows on the ground floor and above all the fascia which connects them, a representation of a course of regularization in rustic brickwork can be found in Villa Schinchinelli in Cavallara³⁴ (belonging to Camillo Magio’s brother-in-law) in which the façades are like those of the loggia of our palazzo and articulated with square insets. The use of ashlar frames was still widespread: from the façade entirely covered with ashlar plaster of Palazzo Vidoni,³⁵ to the ground windows of Palazzo Schinchinelli Martini and the already cited Palazzo Cattaneo to Teatro Ariberti, then Filodrammatici.³⁶ Francesco Pescaroli had adapted, to the pre-existing models well known to him and his commissioners, syntheses simplified by a vast and elusive repertory that goes from Serlio³⁷ to the Julesque inheritance of nearby Mantua, to the Palazzos of Genoa of Rubens, above all the second volume, numerous editions of which spread a long way to the commercial itineraries that touched the state of Milan.

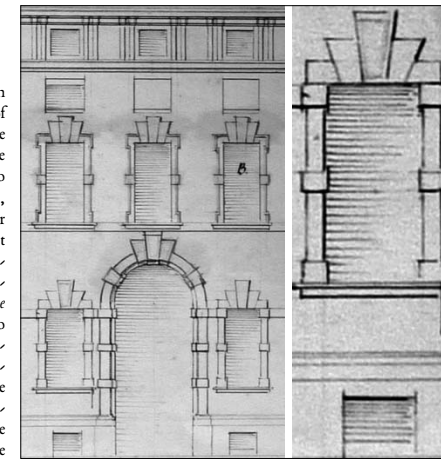
THE NINETEENTH CENTURY: THE RESTORATION OF THE EAVES AND THE COMPLETION OF THE FAÇADE

Annibale Grasselli bought the palazzo in 1873. The last works for the channelization of rainwater and then the drainage system date from about forty years before; the plaster on the façade was much earlier. In 1876 (the palazzo being free by then of the previous occupants), the municipality solicited Grasselli to repair the leakage caused by the weathered eaves but the circumstances justified a complex intervention. With a letter dated 27 March, 1876, Annibale Grasselli informed the *Commissione d’Ornato* that “with the necessity of having to provide for restoration work which was necessary for the eaves of the house in Via S. Gallo No. 21, after due consideration, Cavaliere Sig.re Annibale Grasselli along with the indications of the respective completion of the simple ornamentation in red requested for the windows on the “piano nobile” and the entrance”, the architect, Vincenzo Marchetti, presented a kind of selection of samples with typologies of frames for the completion of the windows of the “piano nobile”. It is interesting to note how the solutions proposed as an alternative were traced on paper, cancelling the

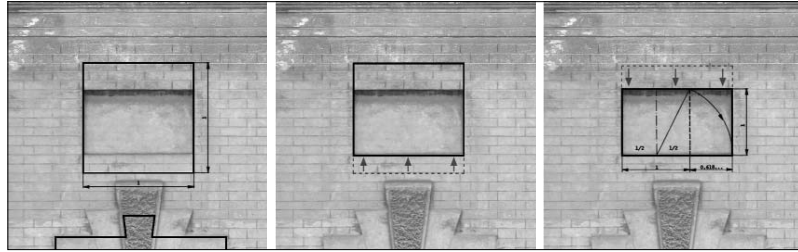
design of the general state of the current conditions and only the elements that were the subject of alterations were represented with red lines, that is the solutions for the architraves of the windows of the “piano nobile”, the adjustment of the headstones of the windows on the ground floor and the carriageway, the dimensions of the faux windows of the faux mezzanine. The contemporaneous interventions on the eaves, the drainpipes and above all the plastering were ignored as these were neither the competence of the commission nor the subject of the “dimanda” or request.

On 16 April, the *Commissione d’Ornato* agreed to the request for the type of arched ceiling architraves, choosing between the models proposed, and countermarked it with the letter “A”. At the same time, they recommended that a facing should be carried out on the median keystone of the windows on the ground floor and also on the door frame. After only five days, on 21 April, Grasselli addressed the Commission personally and firmly stated his own choice, exercising his personal influence and arguing the merit of stylistic options. One cannot exclude either that Marchetti had simply transferred the alternative proposals to the commissioners, submitting an interjectory drawing, without having left precise indications for the Commission.³⁹ To overcome the misunderstanding, the commission met again the next day, 22 April, inviting Marchetti himself to attend and, having “the pleasure to be able to second the desire of your very illustrious Lordship [...] agreed that the ornamentation proposed in the request and indicated in type with the letter B be carried out”.⁴⁰ In this way, Grasselli obtained the permission to replicate the ground-floor frames on the “piano nobile”, renouncing the residual, Baroque traces of the palazzo in favour of a structured design, maybe more modern and certainly adherent to a certain historic taste with the accentuation of the rustic tone of the windows on the ground floor to which keystones were added in ashlar relief (“a facing”) and the alteration of the proportions of the faux windows on the mezzanine (fig. 138).

