Le superfici esterne negli edifici residenziali progettati da Giuseppe Terragni. Intonaci, rivestimenti in pietra e elementi prefabbricati alla prova del tempo

Marta Casanova (Università degli Studi di Genova)

Partendo dall'analisi della documentazione archivistica, bibliografica e dall'osservazione diretta degli edifici, il saggio analizza le superfici di finitura degli edifici residenziali progettati da Giuseppe Terragni per comprenderne le scelte formali e tecnologico-costruttive, gli esiti in cantiere e le modifiche che tali finiture hanno subito nel tempo. Giuseppe Terragni, dal 1927 al 1943, ha progettato e realizzato, da solo o in collaborazione con architetti come Pietro Lingeri e Alberto Sartoris, nove edifici destinati ad abitazioni plurifamiliari e due ville monofamiliari. Per le finiture esterne delle sue architetture sperimenta diverse soluzioni: finiture ad intonaco, rivestimenti lapidei in lastre di grandi dimensioni e in elementi più piccoli oltre a un rivestimento in elementi prefabbricati in graniglia di cemento. Nonostante la dichiarata volontà di Terragni di realizzare finiture durevoli, che potessero resistere all'azione degli agenti atmosferici, la maggior parte hanno subito modifiche e trasformazioni.

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The Outer Surfaces of the Residential Buildings Designed by Giuseppe Terragni. Plasters, Stone Cladding and Prefabricated Elements to the Test of Time

Marta Casanova

The cladding surfaces form the external layer which, together with the shape and the volume composition, characterises and defines the architecture of a building. With their protective role from aggressive agents and their architectural design expression, they are the visible and value-carrying part of the building but, at the same time, a fragile part subject to degradation and transformation.

Giuseppe Terragni, one of the most representative figures of Italian architecture between the two world wars, designed and built nine buildings intended for multi-family dwellings and two single-family villas between 1927 and 1943. Except for the Novocomum, the first residential building designed by Terragni, which met great critical acclaim in Italy and abroad, these buildings, considered to be "minor" works, have not been the subject of in-depth studies (fig. 1).

The research is based on the exploration of archival sources in relation to the direct investigation on the case studies examined[1].

The aim of this work, which starts from the research carried out during the PhD Course in Preservation of the Architectural Heritage of Polytechnic of Milan[2], is to highlight the residential

1. At this stage of the research, it was not possible to perform a campaign of chemical-physical analysis of the plasters. This study, however, can be considered a basis for the future choice of possible sampling points.

2. The research has been carried out within a framework of a PhD thesis in Conservation of Architectural Heritage (XXXII cycle) at the Polytechnic of Milan, Coordinator Maria Cristina Giambruno, with supervisor Stefano Francesco Musso

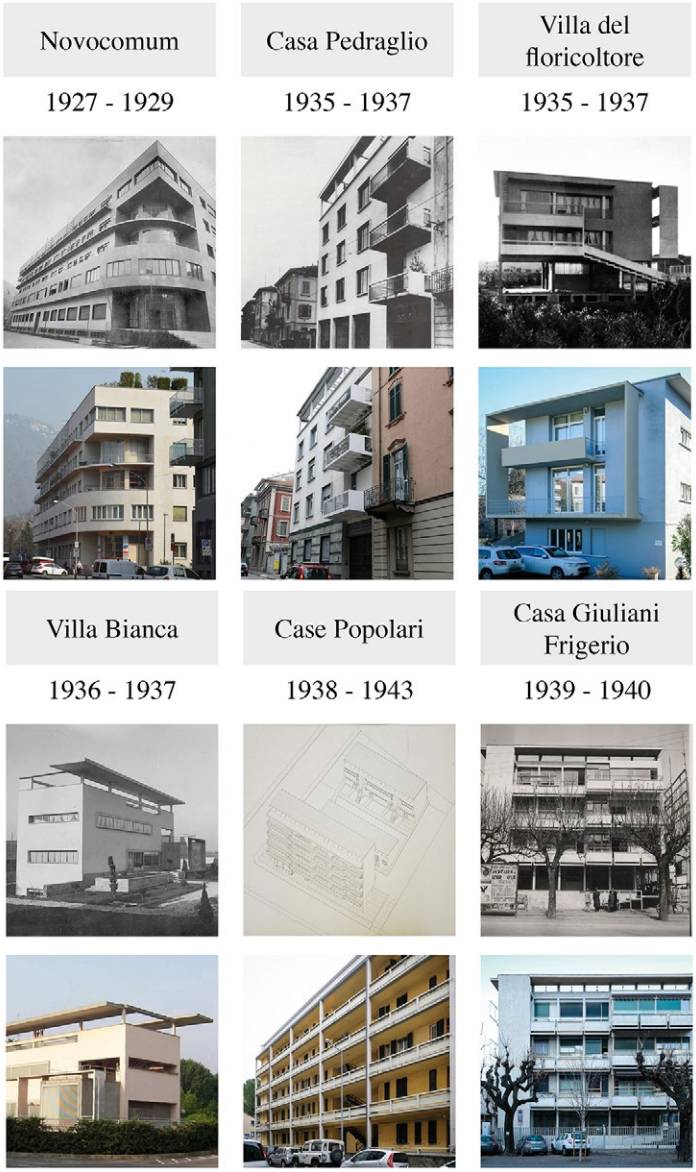


Figure 1. The residential buildings designed by Giuseppe Terragni in Como and Seveso. Picture at the end of the construction; for the Social Houses planned by Giuseppe Terragni in Via Anzani there are no pictures at the end of construction (AGT, photographs, Novocomum, Casa Pedraglio, Villa del Floricoltore, Villa Bianca, Casa Giuliani Frigerio – AGT, Social Houses, drawings) and current (photo M. Casanova, 2019). For the buildings designed in Milan see figure 3.

buildings of Giuseppe Terragni, in particular their outer surfaces, to know and understand their history which certainly did not end when they were built. The reconstruction of the material history of these architectures is one of their essential prerequisites for their desirable future preservation. The direct examination of the buildings, together with the reading of the written and documentary sources that refer to them, has made it possible, in most of the cases analysed, to recognise the elements and materials envisaged in Terragni's projects and those added or replaced in later phases of the buildings' life. This research, moreover, means to be a contribution offered to the owners, building administrator and future designers of possible new interventions, first and often sole guardians of this fragile heritage, so that future interventions are always aimed at the conservation and the correct maintenance of the outer surfaces of the analysed buildings. This is to avoid further losses of the material consistency and architectural features of the buildings analysed, in addition to those already suffered in other cases.

