Traditional and Modern Building Materials. Autarkical Lodging Houses in Carbonia

Giuseppina Monni

Modern Italian architecture is characterised by a particular combination of innovation and continuity. "The great wall tradition constantly interacts in a fertile dialectic with new materials and the renewed structural and space concepts of the building, characterising overall a peculiar version of the modern project" (Sanna 2005).

Such aspects were emphasised in the late thirties by a policy of national self-sufficiency forcing architecture to search within its own local resources, among unresolved contradictions between tradition and innovation, for its own identity and specific regional qualities.

The example of Carbonia, designed and built around the time of the Second World War, is representative of a particular mixture of tradition and innovation at a typological and linguistic but above all, a technical level. Designers of pithead housing had to find solutions from modern and traditional materials. As continuity was the guiding principle, structural work within the site retained traditional building methods, used little reinforced concrete, rationalised brick usage and above all made extensive use of locally available materials. The resulting architecture with its minimalism, rigour and dryness of language tries to overcome the limitations and contradictions imposed by economic policy.

The coal town was a large experimental building site characterised by technical solutions defined by the building Enterprise and the managers of the building works.

BUILDING THE COAL TOWN

The planning and building of the "coal town" comes under the autarkical policy which led the building sector into an important phase, rich in research into technological innovation, use of locally available materials and a drastic reduction in imported products. The broad consensus in Italy on this way of viewing architectural projects was due partly to the regime's programme, started in 1926 with the intention of transforming building production within the government's action plan, rather than leaving it to the rule of unconstrained market forces. The goal was to make modernisation appear to be a movement promoted by fascism, while at the same time supporting (with the exception of work focused on the application of the new reinforced concrete techniques) the creation of a network of small enterprises, and a strategy of not contrasting modernity and continuity with the great national tradition.

Within this context, despite the difficulties arising from the imminence of the war, two groups of young architects from Rome and Trieste designed Carbonia, in just a few years creating works of undisputed architectural quality. The first building phase was controlled mostly by the Trieste school through the Gustavo Pulitzer Finali's Stuard studio, the extension was assigned to the youngest member of the Roman group, Eugenio Montuori, and the final phase was left to Saverio Muratori, who designed the satellite town of Cortoghiana.

From the calibre of the professionals involved it is easy to see that the cultural context in which these projects were executed was anything but provincial. During that particular period Giuseppe Pagano, with the 1936 Rural House Exhibition, reaffirmed that "the academic repercussions […] the true autochthonous tradition of architecture: clear, logical, linear, morally as well as formally [are] very close to contemporary taste" (Pagano and Daniel 1936). The fundamental architectural elements "…shall be anonymous, collective, refinable: this is implicit both within the classic and the rural model"[1] (Ciucci 1989).

The ambition of representing local tradition led the architects from the architectural schools of Trieste and Rome to a re-interpretation of the European ratio-culturalism in a Mediterranean and classical key, with some hints of metaphysics. "When tracing the background of this compromise it is certainly appropriate to refer to Muthesius' concept, to his cottage reassessment, to the new planning methods highlighted by the functionalist and additive principle of his houses' rooms distribution. Similarly it is not correct to refer to Tessenow and his "modernity with no avant-gard" where archetype replaces historicist reference, combining itself with a local and ethnic dimension progressively bringing back architecture to its building substance"[2] (Sanna 2005).

But what are the consequences of a building modernisation so deeply marked by the preservation/innovation dualism within building methods and in the architectural language?

To examine the mutual influences of technological evolution and architectural elaboration we look at some completed works, selected for their particular relevance from the experimental, as well as the building and architectural viewpoint.

PULITZER, MONTUORI AND MURATORI: THREE DIFFERENT APPROACHES TO THE LODGING HOUSE THEME

From the latter half of 1937, workers' lodging houses were built next to the existing isolated houses in Carbonia, to a master plan designed by Gustavo Pulitzer Finali. "Real house monuments, these building complexes represent a substantial change compared to garden towns typologies; their urban dimension is enhanced by their disposition in pairs heading down the main pathways to the mine" **(fig.1)** (Sanna 2004).

