Materials & architectural details in the architecture of the Modern Movement in Sardinia

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It should be stated at the outset that every type of material expresses—or rather invokes—a formal world that is consentaneous and homogeneous to it. Brick, stucco, wood or stone live «de facto» within a formal concordance and, above all, they proceed at the same pace within the world of traditional work. The labour of the metal worker is matched by the labour of the mason, of the paver or that of the carpenter. Thus our age, whose crisis we are only now starting to realise, may also be categorised under the name of consentaneous expressive materials, those, that is, which pass through the filter of manual labour, inheriting its insuppressible hallmark of uniqueness.

A world thus constructed and so slowly settled is obviously destined to crumble when it is called upon to face up to the use of new materials; since the latter, in their turn, carry internally and therefore promote and require a formal vocation of their own. In the same way, they require different work, different trades, other working languages, other words. We are, indeed, within that silent space, in truth intense and filled with noise, which opens between intuition and result: we are, that is, right in that space which idealistic Italian tradition has almost always kept hidden. Firstly denying to the notion of «mechanical» the prestige reserved only to the «liberal»; subsequently extending out of proportion the borders of the intuitive act and consequently narrowing the bounds of the executive and operational act. (Emiliani 1981).

In his inspiring work, Andrea Emiliani challenged historians to try and adopt also the viewpoint of the construction (besides that of the project) to achieve deeper and more complete awareness of the history of architecture. Emiliani quotes Focillon who affirmed that «materials involve a certain destiny or, rather, a certain formal vocation»; but he also wrote that «materials are not interchangeable but techniques penetrate each other and, on their borders, interference tends to create new materials». The latter quotation may serve as a key to understanding this paper, which attempts to analyse some forms of modern architectures in a land dominated by a strongly marked tradition, as was Sardinia in the first half of the 20th century. This contribution aims at identifying that very interference between «text» and «context», i.e. between traditional techniques and materials, and the innovations introduced by the modern project which, in its original contexts, expressed itself in far different materials and techniques.

But even a broader interpretation of Focillon’s phrase may help us focus on the more general theme of this Congress, by highlighting the need for an approach that cuts across different areas of study, including the history of techniques, structure and material analysis, the history of architecture etc.,
leading us to develop an inherently interdisciplinary history, through the effort generated by each area of study in its intermingling with other areas, rather than the flowering of many sectoral studies in the perspective of an always sought after (but rarely achieved) form of interdisciplinary study.

The Modern Movement appeared in Sardinia in the early 1930s, thanks to the foundation of new cities: Mussolinia (Pellegrini 1998, 1999), Fertilia (Peghin 2001), Carbonia (Pisano 1998), and Cortoghiana (Sanna 2000). The architects and engineers called upon to draw up these city-founding projects were well versed in the use of modern materials (reinforced cement concrete, iron sections for casings and frames, linoleum for flooring and wall facing, cladding bricks etc.). However, due to the political and economic circumstances of Fascist Italy (firstly the sanctions imposed on Italy by the League of Nations, then, from 1936 onwards, the autarchy policy), they were compelled to limit the use of these modern materials and turn to traditional techniques and local materials (or at least materials produced in Italy), and above all to reduce drastically the use of iron, which came from abroad, in reinforced concrete structures.

This particular state of affairs contributed to the development in central Italy and the Italian islands of a modern architecture which, with respect to European architecture, was marked by the prevalence of masonry technologies, as a distinctive formal characteristic. This cross between modern design and the local contexts firmly rooted in traditional materials and techniques led the best designers to bend to modern design requirements those materials (stone, wood, lime mortars and plasters) and those types of manual works (load-bearing walls, wooden roofing structures, plasterwork dressed in place, stone cladding) deriving from a tradition stretching back many centuries.


This building, about 10 m high, is based on a 4.5 m structural module. Its L-shaped plan has its joint in the square atrium with at the centre a round pool which collects rainwater from the roof. The latter is supported by a series of reinforced cement concrete beams which rest on a circular architrave, born by eight pillars clad in solid brick in stretcher bond courses. The two arms of the «L» are formed by the covered gymnasium and the open-air swimming pool (8.70 × 20 m).