Starting with the Terragni Archive (AGT)[3], the research was extended to the archives which collect the authorization and planning documentation for the design, the construction and all the subsequent transformation of the building: Historical Civic Archive of the Municipality of Como (Archivio Storico Civico del Comune di Como, ACCo), Civic Archive, "Cittadella degli Archivi" of the Municipality of Milan (ACM), Archives de la Construction Moderne of Losanna (ACMo), Aler Archives (Archivio Aler, AAl) and the archives of the bodies responsible for the protection of some of the buildings analysed.

For the outer finishes of his architectural works, Giuseppe Terragni experimented with different solutions, most of which seemed to tend to the achievement of that smooth and uniform surface sought by the architects of the Modern Movement, also using materials other than plaster.

Regarding the use of marble cladding, Giuseppe Terragni himself expressed a positive opinion in the magazine «Quadrante»: «foreign architects visiting our rationalist buildings have often noticed the widespread use of marble we Italians make; then informed of the costs of materials and comparing them with those of their foreign "substitutes", they become aware of the favourable position that we have of being able to take advantage of a so excellent and elegant plaster»[4]. He personally stresses the fact that this cladding should not be intended as purely decorative but with a functional need opposing the «disrupting actions of the weather – rain, sun, wind, fog, ice – which characterise our climate,

and co-supervisors Giovanna Franco and Ornella Selvafolta, discussed on December 15th 2020 entitled *Construction and transformations of the architecture of Giuseppe Terragni. Residential buildings between Como and Milan*.

3. An agreement between the Department of Architecture and Urban Studies of the Polytechnic of Milan and Giuseppe Terragni's archive, Carolina Di Biase's scientific manager, has allowed the access to a large archival documentation.

4. Terragni 1936, p. 51 (translated by author).

alternatively and frequently at its highest extent; a surface which resists in the best conditions»[5], thus focusing on the use of this cladding against degradation causes in particular referring to Como, which according to Terragni has always been accompanied by strong gusts of wind. When illustrating the project for the Casa del Fascio in Como, Terragni justified the use of stone cladding, which was imposed on him when the building site had already begun, through functionality.

The stone is one of the materials used by the architects of the period to expresses both the continuity with the past and the values of tradition, and the dialogue with modernity[6].

In the Italian architecture of the 1930s, the thin stone cladding «takes on the role of a layer which qualifies the image of the building and protects the space contained»[7], but in some cases (Casa del Fascio di Lissone, Casa Giuliani Frigerio a Como) Terragni moves away from the concept of the smooth plaster or stone cladding, proposing «marble mosaic» coatings[8] and one of the first Italian experiment of prefabricated elements in "grit"[9].

The decision to vary the technical and formal solutions or the external finishes of the examined buildings could depend on the fact that Giuseppe Terragni faced many difficulties in obtaining the designed works carried out in a workmanlike manner and within the timeframe required. In fact, Terragni studied and designed the construction details of his buildings on site (cladding, finishes and doors and windows) and this fact provoked several problems during the construction and installation phases and, consequently, lead to severe disputes with suppliers and customers.

Large smooth surfaces: plasters and stone cladding

In the design of his first residential building in Como, the Novocomum, built between 1928 and 1930 with 34 flats and 6 office rooms distributed on five floors, Terragni chose a plaster with marble powder smoothing paste[10]; the information about colours can be deduced from the observation of the original maquette (main body in light noisette colour and openings in orange) kept in the Terragni Archive, and from the descriptions in the articles published when the building site was just finished. For

5. *Ibidem*.

6. See the use of the stone cladding in Casa del Fascio in Como, by Terragni himself, in Palazzo delle Poste in Bologna or in the one in Naples.

7. Bertolazzi 2015, p. 38 (translated by author).

8. ACCo, Building permits, 301/37, Request for project approval, March 28 1939.

9. AGT, Faldone 6, Casa Pegraglio, D_681, Assignment, June 25 1935.

10. Due to following modifications, today it is not possible to see this plaster or even to take samples of it.

the base, up to the height of the lateral stairs, Terragni chose a cladding in Saltrio stone, a sedimentary limestone from the province of Varese already used in Como in previous centuries for the building of the basilicas of San Fedele and San Giorgio. The slabs, with maximum dimensions of 1 m by 1.4 m and a thickness of 3 cm, are laid in cement mortar without the use of pins or clips (figs. 2a-e).

To the north wall, it is applied a protective water-repellent siloxane coating (Silexore), already considered in the project phase[11]. In the buildings later designed by Terragni, he experimented different solutions to protect the walls most exposed to weather conditions, that seemed to aim at a better formal result which would not deteriorate in the short term.

Probably because of the problems arisen with the big plastered surfaces during the construction of Novocomum, which led him to apply, at the end of the construction, a protective water-repellent siloxane coating (Silexore) to the North wall, which is more exposed to all kind of weather conditions, Terragni experimented with different solutions for his following buildings that seemed to aim at a better formal result which would not deteriorate in the short term.

The five apartment buildings designed with Pietro Lingeri and built in Milan between 1933 and 1938 (fig. 3): Casa Ghiringhelli[12], Casa Toninello[13], Casa Rustici[14], Casa Lavezzari[15] and Casa Comolli Rustici[16], are located in the area in the North of the historic centre between Corso Sempione, the Isola district and Morbegno square to the East. For these buildings it was not possible to consult the planning documentation, which had been lost in the bombing of Lingeri Study in Milan, but the information was taken from the design documentation filed for the building permit[17], from articles in magazines of the period and from observation of the current state.