The lodging houses are of the courtyard, two-storey building type, composed of three volumes describing a main block with symmetric wings, and a westward orientation towards the mine. The

bedrooms, including toilet facilities are in the two wings and the first floor of the main block, whilst communal rooms, the kitchen and dining-hall are located on the ground floor of the main block **(fig.2)**. The stairs are located externally. The courtyard takes the shape of a small green square and is at the same time a big back yard protecting the complexities of the articulation and use of the urban context, towards which the building addresses its representative aspect **(fig.3)**.
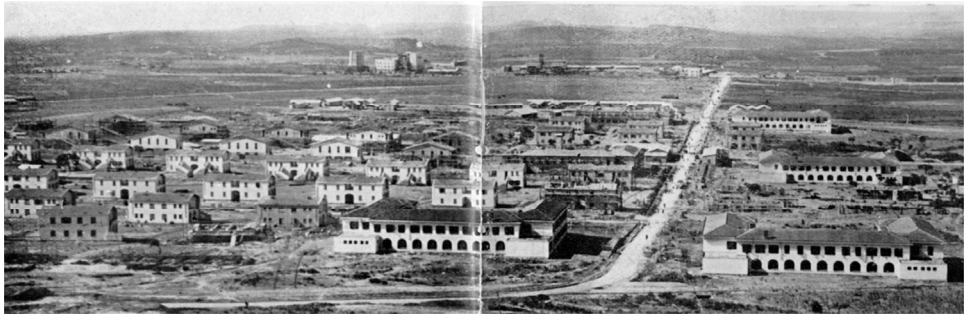

Figure 1. View of the workers' lodging houses (Carbonia, town record office)

The external façade relates itself to the "village" through the compactness of the wall, emphasised by the serial repetition of high and narrow windows lighting up the rooms, the only exception being the big arches lightening the dining-hall **(fig.1)**. The English-style panes of glass in the wooden windows, emphasised by the continuity of the plastered surface, and the slightly set off red brick windowsills, give the façade a domestic character underlined by the use of shutters. The unique characteristic of this typological solution amongst the housing in Carbonia is the reinforced concrete double columns of the big central dining hall which are placed alongside the external part of the wall looking onto the inner room **(fig.4)**. In another building Pulitzer adopts the same solution with a slight variation: he disposes the beams crosswise to the façade wall enhancing the light from the big windows through the beams themselves, which concretize its pathway, amplifying space perception.

The characteristic element of the courtyard is the continuous balcony giving covered access to all the bedrooms **(fig.5)**. It is a space modulated by the repetition of reinforced concrete pilasters, surmounted by a continuous architrave made of the same material. However the frame is perceived as a trabeated system, precisely as a column, rigorously lined up with the wall: it is therefore a typical classical wall system, with a hint of modernity from the thinness of the pilasters and beams, permitted by the structural quality of reinforced concrete. The solidity of the back wall, only slightly interrupted by the small windows of the toilet facilities, thwarts the lightness and structural strength of the columns. Such contradiction reveals on the one hand the ambiguous coexistence between real and unreal autarchies, and on the other hand the inconsistencies between architectural language and the expressive potential of the structural solution. The dining hall's arch openings are an example: the reinforced concrete beams surmounting the arches offer the opportunity to define

the broader rectangular openings, more coherent with the adopted building system and definitely more modern. The reasons for such inconsistencies are due to two main reasons: the enterprise project was given to the building enterprise; Gustavo Pulitzer Finali was at the same time entrusted with the more interesting mandate of defining all the public buildings in the centre of Carbonia, with the exception of the church. The incontrovertibly modern idea of providing each bedroom with toilet facilities did not come from the designer, but was proposed by the building enterprise planning ahead for the possibility of transforming the lodgings into flats at minimum expense.
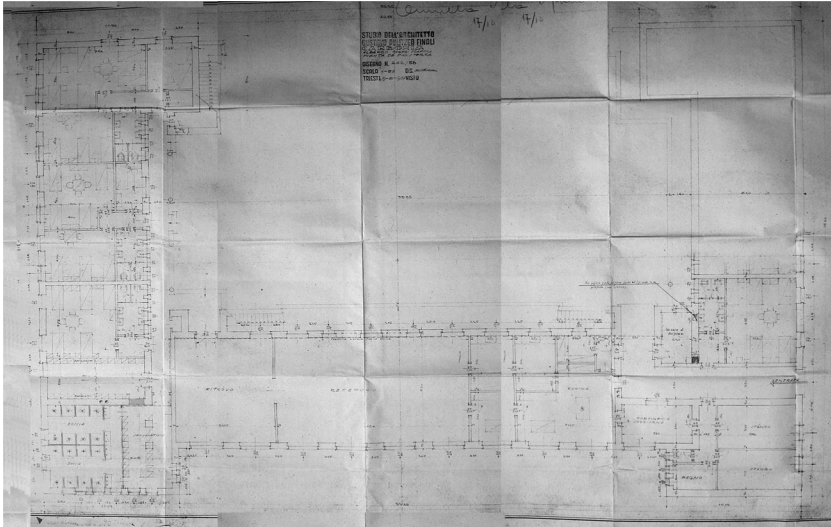

