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REGIONAL ARCHITECTURE IN THE MEDITERRANEAN AREA

edited by
Alessandro Bucci, Luigi Mollo

ALINEA EDITRICE

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Napoli, view from the Certosa of San Martino

FOREWORD

Today, when the contemporary society is experiencing a crisis in the process of globalization and European Union is confronting with the extension of its boundaries, the debate on the regional dimension becomes central.

Two are the possible scenarios:
- a complete planetary uniformity of behaviours, economies lifestyles and urban environments dominated by a reduces number of industrial and tertiary conglomerates creating a sub-urban environment characterized by the system skyscrapers-highways-suburbs;
- a globalization developed through enhancing regional characters: natural and urban environments, food, culture, habits, and lifestyles, construction techniques, urban and architectural types.

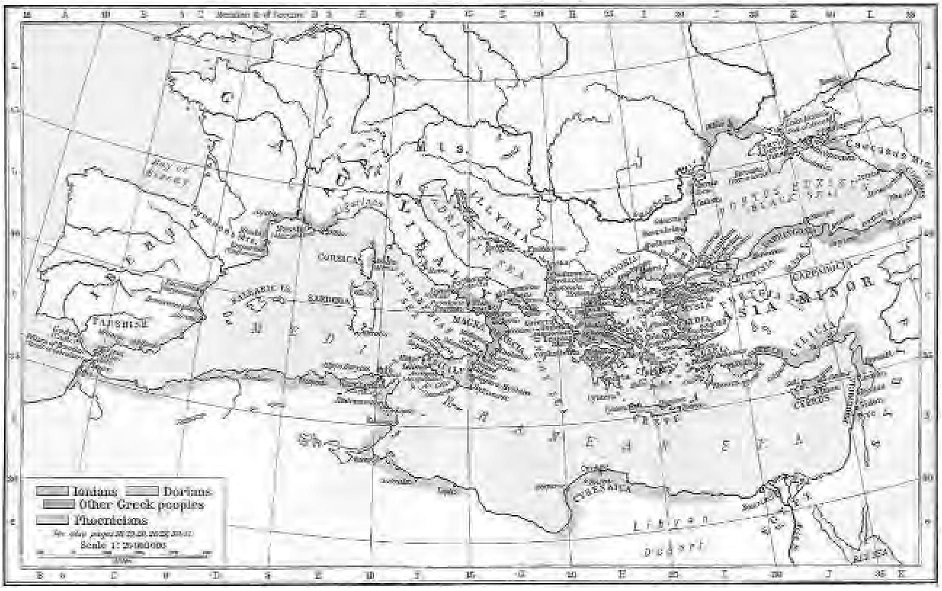
According to the second scenario, inspired by the creation of a world enriched through the variety of differences, the search for a regional dimension in architecture becomes the key factor as an alternative to the diffusion of a sub-urban condition at a world scale.

What are the architectural features of a Region? How can we classify a Regional Architecture? How is it possible to develop a programme of Urban Renaissance in decaying centres and suburbs though the use of a Regional Architecture? With what materials? With what construction techniques?

This book generated by the MIUR Research Program in 2004-2006 coordinated by Professor Carlo Aymerich - University of Cagliari, with the contribution of the Polytechnic of Bari (directed by Professor Paolo Pastore), the University of Bologna (directed by Professor Adolfo Cesare Dell'Acqua), the University of Ferrara (directed by Professor Gabriele Tagliaventi), and the University of Palermo (directed by Professor Giovanni Fatta), aims at systematically analyzing the main features of Traditional Architecture and Urban Fabric in the Mediterranean Area in relationship with a wider European context where the Region is recognized as the fundamental actor of a sustainable development in the Age of Globalization.
It shows a development based upon the rational evolution of local architectural and urban types which are compatible with geographical and environmental elements.

This work underlines their key role in the actual process of both architectural re-qualification of historic edifices and urban redevelopment and promotes the use of Regional Architecture and Traditional Urban Fabric as key element for the creation of a better urban environment in an age which has to face processes of intense standardization and reduction of architectural elements.
Thus, the research proposes an alternative way to globalization, based upon the reinforcement of local cultural and architectural characters seen as generators of a richer urban environment.

Alessandro Bucci
Luigi Mollo



The Mediterranean Basin (550 a.C.)

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INTRODUCTION

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M. Culot

BE REGIONAL
YOU WILL BE UNIVERSAL !

Today in Europe regionalist architecture is not taught in schools anymore, professional architecture reviews never speak of it, but it still lives and numerous quality realizations are being produced every year.

Why has this form of architecture become shameful, why does it provoke so much indifference in most architects? Why is there such a fear, such a rejection, when ecology makes constant progresses, when natural products are more and more sought after, when the notion of durable architecture nowadays is generally acknowledged, when the priority of the car is questioned, …? Why regionalist architecture does not benefits from a renewal of interest by architects, given that the market exists?

Beyond the misleading argumentations having been put forward for 50 years (link between regionalism and the bourgeois right (if not with fascism), with reactionary separatist movements, with nostalgia for the past, with kitsch…) it seems that the true reason is the inability of most of architects to conceive a regionalist quality architecture. As they are no more trained to know it and produce it, they cannot but deny it, to ridicule it, and at the best, ignore it. But the efforts to rehabilitate regionalist architecture undertaken about twenty years ago by some people and scattered groups start bearing their fruits: books, expositions dedicated to it and in the USA the movement of New Urbanism (which much owes to François Spoerry, the inventor of Port-Grimaud and to Léon Krier) is knowing a great success, which is already having its echoes in Europe…It is a fact.

Regionalism is finally on its way back and it is with great pleasure that I answer to the invitation of talking about it made to me by Alessandro Bucci and Luigi Mollo.