Although these buildings were designed almost at the same time, the choices, even for the exterior cladding, were different.

The large tripartite façade of Casa Ghiringhelli, which overlooks the square, as well as the two side façades, were finished at the end of the construction site with Duralbo plaster with marble

11. The use of this protective material is included in the estimate, probably drawn up in 1928: «Silixor on the north façade - square metres 1333.50 - ₤ 6.00 - ₤ 8001.00,00» (AGT, F5, Novocomum, Project in Town Hall).

12. Piazzale Lagosta, 2, a seven-floor building with flats to rent built on an area of 457 square metres, with commercial premises on the ground floor.

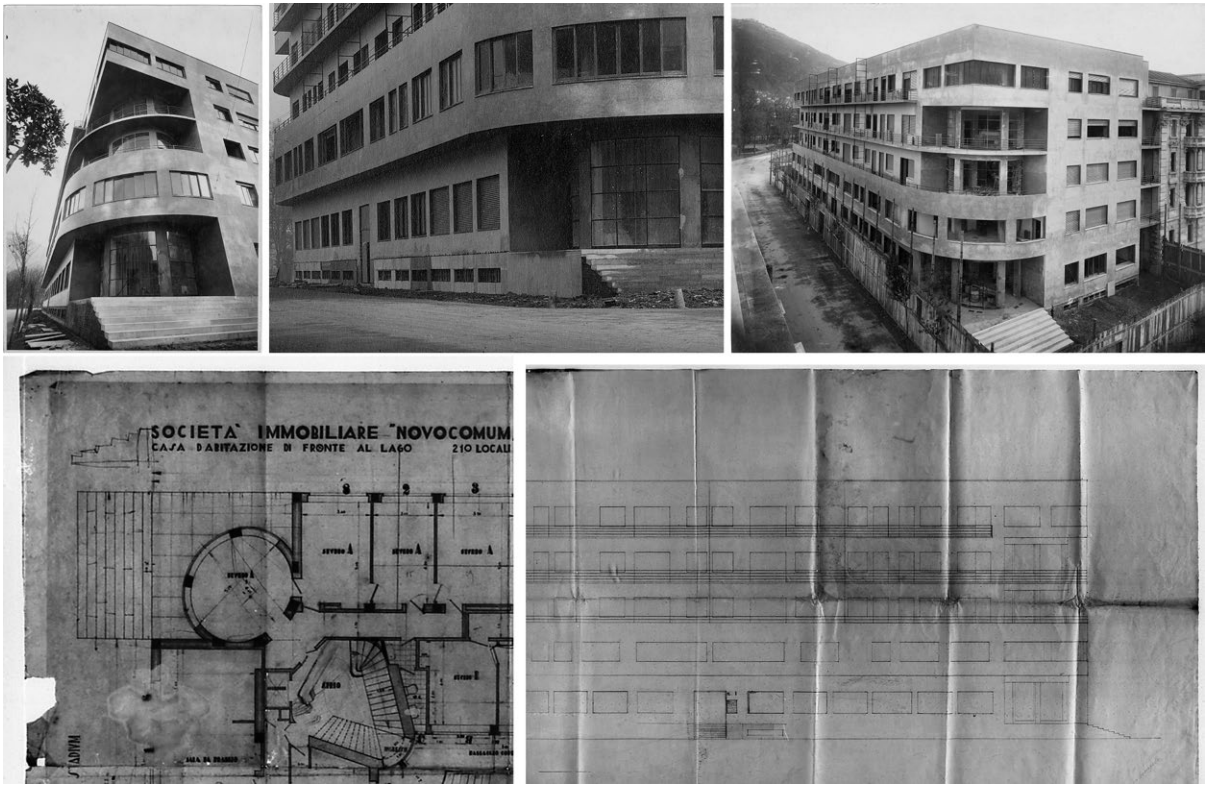
13. Via Perasto, 3, a four-floor building with three rental accommodations per floor.

14. Corso Sempione, 36, a seven-floor building with a volume of approximately 20.000 cubic metres.

15. Piazza Morbegno, 3, five-floor building for rental flats and the ground floor dedicated to commercial activities.

16. Via Guglielmo Pepe, 32, rental apartment building consisting of a seven-storey and a three-storey block.

17. The file containing Casa Rustici's authorisation documentation is currently missing.



Figures 2a-e. Como, Novocomum apartment building exteriors during the final phases of the construction (AGT, photographs, Novocomum, 08/020/C/S - 08/015/E/S - 08/030/C/S), floor plan (AGT, F5, Novocomum, drawings, 6/040/B1/S/E) and elevation (AGT, F5, Novocomum, drawings, 6/041/B2/S/E) with indications of the dimensions and arrangement of the cladding slabs of Saltrio stone basement and stairs.

Figure 3. Map of the area in the North of the historic centre of Milan, with identification of the five residential buildings designed by Terragni and Lingeri. Photographs of the buildings at the end of the constructions (AGT, photographs, Casa Rustici, Casa Ghiringhelli, Casa Toninello, Casa Lavezzari, Casa Comolli Rustici).

powder and cement, produced by the Società Istriana dei Cementi with headquarters in Pola, light havana for the bottoms and grey for the overhangs and loggias[18]. On the ground floor there is a cladding of black serpentine stone slabs, while the "detailed description of the works" in the application for planning permission[19] indicated a cladding of Musso marble, a white-grey marble from the Musso quarries near Como.

The slabs, 50 or 95 cm wide, 111 cm high and 2 cm thick, arranged partly horizontally (between the shop windows) and partly vertically (at the top of the ground floor), were laid with a bed of cement mortar without clips or hooks (figs. 4a-b).