Figure 2.   Ground floor plan, designed by the Stuard studio of G. Pulitzer (Carbonia, IACP record office)

So why investigate this subject? The architectural quality of these solutions lies in the mixture of a domestic language which never lapses into the picturesque, and a modernity able to find in the limits imposed by autarchy and in the substantial language of classic values, the reasons of its own concreteness. The constituent essentiality, the simplicity of this architecture, free of any superfluous decorative element is connected with Loos' architectural language "when he affirms that a bare and linear work, far from expressing poverty, reflects on the contrary a clear and pure thought and therefore embodies a high level of civilization; when both pursue the objects' harmony whatever their scale, which comes from the exact correspondence with the goals they were created for" (Sanna, 2005).

Apart from the balcony and the dining hall, the supporting structure is defined by a regular pattern of trachytic wall; the attic is "Rex"-type, namely a structure of in situ reinforced concrete beams, which not only permits less metal to be used but also does not require the use of wood as it is sufficient to insert a simple beam on the centre-line of the span. The roof truss, made of reinforced concrete, as suggested by the enterprise, is somehow a symbol of a building site facing great

difficulties in realisation and construction within the mixture of continuity and innovation of languages, technologies and materials. The reinforced concrete cornice juts out 60 cm representing a pause between the compact volume and the pavilion top, which thereafter seems to gain lightness, until vanishing from an angular perspective giving the illusion of a flat top.

Figure 3.   The corner of a courtyard (Carbonia, IACP record office)

Figure 4.   The dining hall (Carbonia, IACP record office)

Figure 5.   The balcony (Carbonia, IACP record office)

The clerks' lodging house, designed by Eugenio Montuori was built between the beginning of 1937 and the end of 1938. **(fig.6)**. The building, known as the "central" lodging house, represents the baseline of the linear square, which at the other end gives way to the more institutional piazza Roma **(fig.7)**. Apart from integrating itself within the contextual geometry, the hotel establishes a deeper and more lasting dialogue with the town through its own intrinsic typological and linguistic features. The architectural work is basically composed of two three-floor volumes orthogonal to each other, describing an asymmetric T; a single-storey third body completes the complex. The body's articulation defines two courtyards: a small south-orientated courtyard facing the main façade that is overlooked by some of the rooms, and a much wider courtyard to the rear.

As in the majority of housing typologies the entrance is not located on the frontage but on the side front, out of sight from the road. The big entrance hall is a junction room giving access to communal rooms and to the servants' rooms located in the side wings, or to the living room, the

2266

small hall and to the two big dining halls in the central body. Finally the single-storey building houses the kitchen and a service canteen. The upper floors are designed in the same way: the bedrooms face the external prospect and give onto the same corridor. The only difference is that the corridor on the first floor has a series of French windows giving onto a terrace, the latter defined by the low volume roof and by the roof of another body leant to the back of the building. A staircase, located at the junction of the two T wings, connects the various floors and allows access to the roof terrace **(fig.8)**.

Figure 6.   Main front (Consalvo F. 2005)