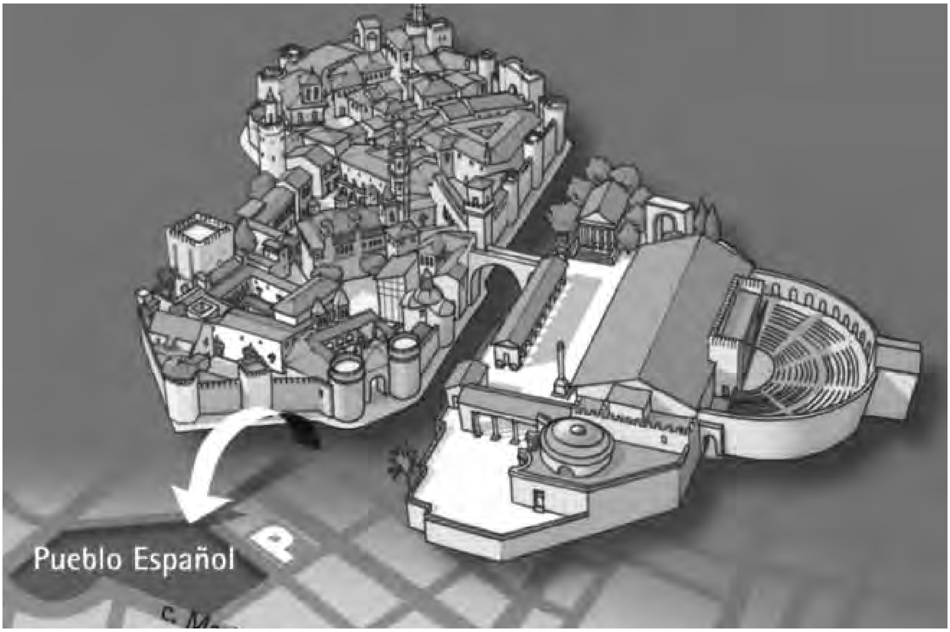
Regionalism in architecture is a way of thinking architecture which developed starting from the second half of the XIXth century. It has its origins in two phenomena: the growth of nationalisms and the reaction to the influence of the industrial society. The first has given impulse to the European movement in favor of national Romanticism of arts, the second has started the idea of architectonic particularism applied to regions and inspired by local traditions. England, which had experienced before the other countries of Europe the devastating effects of industrialism to the last on its cities and landscapes, is the landmark through the movement Arts and Crafts. Its influence has been remarkable, since its birth, in 1888, around William Morris, Arthur Mackmurdo, Walter Crane, William Lathaby, Charles Robert Ashbee, Voysey, Baillie Scott, just to cite them. In origin, the movement was an invitation made to artist to take inspiration from the vernacular Gothic spirit to fight classicism, as this was considered as a international style opposed to local aspirations. One of the most beautiful applications of this doctrine can be found in France, in Varengeville near Dieppe, where Edwin Lutyens and the landscaper Gertrude Jeckyll have realized, on sea-shore, one of the most beautiful fusions between architecture and garden art. The influence of Arts and Crafts is at the basis of almost all national romanticisms of northern Europe. North America too held on it to assure the renewal of artisanal values, defended, among the others, by Frank Lloyd Wright and his disciples.

National Romanticism and Regionalism

After the Second World War, Europe knew an extraordinary change in scale. The one resulting from the destructions caused by war, by the revival of industry, of modernization of infrastructures, of the question of lodging, or more, by the Americanization of the ways of life. In order to satisfy this unparalleled turmoil, it was necessary to break the old system of production of architecture, discredit traditional architecture. Alias, to make the new post-war society with its new values (capital flow, development of car production and of road transport, electrification, massive liberalization of markets, access of women to work,…) emerge and meet the massive demand of new constructions, it was necessary to simplify the architectonic and building process. This simplification had been prepared by Le Corbuisier and by his emulators, since their simplicist theories on the cities and on architecture could be considered as the Trojan horse of new politics. This found its expression in the method of zoning: industrial, administrative and residential zoning, opposed to the old urban mixity. To bring this radical process to a good end, it was absolutely necessary to get rid of qualified architects. This supposed to seize teaching in order to exclude from it all the approaches that were not those of tabula rasa. Once this cleaning operation had been done, architects, who believed they were now the champions of artistic creativity and of the management of abstract notions, in reality rapidly became valets of a society essentially oriented towards consumerism and towards its corollary: waste. It is to bring to a good end this project of massive discredit of a profession that, after the Second World War, all the architectures derived from the national romanticism of regionalism and of classicism have been assimilated (either from the architectonic critics and by architects themselves), to political nationalism. Now, they are two completely different things. Political nationalism brings to isolation, to withdraw in oneself, revives chauvinism and xenophobe feelings. Artistic nationalism is the assertion of cultural values peculiar of a society displaying a respect and an interest for its own roots, its own past, its own history, its own memory and proposing itself to share its own cultural heritage. The Hungarian architect Jozsef Vago (1877-1947) in his book Through Cities, published in 1930, sensed the danger for Europe, of a unique architectonic thought and wrote that "though appearances, in this world full of international exchanges, architecture, like a conservative and resolute patriot, will affirm and resolutely emphasize national characteristics, which are its own in every country". In 1938, he takes advantage of his participation to the competition for the new parliament of Ankara to explain his view of artistic nationalism with a project he knows to be against the tide. He deliberately places two columns in form of minaret in front of the main entrance of the new Parliament. A proposal that appeared as a provocation to the eyes of the laic authorities of the modern Turkey established by Mustapha Kemal. But Joszef Vago was convinced that in "Turkey, as in the other countries, the national spirit will triumph in art (…), hence minarets, specific creations of the Turkish genius, will no more mean neither decadence, nor ignorance, nor corruption, but will recall the glorious centuries that have created them". National romanticism has given birth to great figures, always estimated today in their relative countries by populations and by visitors, despite architects.