In the almost contemporary construction of Casa Toninello, a more modest building not far from Casa Ghiringhelli, Terragni and Lingeri used the same materials. The façade has a central bow window, the entrance on the left-hand side and the top floor set back with a large terrace surmounted by a canopy framing it within the façade.

The finishes are made of ground Duralbo plaster in a colour that is described as "natural" in the publications of the construction period[20]. From the external image of the building at the end of the works, there does not seem to have been any difference in colour, which is currently very pronounced, between the bow window and the walls set back at the sides. The central portion of the building on the ground floor and the blind infill of the lower strip of the fence closing the setbacks are clad with serpentine stone slabs measuring 65 cm by 91 cm and 2 cm thick arranged horizontally.

The façades of Casa Rustici feature alternating plastered portions, limited to the mirrors framed by the outline of the stone-clad structural grid, and continuous stone cladding on the base and the transversal body in Via Mussi.

In this case too, the architects chose the paste coloured Duralbo plaster described in the «Casabella» article of 1935[21], whose presence was confirmed by the analyses carried out during the restoration work on the facades in the 1990s described in Alberto Artioli's essay in «Arkos»[22].

Unlike the other Milan buildings, Terragni and Lingeri opted for a light-coloured, uniform stone cladding with small to medium-sized slabs for the main body of the Lavezzari house, the design of which, together with that of the Comolli Rustici house, began when the other three Milan residential buildings were already under construction, leaving the plaster finish, whose colour is described as

18. *Quattro case in Milano* 1935.

19. ACM, Casa Ghiringhelli, P.G. 153052 -1935, Application for building permit, December 29th 1933.

20. *Quattro case in Milano* 1935.

21. *Ibidem*.

22. Artioli 1991a.

Figures 4a-b. On the left, detail of the cladding slabs on the ground floor of Casa Ghiringhelli, on the right, detail of the cladding slabs of Casa Toninello in the same material (photo M. Casanova, 2020).

"yellowish" in a document of 1950[23], only for the two bow windows on the side elevations. The request for building permission, signed by the owner and Lingeri, describes the «cladding in Trani stone for all the height of the front facing Piazza Morbegno including the sides up to the height of the 1st floor»[24]. From the file concerning the building, in the monograph on Pietro Lingeri's work, it emerges that at an earlier stage in the design process the cladding was planned in polished concrete slabs[25] but that later slabs of Botticino marble were used, which are still partially present on the ground floor.

Also for the last Milan building designed with Lingeri, Casa Comolli Rustici, a building apparently composed of two separated volumes, actually strongly connected in plan, the designers chose a Duralbo plaster finish with the exception of the base, which is clad in marble slabs (the lithotype is not indicated in the publications at the time of construction or in the documents drawn up for the building permit; close observation does not seem to correspond to any of the stones used for the cladding of the other buildings analysed) with maximum dimensions of 158 cm high by 139 cm wide and 2 cm thick[26].

The outer and inner surfaces of Villa del Floricoltore are plastered; in the documents there is no indication about the colours used, apart from the first description of the design submitted to the Municipality for the building permission, in which Terragni declares that «the façades will be carried out with petrifying plaster in a light colour»[27]. Terragni chose a plastered finish also for the second villa he designed and built, Villa Bianca in Seveso, and the stone cladding is limited to the jutting body.

The plastered finish of the villa was one of the elements which caused problems for the designer on site; in a letter, the owner and cousin Angelo Terragni, referring to the repairs carried out by the company in charge of the painting of the building, said «it takes a lot of nerve to go over plaster that has already peeled off and he perfectly knows I have to do it again»[28] and blamed the product «that is too strong for civil plaster» as the cause of these detachments, adding that in spring he intended

23. ACM, piazza Morbegno, 3, p.g. 54148-1951, Project for decoration of elevations, October 25 1950.

24. ACM, piazza Morbegno, 3, p.g. 152797-1936, Application for building permit, November 24 1934 (translated by author).

25. Baglione, Susani 2004, p. 220.

26. The dimensions of the slabs were confirmed by direct survey.

27. ACCo, Building permits, 44/40, Application for building permit, July 31 1936.

28. AGT, Faldone 4, Villa a Seveso, S12, Update on repair works, description of the problems, December 4 1937 (translated by author).

to «completely peel off the civil plaster and apply cement coatings»[29]. Angelo Terragni puts the problems of the plaster down to the choice made by the contractor and by Giuseppe Terragni of a «weather-resistant washable silicate' paint finish»[30].

Concerning the outer cladding of the projecting body, Terragni asked at first for an estimate for the cladding with white and grey bush-hammered and split white and grey beola slabs[31] and a few months later, during the building phase in progress, he asked the same company (Fratelli Gerletti) for an estimate for the supply of Moltrasio stone slabs, a dark grey flinty limestone, 4-5 cm thick, bushhammered, for which the contract was awarded[32]. The slabs are laid in alternating vertical and horizontal courses, using metal clamps[33] (fig. 5).

The two buildings of the council houses in Via Anzani do not show any stone cladding. All the outer surfaces are plastered and painted except for those made of concrete, which have been left exposed.

An analysis of these buildings shows that Terragni limited the use of stone cladding in almost all cases, probably also for cost reasons, to the basement parts or parts emerging from the main outline of the building. The choice of stone cladding, in terms of lithotype, format, thickness and finish, is varied, even though the buildings were built in a short space of time[34].

The decision to use Duralbo plaster for the finishes on the Milan buildings, which guaranteed resistance and durability, is certainly significant and could be due to the problems previously encountered with Novocomum plaster, as well as the massive advertising in the main technical and architectural magazines.

29. *Ibidem*.

30. AGT, Faldone 4, Villa a Seveso, S78, Invoice for weatherproof washable silicate paint, December 31 1937 (translated by author).

31. AGT, Faldone 4, Villa a Seveso, S35, Quotation for cladding in bush-hammered and split white and bush-hammered and split grey beola slabs, September 15 1936.