The main elevation contains a peculiarity, unique among the buildings of the coal town: a big projecting arcade made of reinforced concrete and bricks of an undisputed modernity. Its lightness is not only the result of the thin brick partition walls pushing on the reinforced concrete projecting beams, but mostly the result of the contrasts between light and shade emphasised by the asymmetric position of the openings which, by drawing back, empty the back wall. The projecting element gives the arcade a space and volumetric connotation, which finds a counterpoint only in the advancing of the side volume, pierced on the ground floor by a series of openings. Within this work the goal of combining modernity and tradition is met by articulating it in two parts: in the foreground the new, dynamic element, emblematic of its modernity, behind as a support, an elementary, abstract, static, classic form. However the mask of modernity does not overlap the wall surface but integrates itself with it thanks to a simple detail solution: the brick partition wall of the arcade gets into the wall to define the opening splay, which purposely draws back from the façade line.
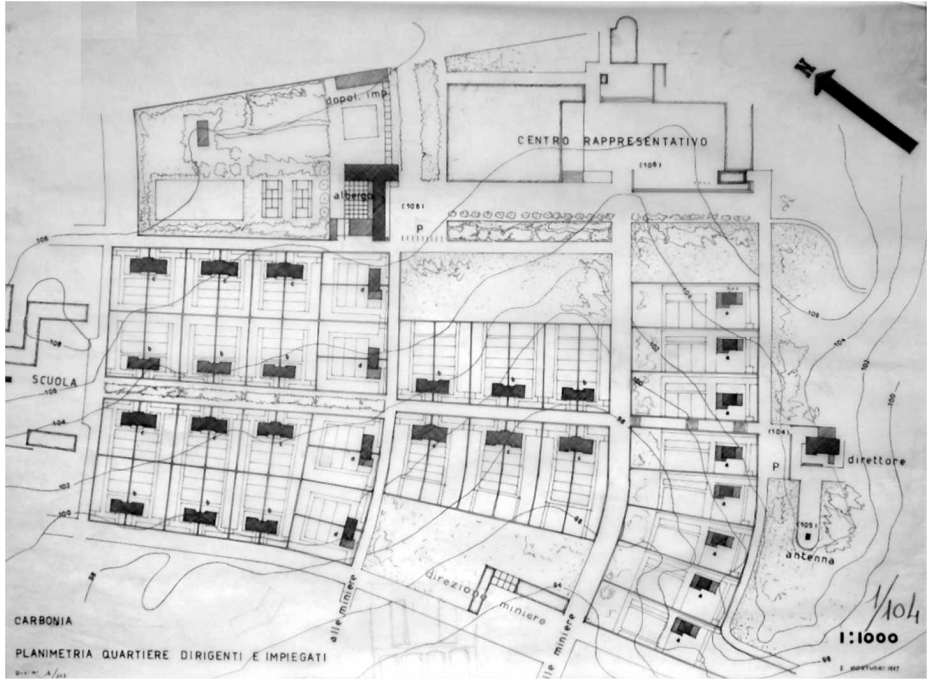
Figure 7.   Plan of the Management and office-workers' quarter   (Carbonia, IACP record office)
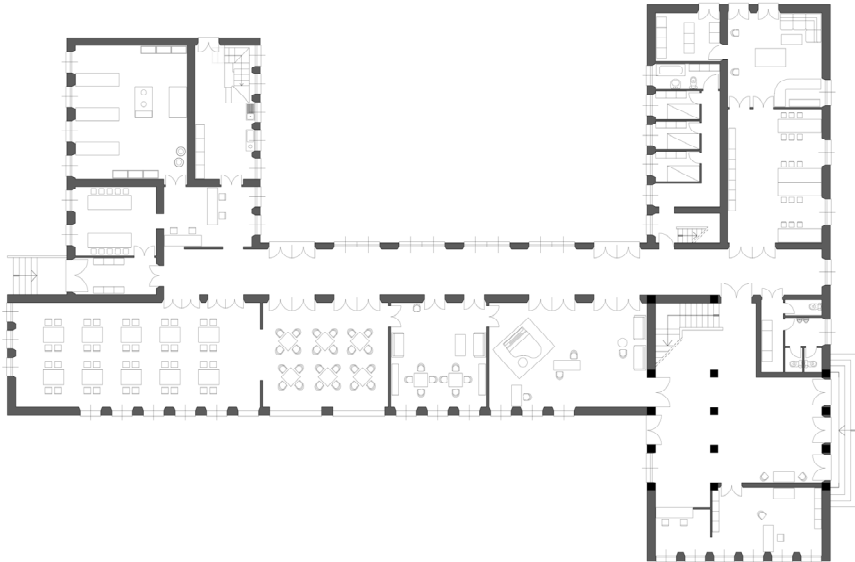