In Spain, after the loss of the colonies, nostalgia for the past grandeur of the nation has inspired a lot of artists, whose works are still to discover. In this country, national romanticism and regionalism cannot be distinguished the one from the other. The Basque Léonardo Rucabado (1875-1918) has marked with his print the city of Santander. Annibal Gonzalez y Ossorio from Seville (1876-1929), called by his colleagues the don Juan of architecture, because he loved styles, but was not faithful to any of them, is the author of the extraordinary Spanish square in Seville (1914-1928). Rafal Maso (1880-1935) has realized the coastal village of S'Agaro near Barcelona with its "camino de ronda", overlooking the sea. Pedro Muguruza (1893-1952) embellished the border city of Fuenterabia the morrow of the civil war. His work will be continued by Manuel Manzano Monis (1913-1997), who rebuilt part of the historical center. After the death of Franco, the work of these two architects will be discredited both by the left power and by Basque nationalists, who have not yet reached the cultural maturity sufficient to make them separate art and ideology. It is just a short while that a major work like the Pueblo espagnol (X. Noguès, F. Folguera and R. Raventos), built in Barcelona on the occasion of the Iberian-American exposition of 1929, is acknowledged by part of the architectonic critics. This high place of knowledge summarizes in the path of its streets and of its squares the architecture of all the Spanish provinces. Noucentism, a movement centered on the perpetuity of the Mediterranean culture has been extraordinarily exemplified by Caesr Martinell (1888-1973), a disciple of Gaudi, who built more than thirty cooperative pits between 1915 and 1945 in which he reinterprets the traditional rural brick building in elegant vaults. Italy, like Spain, is a reservoir of works and of architects to rediscover, and behind every artist here quoted, hundreds of other artists by the same talent crowd. The medieval Borgo and the Rocca built in Turin in 1884 by Alfonso d'Andrade (1939-1915) remain one of the best examples of recreation, on the occasion of a national, international or universal exposition, of an ancient city quarter. Bologna would not be the city we nowadays know without the extraordinary work of reconstruction by Alfonso Rubbiani, the Italian Viollet-le Duc … This Italian Viollet-le Duc is also the author of the identical reconstruction of the castle of Fenis, the Piemontese equivalent of the castle of Pierrefonds by Viollet-le Duc. Angiolo Mazzoni (1894-1979) has marked the landscape of the Italian cities with his stations and his post offices, like the sublime one of Ferrara, while Giancarlo Maroni translates the thought of D'Annunzio in the unforgettable propriety of Gardone Riviera, the Vittoriale of the Italians. The nationalist and protectionist revival characterizing the period preceding the Second World War materializes in the realizations that take their inspiration from the examples of national monumental architecture. Franco's Spain will invent an original style, inspired to the Escorial and to the plaza Mayor in Madrid, Italy will invent a neo-imperial style, influenced by the Rome of the Caesars, Germany and France will turn towards classic strictness. Among the manifold figures excelling in monumental urban art, that produced complexes like the Palais de Chaillot in Paris, EUR in Rome, the Ministries in Madrid, the Italian Marcello Piacentini (1881-1960), the German Albert Speer (1905-1981), the Spanish Luis Moya (1904-1990) and the Soviet Iofan stand out.

By contrast to national romanticism which is based on themes recalling the native land, regionalism is interested in its children, that is to say regions with their particularisms. Regionalism does not try to express a national mythological soul in a pedagogic aim of reinforcement of citizens around a flag and a country, but to emphasize local features dependent on climate, on geography, on folklore, on religious traditions, on materials, on ancestral colors, like the red color spurting out of the ox-blood… Regionalism is a mainly cultural attitude, motivated by the nostalgia for ancient constructions, by their beauty with no blusher, by their harmonic insertion in the landscape. In France, the question of national romanticism in the arts was not posed. The problem of Alsace and of Loraine did exist, but the artistic illustration of the territorial claim was limited only to literary and folkloristic aspects; until the 1950s, the country was still mainly based on agriculture and the uglification made by industry, by urbanism was limited to certain delimited parts. The movement in favor of architectonic regionalism centered in the regions having a strong traditional culture, like Normandy, Basque Countries and Provence. These regions attracted the élite of vacationers and of tourists, who were also their most active defenders. As it is a paradox to realize that in France, regionalism was invented in Paris and exported in the regions. Actually, it does not stem from a local realization, but from novels, from films or from the architectures realized by personalities stranger to the region. The true inventors of architectonic regionalism are the architects trained at the School of Fine Arts in Paris… that is artists who received a mainly cultural training inviting them to be curious of Italy, of Greece, of Renaissance. And this apprenticeship of curiosity is made through the practice of the revealed, of drawing and of composition. The young architects coming out of school have then a precise and analytical view of things. And when they travel the beautiful provinces of their country, they are frightened by what local artists build: often bad imitations of Paris architecture, seen and copied from reviews. For different reasons (regaining their health ruined in northern trenches, taking part to the reconstruction of devastated areas, working for a bathing clientele,…) some of these architects will settle in the region and will have a remarkable influence on local architecture. The building of Trouville station in neo-Norman style by Philippot, a Parisian architect, will give the starting signal to local architects and the realization of works of art so extraordinary like Trouville fishmonger by Maurice Vincent, that nowadays it has been classed as historical monument and emblem of the small fishing port…In the Basque Countries, Henri Godbarge (1872-1946) in a precious work gives a theoretic frame to the modern neo-Basque current, that makes him, still today, a commander. André Pavlovsky, another Basque of adoption, after having run the steps of initiation, does not hesitate to take inspiration from the regionalist architecture of the Californian coast to build the lights of the