The construction of the vault in the “sala grande”⁴¹ on the “piano nobile” and the reduction of the small windows that form the second arrangement of apertures had already been decided upon during the eighteenth



138. Some details of the “Type of house located in Via San Gallo No.21 in Cremona” (see pl. XLIII). On the left-hand side: the solution for the frames and the windows and the great door with elements foreseen and not realized. On the right-hand side: the alterations of the windows headstones requested by the Commission (“that a facing should be carried out on the median keystone of the windows on the ground floor and also on the door frame”) were drawn in pencil on the original design.



139. The faux 17th century windows were square, measuring approximately 1.20 x 1.20 m. To make room for the high keystones of the windows of the "piano nobile", it was necessary to increase the height of the window sills by two courses altering these dimensions (approximately 1.20 m x 1.00 m), with a ratio of 1:2.62 almost shaped like an aural section.

century. The height of the architraves had already been lowered by 15-20 cm. On the façade, the problem was probably resolved with a carved decoration, a tinted board to impede the sight of the structure from the road without altering the silhouette of the aperture and the dimension of the frames. This solution, accurately registered with Marchetti relief allowed for the alignment with the other faux windows which completed the design of the façade opportunely with a square, faux mezzanine necessary to the composition of this façade and characterised by the significant height of the "piano nobile". The "completion of the simple outlines of the decoration requested for the windows of the piano nobile", that is an imitation of the over-windows on the ground floor, resulting from the diatribe with the *Commissione d'Ornato*, however, resulted in an increase of three courses at the level of the window sills of the three small windows of the hall in order to keep them sufficiently at a distance from the new, significant keystone which was almost double the height of the previous one. The alteration of the height was to be extended to all of the faux windows on the mezzanine to preserve the alignment given to it by Vincenzo Marchetti in the description in the drawing. The new design of the apertures, however, cannot have been totally satisfactory considering the new proportions of the façade. The faux seventeenth century windows were square, measuring approximately 1.20 x 1.20 m. The increased height of the window sills changed this ratio (1.20 x 1.00 m approximately) without, however, bringing them back to an established ratio and necessitating this course of vignettes to be moved three courses above the new keystone and three rows under the moulding of the frames on which the semi-volutes rest. The small windows and faux windows were reduced so much in height that the architraves were lowered by three courses and reduced further in width, obtaining in this way a series of rectangles well distanced both from above and from below by approximately 1.17 m x 0.72 with a ratio of 1:1.62, almost shaped⁴³ like an aural section (fig. 139).

From the documentation concerning the diatribe between Annibale Grasselli and the *Commissione d'Ornato*, it is still possible to note how the "completion" of the eighteenth century re-design also took into consideration the frames on the ground floor. In the drawing attached to the request, the architect, Marchetti, traced two red segments above each of the windows to complete the drawing of the tripartite headstone, simulating the effect of a double overhang which is still visible today. The project had the intention of accentuating in this way the rustic character of the ground floor, adding to the keystones of the carriageway the same tripartite motives on the architraves and enriching the shoulders with further projecting elements which were not executed. The examination of the documented data, in this case the drawing by Vincenzo Marchetti, illustrates once more the power of this instrument in analysing historical construction. In this case, it was very useful in determining the subject, proportions and effective consistency of the "completion" of the nineteenth century restoration of the façade and indispensable in orientating the results of the "autopsy" examination, along with the painstaking interpretation of the stratigraphic evidence on the façade.

The drawing, however, tells us little about the construction of the stone eaves which substituted the pre-existent wooden ones or the finishing touches of the plaster on the big window frames. Each hypothesis can be seen in the tints used to integrate and complete the ochre plaster with a clay-like consistency and lime trims that cover the seventeenth century semi-volutes of which survive integral traces on the walls and eaves and across the

stairway that rises from the small, kitchen courtyard:⁴³ a cornice in Sarnico stone, to substitute the wooden joists, great Beola slabs for the projecting planking, carved Botticino risers for the bargeboard with an assortment of lithographs totally coherent for their commercial style and physical-mechanical properties with the taste and merchandizing documentation of Cremona of that period in the recurring interventions for the stone transformations of the wooden overhang.⁴⁴

The stone elements of the eaves do not necessarily fit in with the completed design of the nineteenth century, probably because they are too various in colour and texture and were consequently plastered and tinted as the traces of mortar and colours surviving on the beola stone slabs and on the surfaces of the sandstone brackets testify. The plaster treatment of the stone elements of the eaves reflects both a protective intention, the Sarnico sandstone used for the cornice being noted for its poor durability, and for aesthetic reasons. In this sense, it is interesting to consider the graduated alternation of the "new" red tint and of the "old" ochre tint in the area of the cornice: the first rising to cover the only shoulders of the small windows, real or faux, introducing a horizontal chromatic limit that attenuated the perception of the architectural element (the faux window) in favour of the ionic architrave on which the seventeenth century yellow ochre tint survives. The same yellow ochre shade continues on the surfaces of the underside of the cornice, alternating in this area with red and exalting the chiaroscuro and the plasticity of the elements that form the frames. Above the capital of the architrave, the red tint starts again also covering the Sarnico stone cornice and the Beola stone slab with a subtle stratum of plaster in which some remnants tending towards a slightly more brownish tint are still visible, protecting and masking it at the same time.