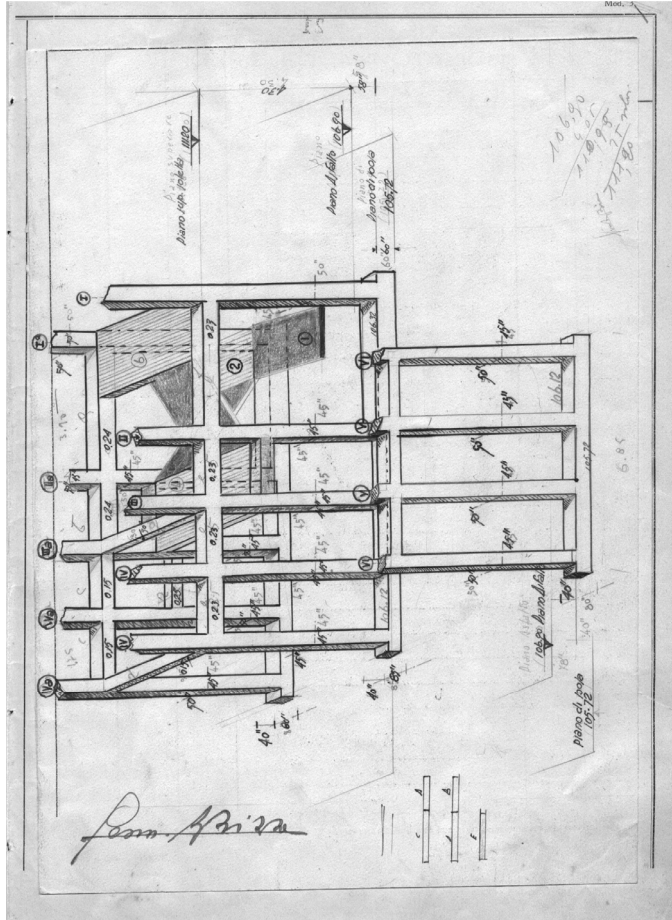Figure 8.   Mezzanine plan (Consalvo, 2005)

Figure 9. Axonometric projection of the reinforced concrete frame of the mezzanine
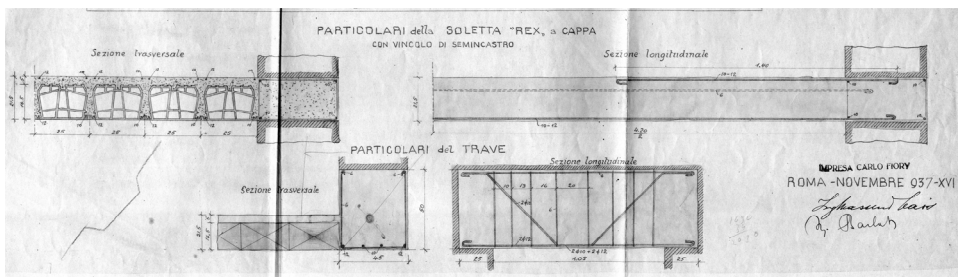(Carbonia, IACP record office)

Figure 10. ""Rex"" attic detail (Carbonia, IACP record office)

The ambiguity of the façade reflects the ambivalence of the structural solution: on the ground floor a reinforced concrete frame makes the space of the hall and then vanishes on the upper floors where it becomes incorporated into the walls. The frame is hidden by the wall structure and only reveals itself to mark the location of the three entrance openings (reflecting the unresolved tension between tradition and modernity that characterises this design). The arcade pattern repeats itself with a single wide span at the side front, providing the protection of a canopy to the entrance. **(fig.9)**.

As in the example of the Pulitzer lodging house, the attic in this building is also made of brick-concrete, "Rex"-type **(fig.10)**; the use of lintel bands goes alongside the use of reinforced concrete architraves; shutters and frames are woodwork; the trachytic wall is hidden by the plastered surface and emerges next to the ground joint to define the basement. Also in this case the detail tables are by the enterprise in charge of the building works.
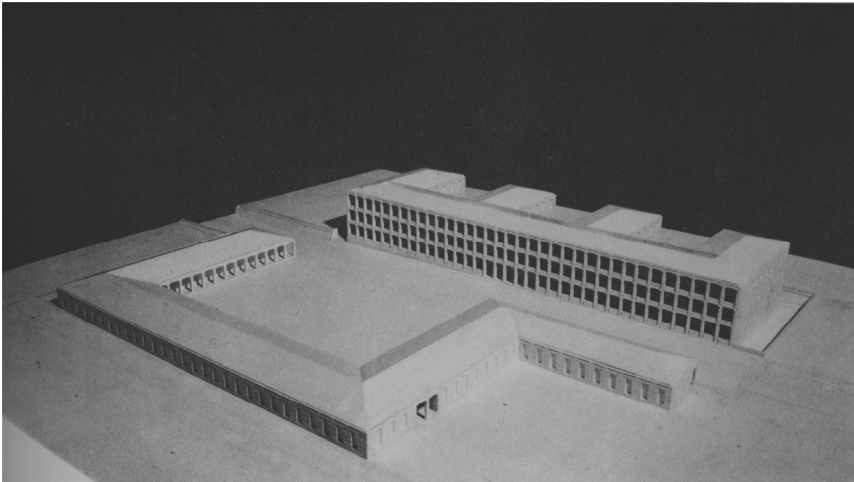

Figure 11. Plastic model of the lodging house and the dining hall

A few years later, in 1940, the Fascist Institute for council houses of the Italian Coal Firm (A.Ca.I.), began the construction of Cortoghiana village, as an expansion of the new town of Carbonia. The project was assigned to Saverio Muratori, who went from planning the general facilities to defining the architectural detail. Because of the war some projects, such as the workers' lodging house, remained unfinished and were not completed until the 1950s when they were substantially modified.