Figg.3,4 - Pueblo Español
Palma de Mallorca, España

harbor of Saint-Jean-de-Luz. He proves in this way the vitality of the style of a region, where emigration was less a loss of identity than an opening on the world. In a first stage, the new regionalists will strive to understand the why and the how of traditional construction. The one of farms, of country houses, of groups of buildings,… and realize an impressive work of adjustment of the ancient lay-outs to the rules of habitat and of comfort of their time. They will also invent some economical decorative and building solutions. For instance, the lack of wood and the impossibility to realize new buildings with wall in wood frame, filled with cement pavement has led regionalist architects to invent the false cement wooden floor and to codify its use. Like 2000 years ago, builders would evoke in stone triglyphs and metopes of the temples the building system of the first cult buildings, made in wood. Architectonic regionalism could have never developed without the support of great artistic personalities. Writers, poets, photographers, actors, cinematographers, have brought their essential moral, esthetic or bourgeois and snob support. The fashion of the neo-Basque house is launched by the great dramatist Edmond Rostand, who had built in Cambo a huge mansion in the ancient style of the country. And the Romanian Ramuntcho de Pierre Loti, who stages a Basque operetta country, has made more for infatuation for neo-Basque architecture than all the professional publications. Regionalism is not a rigid art, on the contrary it is in constant evolution. Remaining to the example of the neo-Basque, at the beginning, architects will take their inspiration mainly from the old farms of the province of Labourd. These farms are built on a rectangular plan and covered with a two-sided roof, which is extended according to the extensions. But as soon as they master the question, architects will extend their investigations to all the provinces of the French and Spanish Basque country. They will take from the aristocratic houses in Navarra, from the sloping roofs of Guipuzcoa, … And when they believe they have reached a personal mastery through the process of imitation, they allow themselves only inventions in plans and sections in order to create buildings moving away from traditional models, but at the same time giving the impression of fully belonging to regional tradition. This remarkable result, that most of today architects is unable to appreciate, is the fruit of a reflection and of a detailed work on our condition and on our ability to lend the hand to the generations which have embellished the world. In the USA, a moralism weighing on the European architecture practically does not exist. Here it is possible to do an international, an imitation, a false ancient style according one's own inspiration, and practice all the styles without being excommunicated. The basic idea that to do the truth it is necessary to do falsehood is here accepted…and this is what explains regionalism's vitality. At the beginning of the XXth century, the States of the sun (California, New Mexico, Texas, Florida) invented a new style, some times called Spanish Style and others Mediterranean Style. This style was characterized by the association of architectonic elements coming from the different cultures of the Mediterranean area: Veneto, Morocco, Provence, Andalusia,… The American habitat standards and the volumes of the garages for cars have allowed architects realizing complex compositions, avoiding to lapse into the kitsch resulting from the accumulation of different details grouped in a too narrow a space. One of the most successful examples is the new city of Coral Gables near Miami, where next to the houses it is possible to find French, Chinese, Hollandaise, Norman villages … But the complex that has marked spirits the most is the residence of the multimillionaire William Randolph Hearst in

San Simeon, whose life inspired the film Citizen Kane. This imposing estate was realized according to Julia Morgan's plans, an architect trained at the school of Fine Arts in Paris. The main building, the Casa Grande, was built on the model of a Spanish cathedral. Nothing less. This style appeared around 1914, and went out of fashion at the end of the twenties. More sober styles were preferred, which were more inspired to cinema (in particular to the film Morocco by von Sternberg) or to the architectures of the Indian pueblos. Do not make confusion between provincialism and regionalism. Provincialism is nothing but a type of meanness, of soul's smallness. The frog of La Fontaine's fable, which wants to become as big as the ox, perfectly shows what provincialism is. The politician who decides that in order to be modern, well-informed, it is necessary to erect a building in the city in the style of the Gugenheim Museum in Bilbao, or the Louvre pyramid, is a provincial. Just like the architect who wants to be as great as Jean Nouvel, Ando or Foster. Provincialism is synonym of superficiality, of an absence of interest for what we are inside our society, inside our social and cultural environment. It is a childish refusal of refusing to accept our own roots, our own origins, by overcoming them in case of need. One can be a provincial, that is living in a city that is not a capital, in a village, without doing provincialism. Inversely, one can live in a big city and show evidence of provincialism. Provincialism is a way of adhering to mass unconventionality. To be regionalist does not mean wanting to impose one's own ideas, at any price, regardless of where and how. Regionalism is characterized by open-mindedness, by cultural curiosity both for the world and for its immediate environment. We are not born regionalist, we become regionalist. Fellini has touched the whole world with films echoing only a part of the Italian society. Georges Simenon has depicted characters inked in local realities and has been translated all over the world. After the First World War, some architects have dreamt to rebuild the world by making tabula rasa of history and of the past, but they had received a classic education that had marked them for life. This gives modernist works of this age a reality and a poetry. But this belongs to the past. Their successors have changed this freshness of the origins in a heavy, and worse, boring moralist doctrine. Hence it is a "urbicide" doctrine. Because they have really become murderers of cities. A feeling murderers share among them is the one of fear. And fear is redoubtable because it causes erratic behaviors, it leads to extreme attitudes. A profession welded only by the fear of losing one's own advantages has no more future than sclerotized corporations had in the XVIIth century.

As far as I am concerned, I am convinced that the time of waste and of ideological manipulation has nowadays gone and that architectonic regionalism will regain all its actuality and its dynamism. Everywhere in the world some architects are working, they do not miss anything but chances - and good will! - of better spreading their work. Who knows, for instance, the work of the Scottish Iann Begg, one of the greatest regionalist architects of our times? Surely Gabriele Tagliaventi, the brilliant moving spirit of the series "A Vision of Europe" will have recourse to it. And taking again Fellini's beautiful formula, I shall take the liberty to say with him: "Be regional you will be universal!".

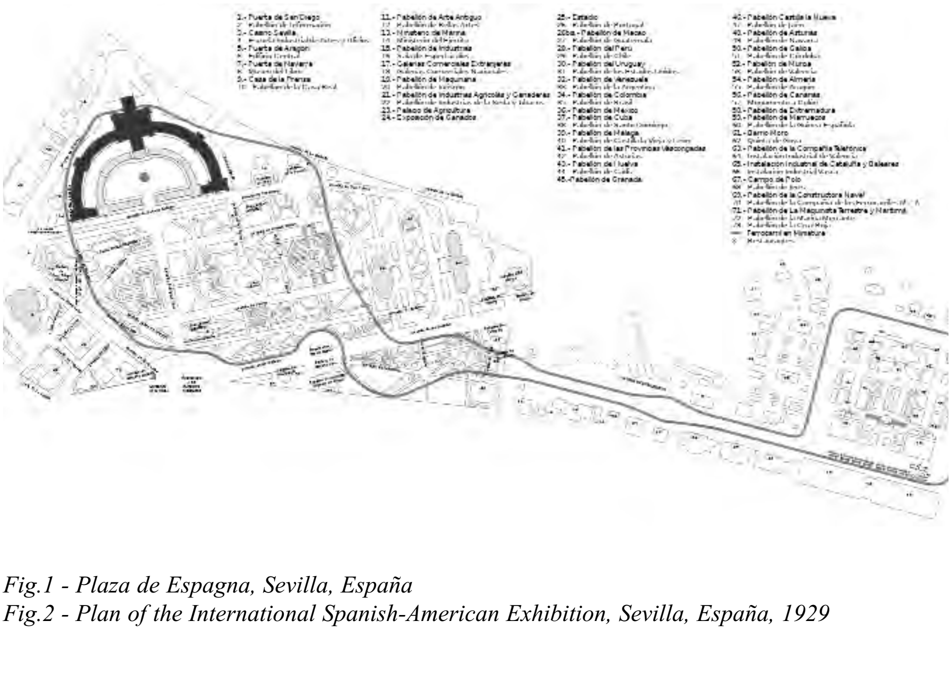


Fig.1 - Plaza de Espagna, Sevilla, España
Fig.2 - Plan of the International Spanish-American Exhibition, Sevilla, España, 1929