The plaster of the frame presents fine granulometric, homogeneous and uniform stratigraphy in its broad development, both on the walls with insets and windows, and on the semi-volutes which support the stone cornice. This has to do with a plaster with a very smooth finish and "lime" tint, with colours described as dark grey shading to accentuate the insets of the faux windows. The microscopic observation of the polished section highlights, already at low magnification, the continuity and adherence of the superficial strata, the regularity of the interfaces between the body of plaster, the plaster made of slaked lime called "fioretto"⁴⁵ of Lodi and recommended for whitewashing and more refined work because the bright white contrasts with the grey binder of the "arriccio" and for the aggregate with fine, uniform granules and the bright red stratum, completely adherent to the plaster to indicate a lime distension on a wet background. The pigment is a natural, earthy red, i.e. iron oxide with traces of silicon and clay-like impurities. From a chemical point of view, this does not exclude the use of other pigments, for example Mars red (Fe_2O_3). The superficial morphology of the section, the modality of adhesion of the tint and the area of the surface treated are characteristic of the use of ochre and cocciopesto⁴⁶ (pls. XLV-XLVI).

The result was, therefore, a frame plastered and tinted in two colours which continued to cover the stone elements of the eaves. The only barge board in Botticino limestone probably remained in sight, maybe to recall the corresponding elements placed to protect the shoulders of the passageway, up to the quota subject to wear and tear in the passage. The Marchetti project foresaw a rustic completion (not realized) of these shoulders that would have enriched the design with raised elements, resuming and accentuating the motif of the windows on the ground floor. This also foresaw the remodelling of the wainscot, probably already in existence but marked by the lowering of the level of the road in 1831. These marks correspond with brief, visible parapets in relief to the base of the air vents.

The plaster wainscoting terminates near the shoulders of the passageway with two corners in sandstone with surfaces worked with a chisel, probably to favour the grip of a plaster destined to unite these elements chromatically to the rest of the base fascia. The present wainscoting was probably renovated in 1907⁴⁷ and maybe more recently. It is, however, interesting to note how its layout plan registered the necessity of rectifying the irregular position of the late medieval facings joined into a single façade. Evident signs of this progressive alignment are visible to the west of the passageway in the tract corresponding to *casa Lotica*, the façade of which is leaning off the plumb line towards the interior a little above the height of the present-day window sills on the ground floor. During the course of construction work in the 1600s, this defect was corrected by lining the external wall, consolidating it and improving the alignment with respect to the shoulders of the passageway and the tract of the façade to the east. The lining is made up of five courses of bricks placed immediately above the present-day wainscot and proceeds with a series of flanged tiles that extended up to the fascia which joined with the window frames on the ground floor. Pick marks are still very visible at the side of the frames and near

the fill-in of the drain pipe. Notwithstanding this intervention, the façade is still out of plumb line today by about 3,5 cm on the ground floor behind the corresponding tract of the “piano nobile”. The façade of *casa Luita* shows further traces of past stabilizing repairs: the wall of the “piano nobile” shows a difference in thickness of about 17 cm in the two rooms towards the street, being thicker in the space above the passageway.⁴⁸ This confirms the hypothesis that this tract of the façade was tampered with in order to widen the carriage access to the courtyard, an operation not without consequences on the stability of the overlying wall which was, thus, reinforced from the interior with a lining of the thickness of two bricks. The same discontinuity proceeds to the eaves where the difference in thickness is limited to one brick. A similar intervention of external lining is visible at the base of the bordering *casa Ramonda*.

Today, the faux-brick finishing covers the tract of the façade to the east of the vertical limit of plaster removal corresponding to the carriage-way. Traces of the same plaster are also present to the west of this limit, indicating how selective removal only eliminated the parts at risk of falling, preserving those adherent to the brickwork which were expected to be renovated. The presence of these fragments causes us to consider the intent and outcome of the completion encouraged by Annibale Crasselli and Vincenzo Marchetti. They demonstrate in the first place that at the termination of work, the faux bricks extending the whole façade and the eighteenth century restoration were an intervention using a seventeenth century plaster with a clay-like base, in part preserved and utilized as a base for the new plaster. Here, we are dealing with plaster formed of two (or locally three) strata on heterogeneous brickwork made up of the remains of the houses which were united and elevated during the second half of the 1600s:

- A “rinzaiffo” or rough coat with well dampened mortar with slaked lime and medium-grained sand to form a base which is easy to grip and to regularize the unevenness at the base, penetrating between the joints above all between the clay-like ones, maybe already eroded due to exposure to atmosphere agents. This stratum is frequently displaced by residues of the preceding seventeenth century plaster with a clay-like base, applied in thicknesses also relevant to the regularization of the underlying brickwork and the protection of its joints;
- a second stratum or “intonaco” with an incision of faux bricks, prepared with a thinner mortar than the previous one and clay and also a local thickness superior to 3-4 cm;
- a finish with a slaked lime base and finely sifted sand on the surface plus a red-tinted mortar applied with “lime”.