In the original plan the lodging house is located at the entry to the town, on the main road connecting the mines with the large and metaphysic piazza Venezia **(fig.11)**. On the other side of the road the porticoed body of the dining hall describes a big C square. The position and monumental character that Muratori aimed for in this work defines an indisputably urban value.

The architectural structure is basically made of five three-floor volumes, one longitudinal and four side wings, describing a big comb. Each tooth of the comb houses twelve four-bed rooms per floor, giving on to a central corridor connected to the side corridor. The main volume includes toilet facilities between each tooth, and an area next to the junction, which acts as a filter space composed of two communicating rooms, a writing room and a storeroom. An atrium lit by a long skylight divides each set of toilet facilities from the arcade and discontinues the pavilion roof, reiterated in the side wings. Two staircases located along the main corridor and next to the courtyard borders link the various floors, all organised in the same way except for the basement housing the storeroom **(fig.12)**.
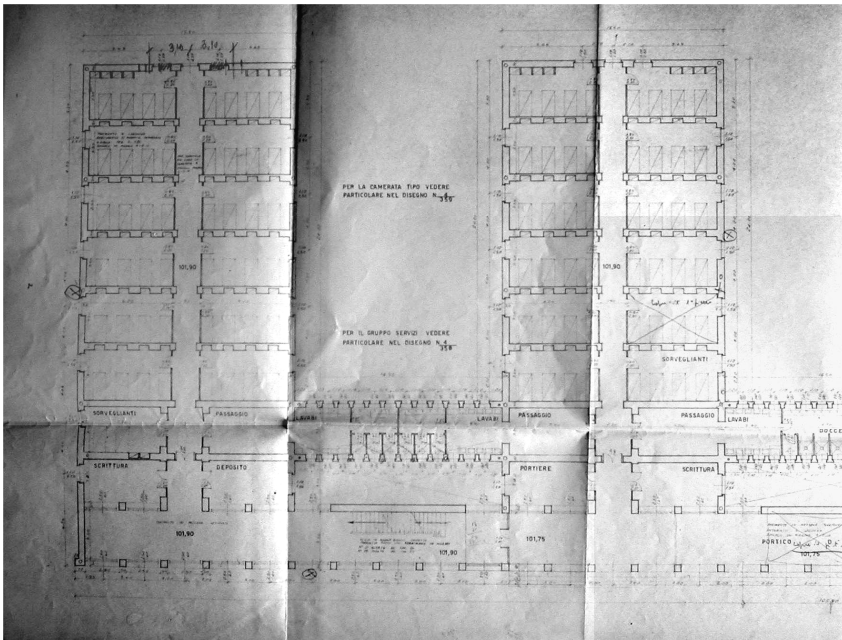

Figure 12. Plan of the Mezzanine (Carbonia, IACP record office)

On the side facing the main road, the longitudinal body is configured on each floor as a long open-air corridor, which on the ground floor is related to the road through a porticoed entrance, while on the upper floors it is related to the landscape with an uninterrupted arcade. The main façade is therefore completely open with the exception of the border arching of the ground floor, which is closed by a concrete parapet drawing back from the façade line, and by a tripartite glass window, framing the entrance. The side blocks housing the rooms appear like pure stereometric shapes, marked by high and narrow windows that, rhythmically reiterated, describe façades of simple figurative effect. The internal layout and the structural solutions are reflected with immediacy and simplicity on the façades. This reveals a design aimed at producing a gradual differentiation of its elements.