G. Tagliaventi, A. Bucci, D. Diolaiti, F. Finetti *

THE UNBEARABLE BEAUTY OF AN ORGANIC REGIONAL WORLD

FROM SEVILLA 1929 TO VAL D'EUROPE 2008

It has today become a worldwide icon. Every guide-book of Seville puts it in the front page, many in the cover, as the RCS one distributed in 1 million copies by the main Italian newspaper: Corriere della Sera. The success of Plaza de España in creating the image of Sevilla is astonishing. However, in a city rich in historical buildings, that one is a fully 20th century creation, designed in 1926 by famous Spanish architect Anibal Gonzalez Y Ossorio to be the centerpiece of the 1929 Ibero-American International Exhibition. So important is its role in the city structure to be today the headquarters of the Autonomia Andalucia Regional Government.

The Plaza de España keeps its links with the beautiful Spanish tradition of the Plaza Mayor, still it introduces some relavant innovations which are ultimately responsible for its unique results. It is surrounded by arcades as every Plaza Mayor in Spain –from Madrid to Bilbao, from Salamanca to La Coruña, from Vitoria to Cordoba- but it is not a square-shaped plaza. Similarly to Toledo's Zocodover it is curved in a semicircular while the presence of water and trees gives Sevilla a truly recognizable character.

The water as a tribute to the historical reason for Sevilla's propserity through centuries. The main harbour for trans-Atlantic trades, the headquarters of the Compañia de las Indias, along the Guadalquivir river course.

The trees as a tribute to the Andalusian desire for shadows and calm. A desire that dates back to the Roman city Italica, and generated the superbe Alcazar's gardens in the historic centre. A desire that the Moorish culture sublimated in the Alhambra.

A Plaza Mayor with water, trees, and bridges. What an innovation!

Still, materials are local. Terracotta tiles and bricks that give the Plaza a direct link to the Moorish architecture so present in the region. Arches and arcades as in the Castillan tradition of the unified plaza which gives every city a clear center. The plaza is surrounded by arcades and open to river. And the entrance is marked by the presence of two paired towers inspired by the Giralda, the Renaissance tower of the Gothic Cathedral built over a pre-existing Moorish minaret after the Catholic conquest in the 15th century.

The 1929 Plaza de España represents a perfect marriage of both he universal character of Spain and the regional one. The historic links with American former colonies and the Mediterranean nostalgia of the city's Roman origins. In a triumph of mosaics, every Spanish city is depicted to show visitors the beauty of a country that was desperately trying to start a new life after the national tragedy of the loss of the last colonies in favour of the emerging United States: Cuba and the Philippines.

One can say that the golden age of 20th century Mediterranean Style is firmly connected with the Plaza de España. However, Sevilla's Plaza de España is just part of a worldwide movement that identifies the Mediterranean traditional architecture as a reference for the construction of the new city. A movement that strecthes its arms till the new world in the construction of the new Garden Cities in Florida as well as the main neighborhoods of Los Angeles and San Francisco.

It was in fact in those days, right before the big storm of Wall Street 1929 fall, that another remarquable example of the Regional ability to create places was built in Barcelona for the World Exhibition that eventually hosted Mies' pavilion too: the famous Pueblo Español.

The Pueblo Español was built as a collection of buildings expressing the different Spanish regions. Designed by Francisco Folguera y Grassi in 1928, it was conceived as a temporary stage, with each building representing a particular Spanish regional architecture. However, it was, again, its incredible success that led to the transfomation of an exhibition stage into a permanent structure in the form of a village. Like any Spanish town, Pueblo Español has a main square in form of an enclosed Plaza Mayor, with a public building representing the Town Hall while the church and the tower occupy a different plaza.

The idea of building a village representing the different regional aspects of a country was deeply ingluenced by the Barcelona's Pueblo Español all over the continent.

In 1937 the French International Exhibition of Arts and Techniques dedicated a specific area right to the "Centre Regional", a village built in order to display the different regional architectures of the different French regions. Therefore, in 1937 Paris, it was possible to have access to the "international" are of the exhibition that opened with the "international gate" of the paired pavilions of both Nazi and Soviet regimes, right at the entrance of the Trocadero esplanade. But it was also possible to visit an alternative view of the possible architectural and economic development: the Regional one. It was a schocking contrast. While the "international" area was conceived as the triumph of precast construction and heavy industrialism, with a very specific "international" architecture, the Regional world was presented as an organic ensamble of various architectural types assembled in the form of a traditional French village where artisanal and tourist cultures were identified as the power-engine of the future economic development.

In 1940, while most European countries were already actively participating in the World War II, the Portoguese government opened another International Exhibition: the Esposição do Mundo Portugues. Such was the success of this exhibition that Antoine de Sainte Exupery celebrated it as an antidote to the contemporary madness. It was again a village built as a traditional Portoguese village, with a series of traditional architectures representing the different Portuguese regions. Again, and in striking contrast with the "international" way to organize exhibitions, the "Portoguese World" was not conceived as a collection of pavilions, but as an organic village built out of a precise traditional typological order showing the deep influence

Figg.3,4 - Plaza de la Moncloa, Madrid, España

Fig.5 - Museo de America, Madrid, España
Fig.6 - Avenida Aguiar, Lisboa, Portugal (left)

Opposite page:

Fig.7 - Universidad Laboral, Gijón , España
Fig.8 - Brunete, España (below, left)
Fig.9 - Villanueva del Pardillo, España (below, right)

Fig.10 - The Biltmore Hotel, Coral Gables, Florida, USA

of the Regional general architectural theory of Raul Lino.

However, in the golden age of the Regional World, boundaries and geographical limits did not count that much. The Mediterranean culture was able to travel and come across the Atlantic to live a splendid season in the American continent. From the loosing country of the Spanish-American war to the winning one. As it happened with the defeated ancient Grece that took over the winning Roman culture.