The workdays can be seen in the subtle demarcations of discontinuity on the surfaces and in the body of the mortar. It is plaster made on site with lime, dampened and inert due to non-airtight sifting, so much so that between one day and the next, a lack of homogeneity of composition and impurities (presence of traces of lime lumps, various granulometry, float traces) are evident. Under close examination the canonical succession of the functional strata is shown to be liable to local variations due to the irregularity of surface grip and the consequent necessity to adapt the thickness and also the number of strata. On the ground floor, the triple strata is present in the tract of the façade to the east of the carriage-way where it covers the remains of the two ancient houses of the Maglio; above the string-course, there are only two strata and a red tint, the granulometry of which leaves a rough surface. The few traces to the west of the passageway (between the twelfth and the thirteenth windows of the “piano nobile”) present a simpler stratification without a rough undercut and with the body of the brown coating which is even thinner, dry-pointed and tinted. Between the third and fourth window to the east, the façade forms a dihedron corresponding with the planimetric intersection of two perspectives respectively corresponding to the house already belonging to Ferrante Maglio and the *domus magna*, the discontinuity highlighted by the doubling of the sub-cornice. To the east of this limit, the plaster is applied in two strata with a body containing clay on which a reticule of faux brick and a very tenacious and inert finish upon which a red “lime” tint was applied.

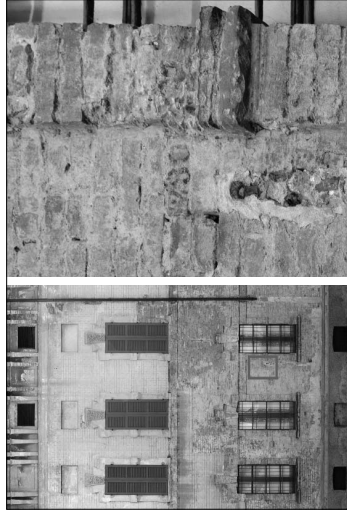
The executive sequence of the functional strata is detectable in the gaps due to the insertion of the hooks then removed with local removal of the surfaces. For example, considering (pl. XLIV), one notes how the finishing stratum relevant to the workday to the right surrounds the relevant surfaces of the preceding day to the left which was already finished and dry. The yellow arrow indicates a gap in the only finishing stratum of the plaster to the right, probably due to the fixing and successive removal of a metal hinge. Under this gap emerges

the lime red tint applied on the finish of the day to the left, a tint lost due to being washed away on the rest of the façade but here protected by the overlap of the plaster on the day to the left over the day to the right. This stratification indicates a limit of phase referable to the sequence of a day at a time in the area of the same work or more probably a few days at a time, in the hypothesis that the plaster was applied by vertical lots, engaging the façade (and the pavement) with successive building sites of limited space and accomplished by proceeding from east to west (pl. XLIV, top left).

After 1876, the red tint of the plaster in faux brick extended the whole façade. The string-course fascia and the window frames maintained a grey tone of contrast, on which the traces of the red marks specified by the *Commissione d'Onorio* can still be seen. The tint survives today only on the background of the joints and the small overhanging of the faux windows of the “piano nobile” where, protected from the rain, they demonstrate a net compositional and chromatic analogy with the finishes of the window frames and also with reference to the silhouettes traced to simulate the missing apertures. Under close observation, the surfaces of the plaster in faux brick are revealed to be rough. The red tint also penetrates deeply into the visible pores in section, across the discontinuity due to granulometry and shrinkage. Thus, it is possible to evaluate it as the same finishing solution and the same “lime” tint already described for the plaster of the cornice where pigmentation can be found in ochre and coccopesto, both aged differently by time due to being exposed to rain. Underneath the gutter remains naturally more protected by the wide overhanging, as much due to the different consistency of the support as the modality of application, being the same distension on the rough surface of the plaster in faux brick probably in part already dry (therefore shrunken and micro-crazed), while to the height of the cornice “almost dry [...] with milk of lime that mixes with the plaster that never goes away” was applied to the background⁴⁹ (pl. XLIV, bottom).

The nineteenth century intervention resulted thus in a true restoration of the façade, which was designed and finished 150 years before ago in the late baroque forms, integrating the gaps of the late nineteenth-century plaster and covering the full prospectus with the above-described plaster imitating a brick curtain. This was composed of aggregates and binder of quality not unexceptionable and was colored bright red. Beyond the differences in grain due to the composition and placing, this plaster reconstituted the entire thickness of the coating, where the seventeenth century plaster was completely lost. Surely this happened in the range close to the ground, since the old plaster showed a distribution and morphology of degradation largely equivalent to those that afflict the current, being similar both the environmental causes both the heterogeneous adhesion to the substrate. The gaps should extend to the height of 3-5-4 meters above the ground as shown by the serial number of a light gas, installed for the lighting of the road after 1861.⁵¹ The number, traced with a brush on the surface of the brick is still visible between the fourth and the fifth window from the east, to 3,60 meters from the floor and shows how, at that time, this area of the façade had already lost the plaster (fig. 140).