The dialectical relationship between the classic feature of the closing balcony, described by a system of reinforced lowered concrete arches pressing on trachyte springers, and the Mediterranean feature of the ground floor arcade and portico seem to express the search for a monumentality able to measure itself with the day-to-day life in the materic consistency of traditional materials or in the silence of the modern materials **(fig.13)**.
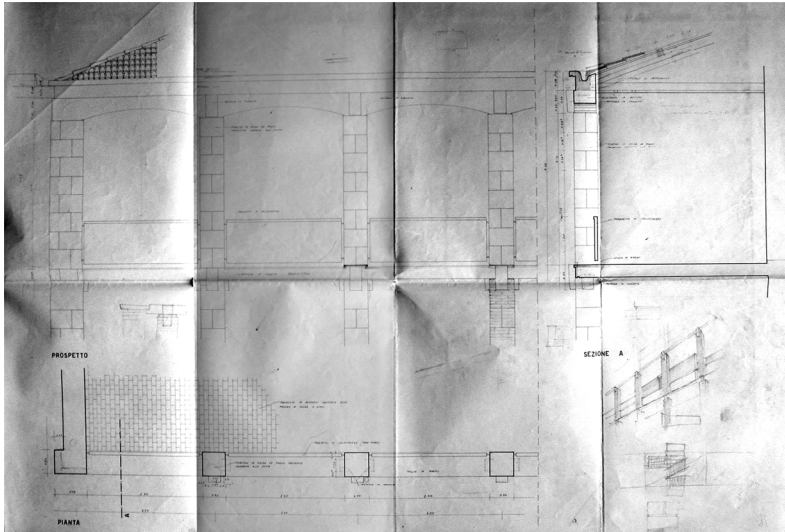

Figure 13. Detail of the front: Carbonia, IACP record office)

The shortage of local resources and the difficulties in obtaining them led the designer to adopt the autarkical building modalities already applied in building Carbonia: trachyte stones for vertical supports, reinforced concrete and bricks for the ceilings. Within this context modern products are used only in so far as they are able to compete in price and simplicity with traditional materials: the springers of the main façade, made of square voussoirs, support the reinforced lowered concrete arches, the windows are externally emphasised by a slightly overhanging frame made of artificial stone; the balconies on the same line of the façade, are protected by very thin concrete banisters, the rooms' wainscot is in washable paint on concrete plasterwork **(fig.13 and 14)**. The result is a modern and respectable project solution, free from any unnecessary formal redundancy and focused on minimalism in the building details and extreme mark reduction.

This simplicity of design not only comes out of local tradition but - as expressed in the work of Muratori - the designer should be positively influenced by such local practices. Such an approach would make use of traditional 'heavy' building materials that result in a vernacular style of architecture rather than spectacular design, which is comprehensible to people using the building. The workers' lodging houses - with their facades reminiscent of domestic monumentality - fall within this idiom.

In such a context the traditional character, simplicity and essentiality not only derive from the limits imposed by autarky, they rather come from the belief, clearly expressed by Muratori in his writings, that the poetry of classical expression and practical features of the functional form give the designer the opportunity to recapture the style and linguistic expressivity. A recapture which, on the one hand, makes use of traditional "heavy" building materials, which by allowing a plastic rather than a picturesque articulation of the architectural product, make understanding easier; on the other hand it makes use of the rigorous and tight exploitation of all expressive potentials made available by old and new building techniques, and particularly by the structural system. The domestic monumentality of the façade of the workers' lodging houses places itself within this logic: here the inspiring pattern of the Roman communicates with extraordinary immediacy the splendour of the wall building.
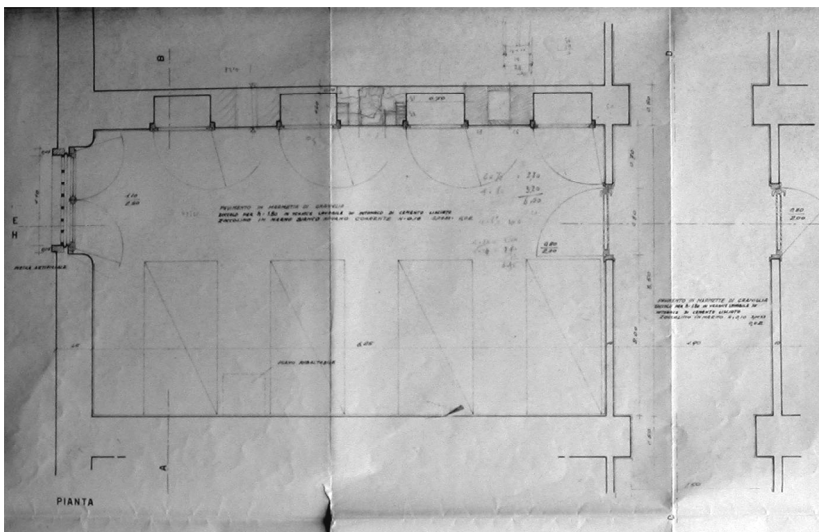

Figure 14. Standard dormitory: detail (Carbonia, IACP record office)

During the building process the Enterprise made alterations which fail to convey Saverio Muratori's architectural idea **(fig.15)**. These amendments affected not only the building and its materials but also the original position of the building itself. Instead of being built at the entrance to the village, which represented a coherent position as far as its function and its monumental feature was concerned, the lodging house was built behind the square with its façade facing the mountains. In order to prevent the workers' from being exposed to strong winds, which was inevitable given the new position of the building, the Enterprise closed most of the arches thereby destroying the composition of the façade.