32. AGT, Faldone 4, Villa a Seveso, S33, Ordered supply of Moltrasio slabs for external house cladding, December 1 1936.

33. The supplier's estimate specifies that each slab is to be supplied with «two recesses for cambre» (AGT, Folder 4, Villa a Seveso, S34, Estimate for the supply of stone cladding, Fratelli Gerletti, Como, November 12 1936).

34. Duralbo, produced by Società Istriana dei Cementi, is an artificial Portland cement obtained by clinkering kaolin and marl in rotary kilns. «In addition to pure white, it allows for bright and delicate colours to be obtained, which are impossible to achieve with ordinary cements; it guarantees casting perfection, beauty, strength and durability» (Duralbo advertising brochure, Milano 1933) (translated by author).

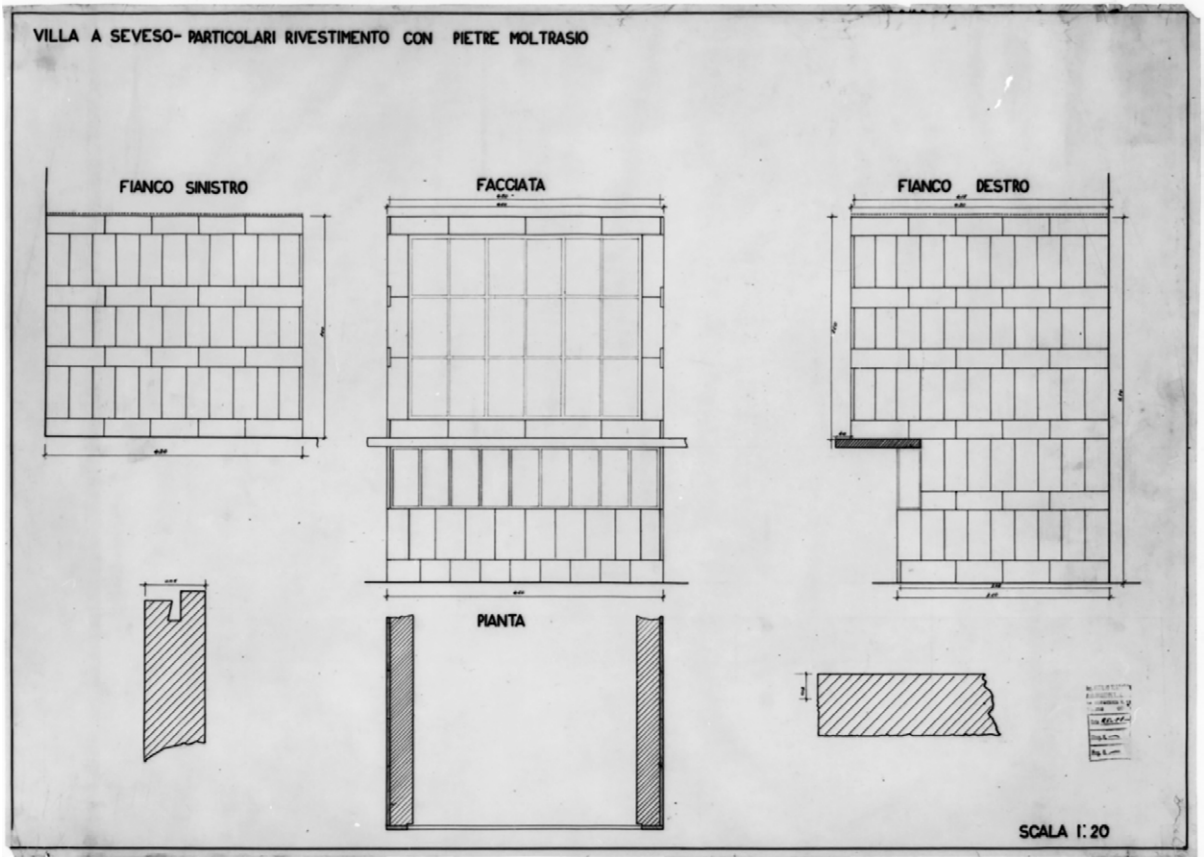


Figure 5. Seveso, Villa Bianca. Detail of the cladding with Moltasio slabs. AGT, f 4, Villa a Seveso, drawings, 39/016/C1/D/L.

A prefabricated cladding for Casa Pedraglio

At the end of 1934, Terragni was commissioned to build a flat-to rent building, of modest dimension, which would have to be built in two subsequent lots in Como, in an expanding area of the city, to the south of the historic centre. It is unusual that Terragni decided to experiment with an innovative cladding just in this building, which is more modest than the others, at an early stage of the project. The report attached to the application for planning permission describes the building, which will be made of brick masonry on reinforced concrete foundations, with the façade facing via Mentana clad in «concrete slabs cast on site and laid with clamps and poured with cement mortar»[35] (figs. 6a-b, 7a-b).

The cladding of the main façade was designed and made of blue cement grit slabs[36] fixed with metal clamps to the masonry behind. The 42 prefabricated slabs, measuring 200-210 cm in width and 190 or 100 cm in height, as well as covering the façade, are folded to form the inner and outer windowsills and the jambs of the holes which jut out 12 centimetres from the outer edge of the wall. The thickness of the slabs is of six centimetres in the vertical part and is tapered by one centimetre from the end of the elements forming the sills and the jambs.

Analysing the documentation related to the planning and the work direction of the residential buildings, it was noticed that Terragni hardly ever trusts in the same company or suppliers, and always asks for different estimates before assigning the works, however in the case of the realization of this cladding, probably because of the technical difficulty of construction and innovation of the designed element, the supply was entrusted directly to the company Bianchi Battista of Villaguardia, near Como, which was given the assignment to supply the steps of the building staircase in green cement grit[37].