The beautiful photographs published by Lidia Azzolini in 1998 enable us to reconstruct the recent history of the degradation of this long façade, uniformly covered with faux brick plaster after 1876. The images show how, at the end of the 1900s, the plaster was still relatively integral in the tract to the east of the passageway, except for the coloration and gaps corresponding to the rising damp and the damage at that time relatively localised, near the terminal drainpipe brickwork.⁵² The faux brick plaster also extended to the west of the passageway even if there were different the knesses and consistencies from the eastern tract, a significant result



140. The serial number of gas lamps installed for the illumination of the street after 1861 is indeed directly on the surface of the brick, indicating how this area was already without plaster during this epoch.

of previous restoration. The signs of at least two series of resumption: the one consistent in localised bits of very thick mortar, maybe cement, of a grey-reddish tone are still present today in the tract of the façade to the west of the carriageway and probably due to repairs carried out by Ippolito Grasselli in 1907; the other consisting of a thinner plaster, disintegrated and covering a good part of the "piano mobile", where the original was already being removed because it was in a bad condition and dangerous, along a precise limit indicated in the higher part of the façade by a big squared nail used to support the band bordering the tract where plaster was to be removed.

If the original finishes resulting from the intervention of Grasselli-Marchetti extended the entire façade (uniformly subject to solar radiation and protected by the same overhanging eaves), it seems legitimate to ask oneself why the degradation was so bad in some parts whilst the plaster was integral in others apart from a loss of colour. Next to the presence of localized vectors of specific degradation, the heterogeneity of the brick curtain and as a result of the additions to the medieval building lots determined the various methods of distending the nineteenth-century plaster even if not successive, functional strata and consequently with a different degree of adherence to the base. The plaster laid on the brickwork of the sixteenth century *assa Latina* penetrated little into the well-sealed joints and is scarcely attached to the compact surface of the well-fired, sealed and "rubbed" bricks. However, the same plaster is attached well to the facing of the *domus magna*, above all the "piano mobile" on the joints of "bazzana" with little or very little lime. The nineteenth century mortar, being eroded by bad weather, permitted deep penetration and the "new" faux brick gripped tightly to the "old" brick facing. It is easy to ascertain the same circumstances for the extreme eastern tract of the façade (Ferrante Magio's house) where erosion of the joints almost completely free of lime determined the better conditions of grip, at least to the damage due to capillary action, notwithstanding the fact that the lime sealing does not exceed the third course above the wainscot. It is possible, however, to note how the presence of the most tenacious, protruding mortar rendered the grip of the plaster less easy on the ground floor of the *domus magna*, on the window frames of the ground floor (M4) and the in-fill brickwork of the ancient passageway of Ferrante Magio's house (M2), favouring gradual detachment due to infiltration or capillary action (pl. XI).



141. Clay appears as a constituent of almost all the plaster mortars on the façade and the bedding mortars of Palazzo Magio Grasselli where it was used to bind both fired and unfired bricks.

THE CLAY MORTAR: A RESEARCH OPPORTUNITY

Despite various percentages and quality, clay appears to be constant in almost all the bedding mortars detected on the façade of Palazzo Magio and is also present in the plaster mortars, both in the yellow ochre covering of the cornice and in the faux brick plaster laid on the entire façade after 1876. The use of clay as a component for the mortars has already been widely documented in Cremona³³ and today two principal ways of confectioning a paste with only sand and water (the "mola")³⁴ have been noted which are useful for bricklaying and recommended for structures above ground. They were also, as in the case of Palazzo Magio, largely utilized for cellars or mixes in which the clay is used together with a more or less significant load of lime (sweet or strong). This second use represents the most interesting and, in some measure, the most specific case of the reality of Cremona. Here, indeed, differently from many other contexts in which construction utilizing crude earth spread in correspondence to the territorial availability of raw materials and in which a specific construction knowledge³⁵ was progressively established, the clay was combined with lime on the basis of an awareness and significant technological control of the material, in reference to both mechanical and hygrothermal properties.³⁶ Furthermore, clay and lime mortar was almost always used, above all in urban and patrician workshops as binders for the laying of terracotta bricks or of mixed, fired and raw bricks, differently from situations in which crude earth was used both to shape bricks and for bedding mortar.

The specific, mechanical performance of the clay was studied in depth, above all with reference to its application in developing countries, the possibility of its use in the processes of self-construction and the antisismic properties that this technique can offer.³⁷ With reference to the historical construction industry of Cremona, the principal reason of interest, however, seems to be the possibility of introducing different compositions of clay mortar as an instrument in the dating of brickwork in a similar way as already studied with reference to lime.³⁸ There are many opportunities for research into chemical-physical behaviour, above all into the presence of the humidity which accumulates in the materials when combined with lime: this recurs so frequently that it suggests higher level of awareness in the documents³⁹ than we are led to believe (fig. 141).

³³ This text presents the results of the study conducted in the laboratory of analyses and building diagnostics at the Dipartimento di Architettura e Pianificazione del Politecnico di Milano that has benefited from the contribution of the ideas and work of colleagues and collaborators, above all for the survey and restitution of data, as well as the constant comparison with the editor and co-author of the present book. My thanks go, moreover, to the architect, Emanuela Carpani, the Architect, Luca Valeri and Dr. Eng. Laura Bagghetti.

³⁴ For an updated list of bibliographic specific references, see BOATO 2008, pp. 190-195.