With regard to technical building aspects, the main alteration relates to the pilasters on the façade, which were made of unplastered bricks rather than square trachyte voussoirs, as originally planned.

Such alterations fail to convey the aim characterising all Muratori's work, namely that of establishing a link with the surrounding historic reality, including the choice of materials. Furthermore, although the stone voussoirs were replaced by brick, the trachyte corbel was still put in place above each pilaster, making a sort of decoration out of an element that represented a conjunction between local and modern materials, and underlining the distinction between one span and the other, emphasising the monumental feature of the façade. The concrete banisters and artificial stone that should have framed the openings were never built.

Figure 15. Main front (photographed by the author, 2005)

The post-war building site faced the same problems and same peculiarities as the late thirties modern building project. The experimental feature of the project solutions is emphasised and sometimes penalised by the fact that the enterprise project is amended or even totally defined by the Enterprise itself during the building process.

The study of the steps of the enterprise experimentation confirms that autarky strengthens a general correspondence between architecture and building: the doubleness of tradition and modernity, the architectural research is focused on, also characterizes technological evolution, constantly fluctuating between modernity and preservation.

The creation of some reinforced concrete elements represents a point of strength for the stability of the delicate balance between preservation of craft building and innovations in technology and materials.

The young architects from Rome and Trieste working in Carbonia met this need through a key modern re-interpretation of the poetry of classic expression and the expressivity of traditional architecture. The essential homogeneity of the building criteria and the materials made available by local resources or by the remaining imports allowed by autarky and, at the same time, the different consistency and complexity are the factors determining analogies and distinction among Pulitzer's classic, Muratori's metaphysical vision, and Montuori's fresh modernity. An aspect that was preserved and never disputed is the crucial role of the wall in the architectural image. Therefore the designers' experimental drive is focused on the narrow operational margin still available, namely on the possibility to renew the design of the façade.

Within this context it is necessary to knock down all the pieces forming the buildings' apparently analogous constructive device: examining the connection between pilaster and wall, the fixture shape, the architrave type, the opening shape, the basement design, the frame stone. It is these constituent elements that the registers giving the three lodging houses non-rhetorical accents derive from.

The intrinsic urban nature of Saverio Muratori's project solution in the first place: not the one due to the more flamboyant use of the form within the context, but the one implicit in the authoritative feature of Roman architecture, according to which the building represents a real reference for surrounding languages and quality, a feature defined by the metaphysical feature embodied by the constant pilasters reiteration in long series. Then there is the domestic monumentality of Pulitzer's lodging house, expressed in the dining hall by the reiteration of the arch openings and the balcony columns, as well as the wide space supported by the reinforced concrete double frame. Finally there is the immediate modernity of Montuori's lodging house with its somehow colonial style, which to contrast the materic consistency of Torre Littoria's wall face places the lightness of an arcade able to confer, thanks to the plaster uniformity, a metaphysic hint on the entire building composition.

It is therefore clearly perceived in these buildings how an accurate "knowledge project" and a project for re-building the "original" features of such architecture might be a propaedeutic to any possible recovery.

REFERENCES

Ciucci, G. 1989, *Architects and fascism. Architects and town 1922-1944*, Torino, Einaudi.

Consalvo, F. 2005, *Recovery and re-use of Eugenio Montuori's clerks' lodging house in Carbonia*, supervisor Prof. Antonello Sanna, unpublished thesis, University of Cagliari.

Pagano,G. e Daniel, G. 1936. *Italian rural architecture*, in *Triennale books* , Milano.

Sanna, A. 2005. "*Autarky building: the Carbonia case. Materials for a recovery manual*", *Theory and practice of building: knowledge, tools and models*, Ravenna.

Sanna, A. 2004. *Types and features of rational home building in Carbonia, in Types and features of rational home: the Carbonia laboratory*, Cagliari: CUEC.

Sanna, A. 2005. *Carbonia: planning and building of architecture and public space in the founding rationalist town*, supervisor Prof. Antonello Sanna, unpublished PhD thesis, University of Cagliari.