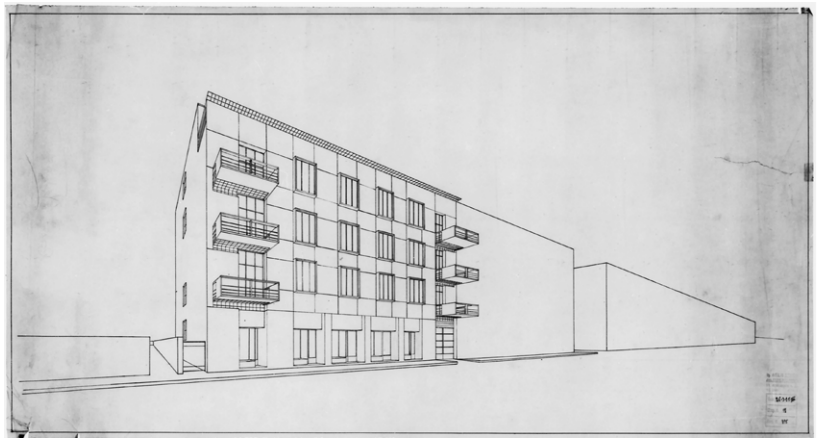
The production and the laying of the big prefabricated slabs take place from bottom to top with long delays, which are followed by several reminders by the designer and not without problems: at the end of the building, in a report about the works done and with notes concerning some work not performed craftsman-like[38], Terragni underlines that six slabs are cracked transversally, the polishing was not accurate and several rainwater seepages occurred, caused by defects in the laying and in the material.

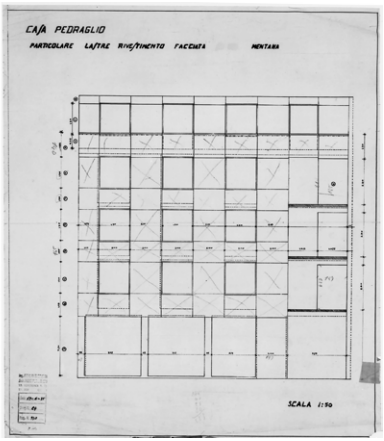
35. ACCo, Building permits, 464/2, Allotment and start of work, March 14 1935 (translated by author).

36. AGT, Faldone 6, Casa Pegraglio, D_681, Assignment, June 25 1935.

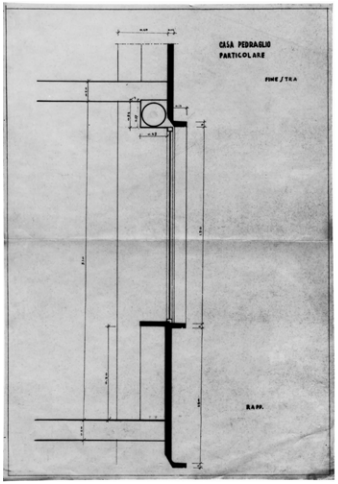
37. AGT, Faldone 6, Casa Pegraglio, D_681, Assignment, June 25 1935.

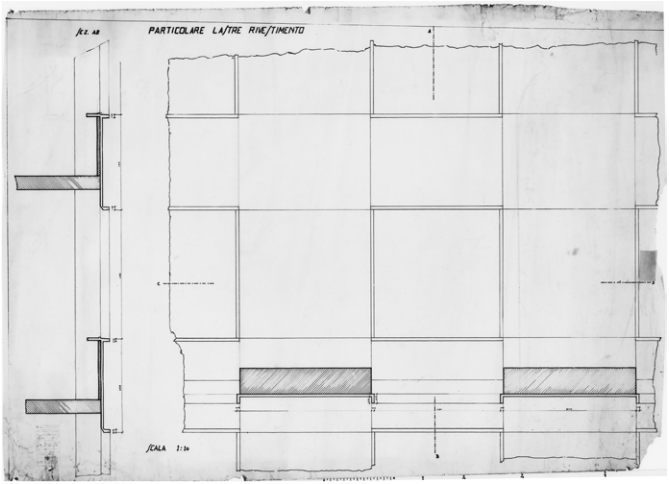
38. AGT, Faldone 6, Casa Pedraglio, D_705, Table of companies involved in the construction, amount of work, advance payments and remarks concerning work not carried out in a workmanlike manner, s.d.



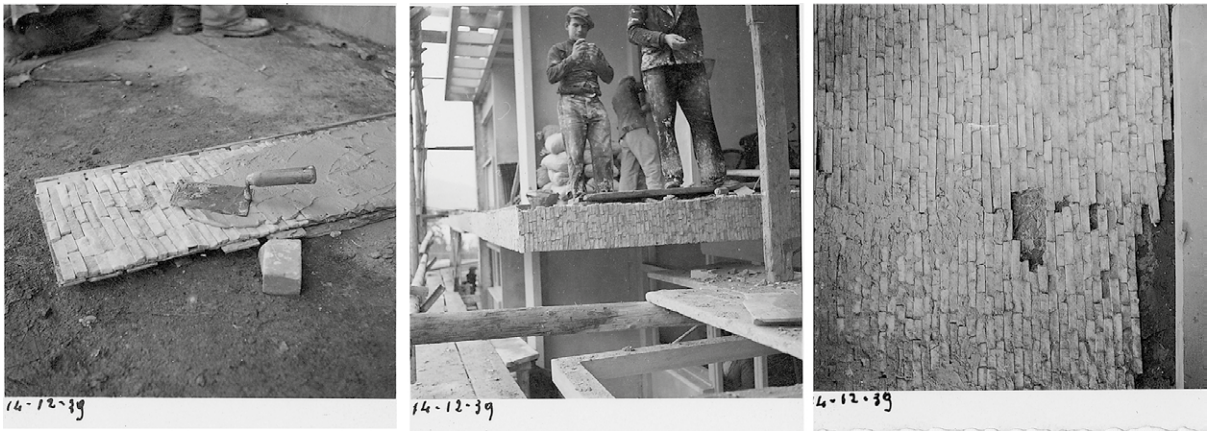


Figures 6a-b. Como, Casa Predaglio. The cladding in the prefabricated elements is already present in the first drawings. On the left, the perspective of the complete planning version of the second lot, on the right the table which represents the slabs in the front. AGT, Casa Pedraglio, drawings, 43/001/D1/D/L, 43/019/C1/S/L.