³⁵ In this book Angelo Landi, *Architettura. Trasformazioni in un'Archeologia. Storia in Cremona. Palazzo Magio Grasselli between Civitas and Urbis*.

³⁶ In this book Sandro Baroni, Paola Tavugliolo, *The Decorative Frames of Palazzo Magio Grasselli in Cremona*.

³⁷ The instrumental investigations (optic microscopy XED, IR and Raman spectroscopy) were carried out by the Laboratorio di Chimica per il Restauro dell'Università degli Studi di Brescia, thanks to the collaboration of Eng. Danilo Benedetti and Dr. Michela Pasqui.

³⁸ A word coming from dialect that which served as an access corridor or passageway to the rooms or the stairways. See CARPANI 2003, p. 147.

³⁹ The main ones...

⁴⁰ On the dimensions of the bricks in commercial use in Cremona at the end of the 19th century, see the measures taken immediately after and elaborated on by PIRACCO 1988, in particular cap. 4, *Interventi di restauro (evoluzione storica, fonti di approvvigionamento)*, par. 4, *Interventi (prezzi)*.

⁴¹ PIRELLI 1987, p. 57.

⁴² The Cremonese term for "bank", CARPANI 2003, p. 216 and 234.

⁴³ The calcium ochre film frequently present on the stone surfaces of the historical, architectural patrimony have been the subject of specific research to study the possible correlation between the morphological and compositional characteristics of the film and the determination of

the product originally employed with aesthetic and/or protective purposes, the mineralization of its organic components produced calcium oxalate. See two Ph.D theses on the Preservation of A rehistoric Milan. Heriaging at the Politecnico di Milano. GARLETO 2007 e ZILBI 2009.

⁴⁴ Concerning the use of organic mixes with a binding function or to improve the workability and grip of mortars, see the rich bibliography on the "receptes" of art and restoration, among others, see ASCOLAO 1998. The custom of enriching the mortar with "non-synthetic" polymers is recorded in the form of technical specifications in PICOLOTTI 1843, e.g. specifications for the preparation of "Mastice" (vol. I, art. VII - *Dalle malte, cementi, bitumi e mastici*, p. 227 and following).

⁴⁵ MARINELLI e SCARPELLINI 1992, pp. 147-149. In the following, the same authors remind us that sagrammatura was born and died on the wall, not allowing for, unlike plaster, continuation or repair. Furthermore, to be carried out, it needed a "regular base made up of new whole, homogeneous bricks such as tiling, manual rubbing which was necessary to create a thin film of stucco, consisting of brick powder bound with lime which leaked from the joints. Spunelli, in fact, claims, commenting on la *Trattato di Nubi* that sagrammatura should only be carried out on old walls as in the case of church towers", *Ibid.*, pp. 134-137.

⁴⁶ For a broad, clear examination of the historical evolution of the term "sagrammatura", see *Ibid.*, pp. 135-137 and the entry word "sagrammatura".

⁴⁷ BENATI 1996, p. 329. Also see GRASSANELLI e Grasselli 2003.

⁴⁸ As we are dealing with a surface macroscopically very different from that surfaced on the facade of Palazzo Magio Grasselli, for an analytical characterization of a brick surface treated with "sagrammatura", see MAROCCHI, DELL'USATI *et al.* 2009: "On some bricks, a very thin, residual layer of lime plaster (*sagrammatura*) with sand formed of quartz, K-feldspar, mica and coccopesto fragments have also been detected.

This technique, *sagrammatura*, was commonly used for grinding the brick surface. Frissures and macro-pores are partially filled in with recycled calcite and gypsum", p. 23.

⁴⁹ A description of the "sagrammatura", "to take away", is in PIAZZONI

1988, p. 137: "Plaster colour of the course material, often of the yellowish brick or of the red brick, discovered that this was obtained by rubbing by hand with another harder brick, keeping the surface wet at the same time so the materials can mix, colour and enter the curves and porosity of the surface and, at the same time, one can render the plastering uniform".

¹⁷ On the treatment of the surface of the brick façades in Venice cfr. DOGLIONI and MIRABELLA 2011, in particular the contributions DOGLIONI and TROVO 2011, pp. 33-66 and SQUASSINA 2011, pp. 67-88.

¹⁸ The rooms 5.01 and 5.02.

¹⁹ The walls that separate the rooms 5.02 and 5.03.

²⁰ The room 5.02.

²¹ Corresponding to a little more than 6 "braccia": 1 "braccia" = 48.3539 cm.

²² AZZOLINI 1994, pp. 77-80. A sketch of the façade of the palazzo and its decorative elements in terra cotta appears between the pages of the sketchbook which Mackintosh brought with him during his journey in Italy 1891. The drawing is noted as "brick home Cremona" - 15 June, 1891. Cfr. LAGANA 1995, p. 47. I thank Alberto Grimaldi for this and other precious indications.

²³ On the drawing of these frames, one can see the following paragraph on the 18th century restoration.

²⁴ For a deeper examination of the borders and ways of making apertures in an existing wall, see DOGLIONI 1997, p. 134 and the following.

²⁵ It is not possible to locate the corresponding, western shutter, the brickwork tamponing of which is directly connected to the 17th century on the old borders of the *domus magna*.