Between 1920 and 1926, the years of the economic boom generated by the end of World War I, Florida experienced a true urbanist blooming. Thanks to the unique characters and courage of personalities such as George Merrick and Addison Mizner, new towns and cities were founded all over the State. Some of them to become worlwide icons and tourist attractions: Corals Gables, Boca Raton, Palm Beach.

If it is due to Addison Mizner the true re-invention of the Mediterranean Style that today is recognized as completely appropriate in Palm Beach, it was George Merrick to invent the largest Garden City in the world: Coral Gables. Not only did Merrick found a new Garden City with Mediterranean Gates such as “Puerta del Sol”, “Alhambra Circle”, “Granada Entrance”, but he conceived the new town as a federation of Regional villages where it is possible to find a large presence of the Mediterraean World. Still today, the skyline of Coral Gables is marked by the presence of its “centerpiece” -the Giralda Tower of the Biltmore Hotel- while the most popular public swimming pool in town is the Venetian Pool, a pool conceived as a lagoon with architectures and bridges recalling the Venetian urban environment. Two clear tributes paid to the Mediterraean reference: the Giralda Tower in Sevilla and the beautiful harmony between city and water embodied by Venice.

The golden age of the Regional World did not end with the tragedy of World War II even if the destruction of hundreds of European cities and the loss of millions people created a worldwide disaster. After the bloody conflict, in fact, the slow process of reconstruction passed through the many modernist experiments that are today reknown as slab-urbia. Nevetheless, it still possible to notice that hundreds of Spanish cities were reconstructed in a Regional way after the 1936-39 Civil War. In addition, the largest example of campus built in Europe according to the American pattern is a beautiful example of 20th century Mediterranean Architecture. It is the case of Gijon’s Universidad Laboral designed in 1945-56 by Luis Moya Blanco, Rodriguez Alonso de la Puente e Ramiro Moya. Like the Pueblo Español it is conceived as an organic Spanish Town organized around an enclosed Plaza Mayor where the main buildings are the Rectorate, the Theater and the Church. Clearly recognizable as a traditional Spanish town, the Universidad Laboral is today a famous Spanish Landmark, visited every year by hundred-thousands tourists and promoted by its 125m high campanile designed in the Mediterranean Style.

Similarly, the monumental entrance to Madrid from the La Coruña highway was designed and built in order to give the Spanish capital city a recognizable regional character. Before entering the Moncloa Plaza, the Museo de America by Moya Blanco and Javier Martinez Feduchi (1942) offers a glimpse of the Spanish traditional convent. After trespassing the Monumental Arch by Modesto Lopez Otero (1955), the large plaza that introduces to the core of the metropolis is flanked by the Military Aviation Headquarters building designed by Luis Gutierrez Soto (1940-55) with reference to the Escorial Monastery.

Fig.11 - Port Grimaud, Provence, France

opposite page:

Fig.12 - Pont Royal, Provence, France (top)
Fig.13 - Kemer, Istanbul, Turkey (centre)
Fig.14 - Pitiousa, Spetses, Greece (below)

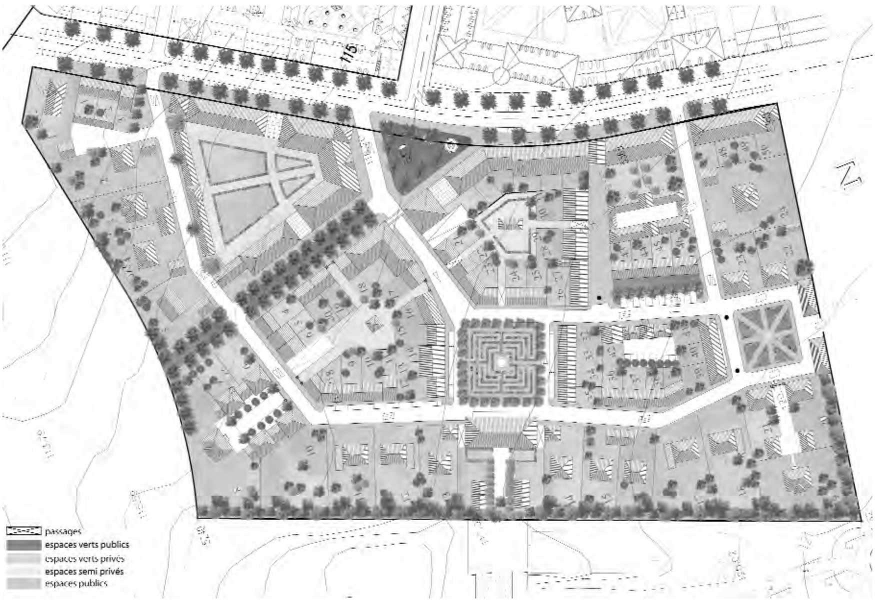
Interestingly enough, the entrance to the Portoguese capital city from the airport is marked by another monumental sequence of public spaces built according to the principles of Regional Architecture: Praça do Areero, Avenida Almirante Reis. All these plazas and avenues were designed in 1938-40 by urbanist De Groer while executed in 1940-56 by several architects such as Luis Cristino Da Silva, Cassiano Branco, Veloso dos Reis Camelo, Porfirio Pardal Monteiro who built the structure of Lisbon's main avenues too giving the city its typical Regional character: Avenida Junqueiro, Praça de Londres, Avenida Antonio Augusto de Aguiar, Avenida Sidonio Pais, Rua Marques de Fronteira.

The big development of the Regional World in the post-war period started in the the late 1960s with the foundation of the French new town of Port Grimaud. Conceived in a Provençal Style by François Spoerry, the new foundation inaugurated the renaissance of the Mediterranean age. Located in the Saint Tropez Bay, Port Grimaud rapidly become an economic success and generated a series of new foundations based upon the concept that the new town or village should respect the region and its traditional architecture. After Port Grimaud it is possible to identify a true new typology of intervention where the Regional character is a key ingredient of the economic investment. It happens in Kemer, near Istanbul with the new town center designed at the beginnings of the 1990s by Duany & Plater-Zyberk as well as in Hammamet with the new Medina designed in 2001 by Tarak Ben Miled, in Marbella in the new village of Puerto Banus as well as in the island of Spetses in the new village of Pitiousas designed in 1994 by Demetri Porphyrios.