Another «L» shaped body, 5.5 m high, partially linking the South and East fronts, houses offices, a library, locker rooms, toilet facilities and a storage area. This body is marked by cladding in stretcher bond courses of full bricks (24 × 12.5 × 6 cm), and by a ribbon windows with white wooden frames. On the main front, framed by splayed brick walls, is set the main entrance, leading to the atrium with its circular pool by means of a paved stairway with bricks set in herring bone design.

The main body of the gymnasium has six round windows in its southern exposure, and the same number in the northern, from which a further three doorways lead down to the sports field by means of a staircase with six stairs in edgewise bricks. In the back wall of the gymnasiump, facing west, there is a large set of windows consisting of a grid of five by four rectangular windows, in varnished wood, with horizontal hung opening. The gymnasium has a flat roof in reinforced cement concrete with two skylights adding to the ventilation and lighting provided by the round wooden windows; these windows, 1.5 m in diameter, are horizontal centre hung so that the top
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The large windows of the gymnasium can be opened and are mounted on an ring of head-set bricks. The structural system is made entirely of reinforced cement concrete and consists of a series of portals, with 4.5 m centre distance, each consisting of two pillars measuring 40 x 84 cm and a beam with «I» shaped section, 150 cm high, with a 18 cm wide core and 40 x 40 cm heads, linked by secondary beams, set with 2.70 m centre distance between, 15 cm in width and of height varying between 23 and 40 cm at the bearings. The roof slab has a design thickness of only 8 cm; beneath it, 80 cm from the intrados of the main beam there is a ceiling consisting of a main wooden beam frame (section 11 x 13 cm) and by a secondary wooden strip frame to which the furring is fixed. In the first area of the gymnasium, near the entrance atrium, there is a grandstand, consisting of floor slab resting on two concrete beams (section 25 x 35/50 cm), originally accessed by means of two staircases contained in curved housings, clad in full brick set in stretcher bond pattern, which today have been demolished.

The open-air swimming pool is inserted in a sort of scenic background consisting of a full height exedra, adjoining the atrium with the circular pool, which extends in two large portals.

The two beams which form each portal, set at a height of 8.3 m, about 22.6 m long, set 2.5 m apart and with a clear span of 18 m, are constructed in reinforced cement concrete, with closed head, while the lower side opens into an inverted «C» bay shape. The intrados of the beams is barrel vaulted by means of a structure in running wooden strips onto which a plaster-supporting net is fixed. The structure is set, by means of sliding rollers, on an independent body consisting of six pillars, four of which form a composite pillar, forming the continuation of the
beam itself from an aesthetic point of view, while the other two are structurally independent, clad in stretcher bond courses of full brick.

Cemetery of San Michele in Cagliari, by Cesare Valle (1934–40) (Opere Pubbliche 1936, L’architettura Italiana 1941, Sanjust 1999, 2001a)

The central portion of the building leading into the cemetery consists of an ample chamber (the Memorial Chapel) of square ground plan, 15 m per side, covered by a reinforced cement concrete dome. It is accessed through a wide main staircase and two large lateral halls, which in turn lead to the two porticoes that open onto the main open area of the cemetery and link the Memorial Chapel with the two side buildings used for various service purposes. The frame structures of these buildings are in limestone and cement mortar, whereas the pillars of the porticoes and the roofs are in reinforced cement concrete. The roof of the Memorial Chapel is constructed in the following manner: a series of beams set out in a square mesh links the drum to the supporting walls; on the drum are set eight beams of varying section (in the form of a rampant arch) linked at the key by an open ring; the vaulting cells are formed of thin concrete slabs. The base course and the pillars are clad in large slabs of travertine stone (6 cm thick) fixed with two hidden joints for each slab.
set diagonally. Flooring of the Memorial Chapel is also in slabs of travertine stone (measuring 80 × 160 cm) with trachyte insets. The porticoes are floored in small rectangular grès tiles. Plasterwork is of the Terranova type, bordered and coloured; externally in red and internally in blue, while the intrados of the cupola is cobalt blue. The door and window frames are in iron sections. Cladding of the building is in trachyte stone from Serrenti in courses between 20 and 40 cm in height, thickness 35 cm, alternating with 5 cm joints, obtained by dressing the stone blocks; cornices and copings are in travertine blocks (section 18 × 60 cm).