²⁶ See Angelo Landi, *The Development of the Urban Network and Building Reforms: Channelling of Rainwater and the Use of "Modern Gutters" in Cremona during the Nineteenth Century* in this book.

²⁷ CARPANI 2003, p. 69, pp. 101 e 161. Even if the author refers to the documents and the 19th century, it is reasonable to recognize in these the continuation of a previous building tradition.

²⁸ For each sample, the granulometric curve and pattern of the components via x-ray diffractometry was determined. An analytic procedure specifically dedicated to clay mortars is discussed in FIENI 1999, pp. 11-12, 17-18.

²⁹ A documented reference for a mortar mixed with clay and lime mortar in equal parts is in RONCAI 1988: "In the church (parish of S. Martino al Lago) projected by Domenico Voghera, the formulation of the mortar had to be as follows: up to the height of four Milanese *braccia*, two parts of lime mortar and one of earth making the *lattata* on every course as in the vaults and frames, and for the rest one had to adopt a mortar made up of earth up to the height of four Milanese *braccia*, two parts lime mortar and one part earth carrying out the *lattata* on every course like on the vaults and frames, and for the rest one had to adopt a mortar consisting of earth and sweet lime mortar in equal parts". The text is mentioned in BONATI 2002, p. 46, note 18.

³⁰ See Landi's article, *Architectural Transformations...*

³¹ JEAN 2000, p. 53 and fig. 100 on p. 153.

³² *Ibid.*, figg. 60, 61, pp. 89-91. For further information on the building cfr. BONANTI e MERONI 1999 and ID. 2008, pp. 23-24.

³³ This wing of the palazzo, seriously damaged in 1945, was demolished and only the façade survives. Cfr. CARINI COBBARI *et al.* 1991, vol. I, cap. V, p. 66 and following.

³⁴ PEROGALLI, SANDRI e RONCAI 1973, pp. 369-370. AZZOLINI 1999, p. 119.

³⁵ VOLTINI 1982. JEAN 2000, pp. 50-51 fig. 41-45 (16th century construction), pp. 112-117 (1660 inventory) and figg. 69 and 71 (plans); figg. 197-199 (drawing of furnishings by Faustino Rodi).

³⁶ AZZOLINI 1998, pp. 58-60 and BONDIONI 2001, pp. 311-368.

³⁷ SERLIO 2001 (1575), pp. 75-76, p. 163.

³⁸ The document, already described in AZZOLINI 1998, p. 23, is kept in ASCR, CCR, Congr. Mun. (1868-1946), b. 1137.

³⁹ Grasselli wrote to the *Commissione d'Ornato*: "Laddove mi avessi a uniformare alle variazioni introdotte dalla Deputazione al Pubblico Ornato al tipo da me prodotto crederei propriamente di immettere la fronte di un edificio che a mio credere non esige eleganza, ma severità di forme giusta il carattere dell'edificio stesso. Che se senza eccezione alcuna come pure era a ritenersi furono ammessi i capelli alle finestre

del pian terreno, non so comprendere come siasi tenuti un'altra norma per quelli del piano superiore che pur deve seguire lo stesso stile, e carattere artistico. Quando però, come non posso credere, si avesse a persistere nel voto consultivo della Deputazione all'Ornato, in questo caso sarei disposto al partito di lasciare intatte le finestre al pian superiore come trovansi al presente, e come li furono dalla costruzione della casa. Mi giova però sperare che per le case sovraespote vorrà l'Onorevole giunta Municipale farni ragione autorizzandomi alla esecuzione dell'opera giusta il tipo che corredeva la mia istanza per nulla contraria al disposto della legge sul pubblico ornato (codice de Podestà, e Sindaci anno 1811) ed a quella libertà di azione che compete al Cittadino che si uniforma alle prescrizioni della legge nelle soggette materie. Del resto verranno osservate le altre piccole modificazioni suggerite dalla suddetta Deputazione" ("If all the variations produced by me were made uniform according to the demands of the Deputazione al Pubblico Ornato, I really believe I would impoverish the front of a building that according to my beliefs does not call for elegance but the right severity of form according to the character of the building itself. Considering how the over-windows on the ground floor were allowed, I do not understand how another standard can be used for the upper floor that should also follow the same style and artistic character. When however, and I cannot believe it, one has to insist on a conference vote of the Deputazione all'Ornato, I would in this case be prepared to leave the windows on the top floor intact as they are at present and as they were when the house was built. It will be good, however, to hope that for the things overexposed, the honourable Town Council will want to say I am right and authorize me to go ahead with the execution of work just like the drawing which accompanies my petition which is for nothing contrary to the disposition of the law on public decoration (codices of the mayors of 1811) and to that freedom of action which lies with the citizens who makes uniform all the regulations of the law on the subject matter. And the other small alterations suggested by the above-mentioned Deputazione will be observed").

⁴⁰ Curiously, the pronouncement contains a refusal, from the moment that chosen solution was indicated again with the letter "a" instead of a "b". The oversight is corrected with a note at the margin of the page is signed by those present at the meeting, among which were the same Marchetti with Visioli, Germani e Finzi.