This new concept of architectural intervention develops the idea of a profound respect of any region, by trying to extend into the new foundations the best elements of the local architectural tradition. If it is possible to state that today the entire area of the French southern coast is deeply infuenced by the Mediterranean culture with new traditional foundations in Pont Royal, Gassin, Aix-en-Provence, etc., a large presence of the new Regional culture is also the base for the development of the new town of Val d'Europe in the Ile-de-France Region. While the success of Port Grimaud has influenced the development of any tourist village since 1970, Val d'Europe represents the largest experiment of a Regional new town for 40,000 inhabitants fully equipped with social infrastructures such as a University, a Hospital, a TGV railway station and 2 regional metro-stations.

Organically designed as an Ile-de-France traditional town, Val d'Europe adopts the Regional language for its architecture in order to give the new foundation a unique character that is able to anchor citizens to the place and create a true sense of community.

In an age of accelerated globalization, the possibility to build a Regional World represents a new challenge for architects, developers, and public administrators. This new challenge offers the opportunity to extend the beautiful world of traditional European cities and villages to the new urban neighborhoods in a sense of continuity. It is not only a problem of creating an architecture truly expressing the character of the place, but primarly to build a world which respects the many differents traditions of the many different regions. An opportunity to develop local economies through craftmanship and smart light industry and contributing to limit the endless sprawl of sub-urbia through the use of the traditional concept of compact cities, towns, villages, and neighborhoods.



Figg.15,16 - New Village Center at Magny-Le-Hongre, Val d'Europe, France
designed by: Tagliaventi & Associati, Arcas Paris, Atelier Blm
for: Disney Resort Paris, Cfh

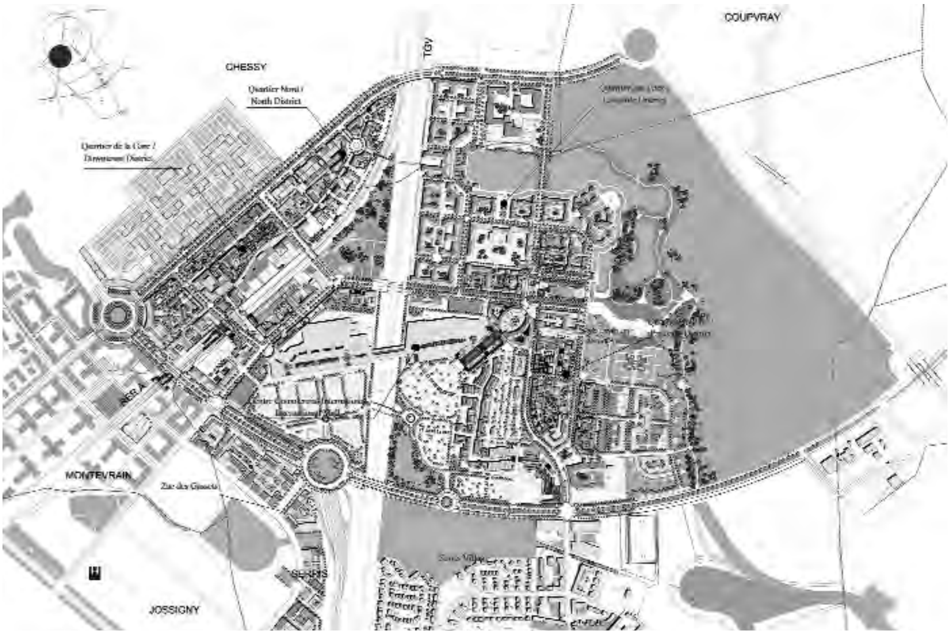


Fig.17 - Ilot Medicis, Quartier du Lac at Val d'Europe - Promogim Ile-de-France; architecture: Tagliaventi & Ass. with Arcas Paris
Fig.18 - Val d'Europe Masterplan by Disneyland Paris Imagineering with Cooper, Robertson & Partners consultant

Today, it might be useful to draw a lesson from the comparison of the contemporary situation and the one of the 1937-40 years. As it happened in 1937 at the Paris International Exhibition, the society has the chance to decide which way of development to follow between the Regional and the Global. History tells us which one of the two radically different visions prevailed in 1937: Globalization and heavy Industrialism. But History tells us too what was the result of such a victory: the 40 millions victims of World War II.

Thus, today the big chance is to make a different choice.

In 1937 the world was dominated by hard totalitarian regimes and hard industrial conglomerates pushing for war and conquest of new markets. Today the world has largely accepted the democratic way, while the push towards the conquest of new markets is still present. Consequently, the "international" or "global" way is available, as well as the Regional one. The fascinating chance today is to avoid another global dysaster by choosing the harmony of an organic Regional World.

Notes

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1. GABRIELE TAGLIAVENTI, L'Altra Modernità 1900-2000, Dogma, Savona-Milano 2000
2. v. SYLVIE ASSASSIN, Séville. L'exposition ibéro-américaine 1929-1930, Institut Français d'Architecture - Editions NORMA, Paris 1992
3. MARGARIDA ACCIAIUOLI, Exposições do Estado Novo 1934-1940, Livros Horizonte, Lisboa 1998
4. ANTOINE DE SAINT-EXUPERY, Lettera a un ostaggio, Arnoldo Mondadori Editore, Milano 1973; con traduzione di Maria Chiappelli e Sergio Morando; introduzione di Roberto Cantini; ediz. orig. Lettre à un otage, Gallimard, Paris 1944; "Quando nel dicembre 1940 ho attraversato il Portogallo per andare negli Stati Uniti, Lisbona mi è apparsa come una sorta di paradiso chiaro e triste. Vi si parlava molto di un'invasione imminente, e il Portogallo si aggrappava all'illusione della sua fortuna. Lisbona, che aveva realizzato la più bella esposizione del mondo sorrideva di un sorriso un po' pallido simile a quello delle madri che non avendo notizie di un figlio in guerra si sforzano di salvarlo con la loro fiducia: <Mio figlio è vivo perché io sorrido...>.