Figures 7a-b. Como, Casa Predaglio. Details of the cladding elements. On the left, section of the detail of the cladding slabs in relation to the window and the rolling shutter (AGT, reference); on the right, details of the prefabricated elements in the plant, elevation and section. AGT, Casa Pedraglio, drawings, 43_007_C1_D_L.



Figures 8a-c. Laying of the cladding with marble splits. AGT, photographs, 72/043/C/S, GF043C - 72/040/C/S, GF040C - 72/041/C/S, GF041C, 14/12/1939).

Cladding with marble tesserae of Casa Giuliani Frigerio

The construction of Casa Giuliani Frigerio is the sole among the residential buildings, besides Novocomum, which was supported by photographs in every phase, probably because Terragni, after having been recalled for military service on the 5th September 1939, followed the building site through the photos and letters which his assistant Luigi Zuccoli sent him from Como daily, to which he replied proposing design solutions, variations and building details.

It is just thanks to this rich documentation that it is possible to reconstruct a time schedule of the construction work and understand the planning choices, the changes made in the approved project and the difficulties met by the designer during the building.

Since the building authorization request, Terragni specified that the «façades will be cladded with marble mosaic»[39]. The cladding was composed by irregular-shaped marble tesserae placed vertically; these tesserae were of 2,2 cm wide and between 6 and 12 cm long; made by Ferrari company, it is laid down in horizontal bands using a support made of wooden boards where the small tesserae are preventively placed and subsequently covered with a uniform layer of cement mortar and applied to the façades (figs. 8a-c).

39. ACCo, Building permits, 301/37, Application for building permit, March 28 1939 (translated by author).

The same cladding, with the same characteristics and dimensions had been carried out few months before for the façades of Casa del Fascio in Lissone, designed by Terragni with Antonio Carminati.

Changes and permanencies

The small changes and the big transformations of the external surfaces of these buildings created, in most of cases, a dissimilarity between the consolidated image, in the building literature at the end of their construction, and the current view. The buildings are no longer only the result of Terragni's design, but they are the sum of all the small and big modifications, substitutions and tampering which have taken place during the years of life and use of these architectures; a constant change which only in some cases was slowed down by conservation interventions.

The building which underwent the most effecting change is surely the Novocomum which in 1957 had an intervention planned by Luigi Zuccoli who, after problems due to the degradation of the plaster[40], decided to apply a cladding with Botticino marble tesserae, similar to the ones used by Terragni for Casa Giuliani Frigerio, but of a bigger size and laid horizontally. Although due to technological needs, this intervention caused significant modifications both in the tone and the materiality of the outer parts. Concerning the technological details, the increase in the thickness of the outside wall cancelled the thickness of the windowsills and consequently hindered the correct distance of the rain from the façade surface.

The plaster finishing on the other buildings under analysis, in most cases coloured Duralbo plaster, have kept at least partially, even though they have been painted several times, with different colours from the original ones.

The stone cladding of the main body of Casa Lavezzari, as showed in the pictures attached to the documents for the raising[41], was fixed with bosses placed on the corner of the slabs; for this kind of intervention, occurred in 1951, no building authorizations were required (figs. 9a-c). Afterwards, probably because of further problems concerning the detachment of the slabs, the cladding was removed completely. No documents have been found to testify the removal of the cladding, but from the pictures published, it is inferred that it took place between 1951 and 1985. The current cladding of the travertine base was introduced successively, while the Botticino cladding (or Trani marble) of the hall has been preserved.

40. There is no documentary evidence, but Greppi and Facchi (Greppi, Facchi 2016, p. 203) describe the state of deterioration of the plasterwork before Zuccoli's intervention, quoting what was said by Augusto Roda and Giorgio Cavalleri, who spoke to Zuccoli himself.

41. ACM, piazza Morbegno, 3, p.g. 54148-1951, January 8 1951.

Figures 9a-c. MIlano, Casa Lavezzari at the end of the working site in 1937 (on the left, AGT, photographs, Casa Lavezzari), after the raising and the application of fixing bosses (from Carraro 2004, p. 221) and in 2019 (photo M. Casanova, 2019).

The façades of Casa Rustici were subjected to restoration work at the beginning of the ’90s. On the plastered parts, the plastic cladding, which had been applied over the Duralbo plaster, was removed, and then a paint of a colour similar to the original one was applied.

The Lasa marble of the cladding slabs showed, before the restoration, a widespread state of sulphation and many slabs presented structural problems, being cracked in several points and in some cases completely disintegrated. Moreover, many slabs did not adhere sufficiently to the wall because they bulged or because of the deterioration of the joining mortar also due to the pressure of the corroded reinforcements of the underlying structure. The intervention work included cleaning, extraction of soluble salts, bonding with silicone resins, insertion of stainless-steel dowels and replacement of some slabs that were too degraded to be preserved.

Although no relating documents were found, from accurate analysis of the stone cladding of the base of Casa Comolli Rustici is clear that in some slabs some holes had been made in order to insert some anchor pins, probably after the detachment of some slabs. The stone cladding today shows a quite good state of preservation, with a few missing portions of the slabs, near the corners of jutting elements, some fractured and disconnected slabs and a consistent deposit in the lower parts of the slabs and in the portions not subject to washing away.

Villa Bianca underwent many modifications, not always respectful of material and history, in order to be transformed into a restaurant until 1994, when after a period of abandonment, it was restored by the current owners. The plasters were in part restored and the stone cladding of the sides of the jutting body, detached and partially removed, was replaced. This intervention on the stone cladding differs from the usual practice of modern restoration which often includes the substitution of the non-intact elements even when it would be technically possible to preserve them; in fact, the Moltasio stone slabs were preserved even when cracked and relocated where possible. At present, almost thirty years after this intervention, there are some areas affected by detachments, gaps, biological patina and small cracks in the plaster, especially at the level of the terrace floor in the north-east and south-east corners. In some points, the cladding slabs of the projecting body show cracks, detachments and biological patina.