**Montuori’s projects for Carbonia (1939–41)**
(Sanjust 2001)

In the construction of Carbonia the use of local, traditional materials and techniques was a planning imperative right from the start: « . . . projections and bold structures were almost entirely abolished; roofs and lintels in reinforced cement concrete were calculated on the basis of a ratio between the stress of the cement concrete and the iron such as to reduce the use of the latter as far as possible. The use of lumber was also contained within rigid limits. It should be

stressed that the structures were chosen with care with an eye to utilising, as far as possible, local materials; thus we see wide use of stone and minimal use of brick; dressed stone, even when intended for decorative purposes, was to be obtained from nearby quarries» (Pisano 1998). Within these constraints in technical and economical resources a line of research was developed which saw Eugenio Montuori develop his projects around the use of trachyte in pure volumes, stereometrically associated with plastered volumes, or in façade and counter-façade sections adjoining plasterwork structures. This line of architectural research was just hinted at in some of the projects drawn up over a very brief period between 1937 and 1938 and realised equally rapidly for the inauguration of the city in December 1938. But this research was further developed starting from 1939 with the project of the Caserma della Milizia, and matured in 1940 with the high-intensity labourer housing project known as type B1, and in 1941 with the project for the blocks of flats with galleries.

The B1 type block, consisting of 48 accommodation units, has a linear development, on four floors with three staircases, each with landings leading to four small apartments per floor. The flats are of two sizes: 51 sq m with two bedrooms, and 38 sq m, with single front and one bedroom. The staircases are external, with a single flight of steps set parallel to the building and a return walkway in the form of a gallery; this latter element is inserted in a deep common loggia looking onto the street, set into the volume of the building. The distinctive element of this building, as regards its type and distribution features as well as its compositional and formal aspects, is this system of loggias and external staircases, in which a decisive role is played by the choice to realise vertical structures with trachyte-faced sections, with passage through round arches; the flights of stairs are in cement and the steps are in trachyte. The result is a strong chromatic contrast between the red of the stone and the plastered sections.

The 18–flat block may be seen as the development, as to type and architecture, of type B1; from the point of view of typology, the choice of the gallery system, well resolved also as regards aspects linked to introspection, allows Montuori to overcome the problem of the single front exposure which we find in type B1. From an architectural point of view, the trachyte sections, which characterised the loggias of

![Figure 8](image_url)

The staircases supported by trachyte sections
type B1, here become a sort of counter-facade system, set against the habitation volume, which contains the galleries. This project, which was never implemented, can probably be seen, in the example of Carbonia, as the best expression of the results of research into the feasibility of Modern design in contexts linked to traditional building methods.

**SAVERIO MURATORI AT CORTOGHIANA (1940)**

(Sanna 2001)

The example of Cortoghiana, a mining village in the Province of Cagliari designed by the young Muratori, tells the story of the extraordinary meeting between the desire to implement some form of European Modernism and the concrete reality of a country which was backward from a technological point of view and which was beginning, in an autarchic regime, to sink back into its past. Cortoghiana was planned round an extraordinary square measuring about 200 × 50 m, with porticoes on all sides, which forms an «L» shape with a small square of about 40 × 70 m onto which opens the Church. A sort of modern metaphysical Venetian Piazza S. Marco which places itself in comparison — and wins the battle — with the more traditional squares of the other fascist new towns built in the same period. And yet it...
is entirely created with the masonry technologies of Italian tradition: the pillars of the square’s portico are in load-bearing trachyte stone, as are the walls of all of the buildings; the roofing structures are generally in wooden trusses covered with bent tiles; for the elevated floors reinforced cement concrete is used, the only concession to a modern material which had by then become of common use on Italian work sites (a material, moreover, which could be easily assimilated into the masonry tradition), but no overhang was possible, in view of the lack or iron, and neither was any large-size opening.

As may be seen, during an initial period, which lasted at least until 1936 and coincided with the opening of the Fascist system towards modern architecture, planners were able to experiment with new forms and new materials. From 1936 on, with the beginning of the crisis, the sanctions of the League of Nations imposed on Fascist Italy, and marked involution in all sectors of Italian life (the shameful racial laws date from the same year) in architecture too it became impossible to experiment with modern materials, and only thanks to the capacity of building designers were architectural projects worthy of their time achieved, albeit realised exclusively with the materials and techniques of bygone days.
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