⁴¹ Room 3.14.

⁴² I owe this and other observations on the drawing of this façade to the collaboration of Luca Valisi.

⁴³ Room 1.37.

⁴⁴ CARPANI 2003, p. 53, note 192.

⁴⁵ *Ibid.*, p. 184.

⁴⁶ In this sense, the characterization was carried out from the Raman spectroscopy and the microscopic observation of the morphology of the section.

⁴⁷ See the article of Landi, *Architectural Transformations...* in this book, in particular note 130.

⁴⁸ Room 3.07.

⁴⁹ RONDELLET 1831-1835, book II (a. 1833), parte II, sez. IV (*Composizione ed applicazioni dell'intonaco*), pp. 78-91.

⁵⁰ *Ibid.*, pp. 88-89. For a systematic treatment of the topic of mortars and plasters in Cremonese historical construction: Giacinta Jean, *Plaster of Cremona: a Research through Archive Materials* in this book.

⁵¹ See the documents in ASCR, CCR, Giunta Municipale (1868-1946). Important elements for the history of urban gas illumination in Cremona and the Kingdom of Lombardy-Venetia are in LANDI 2010.

⁵² AZZOLINI 1998, pp. 23-26. The images are in black and white.

⁵³ RONCAI 1993.

⁵⁴ CARPANI 2003, pp. 142, 210, 217.

⁵⁵ This reference is to the research of CRATERE EAG of Grenoble www.craterre.org and to the results of the research of "Tetra" at the Getty Conservation Institute. The bibliography can be consulted online at the following site: http://www.getty.edu/conservation/publications_resources/pdf_publications/terrabib_categories.pdf. In Italy, see BERTAGNINI 1992 e 1999, SCUDO, NARICI and TALAMO 2001.

⁵⁶ BONAZZI and FIENI 1995, FIENI 1999.

⁵⁷ LICCIARDI 2006.

⁵⁸ FIENI 2000, VECCHIATTINI 2009 and 2010.

⁵⁹ CARPANI 2003, entryword "basiana-bazana", pp. 141-143.

The Development of the Urban Network and Building Reforms: Channelling of Rainwater and the Use of "Modern Gutters" in Cremona during the Nineteenth Century

ANGELO LANDI

In 1856, lingering on a description of Cremona, the priest, Angelo Grandi commented on the precarious condition of the city's channels and, more generally, the drainage system of which he wrote "the Marchionis Aqueduct that crossed the fortification ditch was destroyed in a war at the beginning of the 18th century and it was never thought to rebuild it".¹ The unbearable stench coming from the sewage affected a large part of the city's inhabited area, increasing the risk of epidemics. The building restoration and rectification planned by the Municipal Council had not resulted in a coherent plan for the drains, channels and ditches that, crossing the entire city, collected and carried away refluents water from small firms and habitations. In Cremona, admired for "the magnificence of its temples and palazzos, for the elegance of most of its houses",² the third epidemic of cholera struck the city's poor heavily, resulting in widespread criticism of the public administration.

Academic studies on the "health question"³ and on the principal urban reforms⁴ in Cremona during the nineteenth century have shown a social and economic scene, where the Municipal Council (led by Lodovico Schizzi) gave the go ahead for important renovations which went beyond empirical "theories of stench". The relationship between the urban environment and the health of the population was clear; from the 1830s the restructuring of the city assumed a different scale. This foresaw extensive regularization of the urban structure, substantially inherited from medieval expansion and considered by then inadequate: its aim was to implement the transportation of goods on wheels, safeguard the health of citizens and add lustre to the city.⁵ An intervention of such importance was made possible thanks to a systematic plan, governed by municipal regulations.⁶ The plan was directed to correct the numerous incongruities in public spaces, but with precise orders also for private habitations, even if the economic and political difficulties of the first half of the nineteenth century notably limited the action of the Municipal Council, which was forced to postpone building reforms that had already been planned.

Concessions given for the installation of a network of systems (rain water and foul drains in particular) with regard to the urban structure were the first stimulus that gradually led to better health conditions in the city. The industrial revolution in its first "pale dawn" entered private habitations through the introduction of technological systems:⁷ initially limited to the bourgeoisie or aristocracy, they often resulted in changes to building. During the nineteenth century, a particular relationship of reciprocal influence was established between road works and building restoration; components of a system in which the border between private and public space became increasingly flexible.

The influence that traffic regulations had on the architecture of private buildings, including those less "important" buildings which contribute to our understanding of the "image of the historical centre",⁸ has only been partially examined. On the streets, buildings are strictly connected to the road surface, water channels, drainage ditches. Later with the introduction of drinking water, power and light,⁹ streets became part of the technological network, and at an urban level, their infrastructural development "directed" the restoration of the façades and the internal arrangement of the habitations. The nineteenth century restoration of the façade of Palazzo Magio Grasselli¹⁰ has suggested a research method to probe questions concerning the transformation of the "urban face", documented in the archives of the *Commissione d'Ornato* and *Licenze Edilizie* ("Building Licences"), in which the regulations of the traffic police, with particular reference to the channelling of rainwater, played a decisive but often undervalued role (fig. 142).