The pre-fabricated cladding of Casa Pedraglio today is white in colour and does not have evident degradation signs and from a careful observation from the ground floor any cracks and irregularities, as reported by Terragni at the end of the construction, are visible. Although no documents were found to show that the cracks had been filled and that a paint and/or protective layer had been applied to even out the surface and prevent the infiltration of rainwater, it is plausible that these operations had been carried out directly by the manufacturer to resolve the initial defect. The portion of the ground

floor cladding was removed a few years after completion of the work due to a change in the use of the premises, which were originally used as a shop.

Eighty years after its construction, the marble tesserae cladding of Casa Giuliani Frigerio has not undergone any substantial changes. The building underwent an overall renovation in the 1980s which included the consolidation and the integration of the detached cladding parts from the wall support and the integration of the few missing portions.

The external finishing is exposed to weather and run the risk of decaying quickly, especially in the buildings without eaves projections or other protective elements. As already underlined in the introduction, Terragni was aware of the fragility of the plaster finishing and also for this reason he preferred the stone cladding in other different residential buildings, but the latter not always showed itself to be more long-lasting than the plaster finishing. In fact, as can be seen from the history of these buildings, except in the case of the Novocomum, the plastered finishes have been almost entirely preserved, while most of the stone cladding, which has presented phenomena of detachment of the slabs, has been subject to intervention and removal. Since the design documentation could not be consulted, it was not possible to verify whether the recurring problems found on the stone cladding of the Milan buildings were due to the technical and formal choices of the designers or to incorrect installation.

Conclusions

The study of the buildings alongside the reading of the sources is essential for the acknowledgment and the conservation of the original elements which are the material translation of the architect's thought and formal research. In order to plan the restoration work on the finishing elements of these buildings it is necessary to remember that they are the result of the process of transition between tradition and innovation. This issue is relevant to all the buildings built in this period, which in many cases underwent intervention work which did not take into account or cancelled the traces of this evolution, as in the case of the intervention on the plasters of Klee and Kandinsky's double house in Dessau whose interior plasters were not only «based on cement and innovative materials, as announced by Gropius in a programmatic way, but also with traditional materials consisting of lime plaster with traditional aggregates and silicate-based paints» on which «the first intervention had in fact cancelled out these differences»[42].

The problems linked to technical and formal choices adopted by the architects of the 1930s, for the stone cladding with reinforced concrete structures are numerous and they were already known

42. Salvo 2016.

at that time. The most frequent and dangerous for public safety is absolutely the detachement of the cladding slabs from the support: as early as 1940 many slabs of the fine Botticino stone cladding of the Casa del Fascio in Como were replaced, and in 1935 the Podestà of Milan, Visconti, had sent an order to the Building Owners' Union instructing them to carry out

> «checks on existing buildings, laboratory tests on the slabs to be applied, certification of the methods and anchoring devices […] while the Head of Works and Construction Service of the Ministry of Communications, Pettenati, had ordered periodical inspections on marble cladding in newly built railway stations and postal buildings»[43].

Furthermore it is important to consider that the vicissitudes of these buildings did not end with the project and the building site, but are also the result of fragilities and modifications that increase their complexity and cannot be erased without affecting the material that has already been partly lost or replaced.

The small amount of historical distance, basis of the preservation attention, in many cases leads to interventions which tend to restoration. As Giovanni Carbonara wrote:

> «At first sight it would seem that the problem could be solved by following the usual steps of restoration, in the false hope that the slight chronological distance, which separates us from the twentieth-century works of Novecento, allows them to be entirely returned to history thanks to the wide availability of documents and photographs; a return without uncertainties, to be used as safe guide for the reintroduction of what has been lost or altered. Unfortunately, as the historiographical and philological consideration teaches us, that is exactly a false hope because in this field there are no certainties and every re-proposition, even the most exhaustive and careful, is always an act of critical interpretation»[44].

This research aimed to lay the foundations for the knowledge and conservation of these finishes and coverings, combining the exploration of archival sources with direct investigation of the buildings under study, proposing a synthesis and comparing the design events, the problems encountered on site and the subsequent transformations.

All the buildings analysed show today signs of time, use and history. The challenge for the future of these buildings is mainly to manage the transformation correctly, not to freeze the current situation or to return to the past. The architecture of the 20th century undoubtedly deteriorates rapidly and ages badly, but on the other hand

> «also the imperfections, mistakes and defects, weather involuntary or in some way intentional (in this case to be meant as "transgressions" of the linguistic and technological code of the period), are part of the historical authenticity of the works and should be protected, limiting only the possible effects of further degradation»[45].

43. Poretti 2008 (translated by author).

44. Carbonara 2018, p. 13 (translated by author).

45. Carbonara 2006, pp. 24-25 (translated by author).

The work on the surfaces has intensified over the last twenty years and the current tax relieves for the façade restoration and for energy savings will increase inevitably.

If the planning of these interventions is not respectful of the history and of the material of the buildings and it will not be preceded, as it often has been the case, by a careful analysis of the building and its sources, many of those architectures could be further transformed with the loss of material which holds their value and meaning. The proper management of the information is today in most cases[46], in the hand of the owners and of the condominium administrators who often carry out ordinary maintenance without technical support; it is therefore hoped that the attention and the studies which are being undertaken on these buildings will lead to a greater awareness of their value for those who live in them and administer them.

46. Only the Novocomum apartment building, Casa Rustici, the Villa del Floricoltore and Villa Bianca are subject to direct protection, while the social houses in via Anzani are subject to the provisions of Legislative Decree n. 42 of 22 January 2004 until the cultural interest is verified.

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