(...)Ma il Portogallo ignorava l'appetito del mostro. Rifiutava di credere ai cattivi presagi. Il Portogallo parlava d'arte con disperata fiducia. Si sarebbe osato massacrarlo nel suo culto dell'arte? Aveva tirato fuori tutte le sue meraviglie. Si sarebbe osato massacrarlo nelle sue meraviglie? Mostrava i suoi grandi uomini. In mancanza di un esercito, in mancanza di cannoni, aveva eretto contro la ferraglia dell'invasore tutte le sue sentinelle di pietra: i poeti, gli esploratori, i conquistadores. Tutto il passato del Portogallo, in mancanza di soldati e di cannoni, sbarrava la strada. Si sarebbe osato massacrarlo nella sua eredità di un passato grandioso?

Erravo così ogni sera con malinconia attraverso i successi di quell'esposizione di un buon gusto estremo, dove tutto sfiorava la perfezione, fino alla musica tanto discreta, scelta con tatto squisito, che fluiva sui giardini dolcemente, senza arroganza, come il semplice canto di una fontana. "

5. JEAN-BAPTISTE MINNAERT, Pierre Barbe. Architectures, Institut Français d'Architecture, Paris, Mardaga Editeur, Liège 1991; con introduzione di Bruno Foucart e Avant-propos di Maurice Culot
6. JEAN-CLAUDE VIGATO, L'architecture régionaliste. France 1890-1950, Institut Français d'Architecture-Editions NORMA, Paris 1994
7. RAUL LINO, Casas Portuguesas, Lisboa 1933
8. JOSÉ AUGUSTO FRANÇA, Lisboa: urbanismo e arquitectura, Livros Horizonte, 1997; v. anche PEDRO VIEIRA DE ALMEIDA, La nozione di "passato" nell'architettura dei decenni difficili, in "Rassegna" n. 59, Bologna 1994
9. GABRIELE TAGLIAVENTI (a cura di), Città-Giardino/Garden Cities. Gangemi Editore, Roma 1994
10. DONALD W. CURL, Mizner's Florida, The MIT Press, Cambridge MA 1984
11. MAURICE CULOT, ROBERT BEHAR, Coral Gables, AAM Editions, Bruxelles 1998

ESSAYS

C. Argiolas [1], F. Melis [2]

MATERIALS LIFE CYCLE ASSESSMENT (L.C.A.) AS AN INSTRUMENT OF A PROJECT

1.0 Introduction

The Regional Landscape Plan (Piano Paesaggistico Regionale / P.P.R.) is founded on the concept that the landscape is Sardinia's primary resource and, in that sense, it defines some parameters for the development of the territory. In that plan, the coastal zones are the most sensitive and as such the most important to protect and worth of development.
The value of the coastal landscape is also given by the urban settlement and by the characteristics of the built Architectures: one of the actions promoted by the Plan is toprevent new buildings and to award quality, through incentives to the planning stage, to the coastal areas where residential and accommodation facilities, represented by holiday homes or tourist resorts with no identity or facilities, have mainly been built.
We suppose a complete change for them even with the possibility of volumes shifting to precise urban areas. Underneath the philosophy is the possibility[3] of a sustainable tourism for a sustainable development of the territory.
The regional development though must include a global action. Not only as far as the protection of the whole territory is concerned but also seriously considering the sustainability. We need to keep in mind the environmental input and output of the activities and the subsequent consistency with a given environment. Under these assumptions we identify a research space on the constructional techniques and materials used in the buildings. The research is centred on the use of resources for their production: we need to define different items which are able to measure the sustainability of the landscape system, in other words a set of parameters which evaluate the "embodied energy".

2.0 Structuring the building process

Planning choices and Life Cycle of a product

Materials and building techniques

A planning approach is necessarily based on a preliminary definition of requisites and performance of the objects to build and it makes use of the philosophy suggested in the quality provisions (group of UNI EN ISO 9000 technical norms) which expect a planning control and a prediction on the use, obsolescence and deterioration of the final product.

The building process is made of a sequence of stages (conceiving, planning, construction and management) where different actors interact and choices are taken which can influence the following ones with some constraints.
The decision to build an external cover with cementitious materials, for example, will have an influence on the structure and similarly a steel stayed structural system will offer some advantages when taking decisions on a distributive level. Regulations linked with installation systems and energy saving strongly influence choices which are right now irremissible but heavily binding on our building plans.
As a matter of fact every planning decision is bound by available resources, among them the economic ones which award the role of protagonist to the customer who directs the work of the process manager with his requirements.
The customer's environmental sensibility opens a different attention to the planning choices and then we need to define a practical method for the control of the consequences (in terms of environment) of the single actions of the building process.
We are concentrating on the model referred to in the rules of the family UNI EN ISO 14000 (in particolar on items UNI EN ISO 14040 and following) which practically define the instruments for the Life Cycle Assessment of a product (L.C.A.): an algorithm for the identification of environmental input and output due to a production process.
L.C.A. method has been defined by the Society of Environmental Toxicology and Chemistry (SETAC) as a practical instrument which "evaluates the environmental threats associated to a product, a process or an activity, through the identification and quantification of the materials, energy needed and waste introduced in the environment.
The assessment includes the entire life cycle of the product (process or activity), from mining and working out of raw materials to the manufacture of components and further assemblage, transport and distribution, use, recycling, reuse, warehousing and final disposal. It also identifies and evaluates the opportunity to better improve the product (process or activity)".[4]
Therefore it is necessary to single out and analize the stages of the life cycle of the product and then collect the information about each one of them in a database (Life Cycle Inventory – L.C.I.), defined in the technical norm UNI EN ISO 14041.
In the technical norms we notice the objective sensibility in the choices in order to define the L.C.A., thus underlining a few critical points:
▪ the spatial limit of the system where the environmental threats due to the product are going to fall; ▪ the limitedness of the data related to the study;
▪ in other words, the reference to general data which are very often not strictly relatd to the defined territorial situation;
▪ the level of investigation of the data which can be non-omogeneous among them and therefore the need to define the limit of the study: since the method is ripetitive it is better to use more "levels of refinement";
▪ the collection of quantitative data (environmental input and output) for each stage. The input stage can be divided in resource consumption and energy consumption and, together with the output tage, it needs an eco-point-of-reference represented by the Functional Unit to make data uniform and quantitatively define an impact.

By making clear the precise aims on which the algorithm has to be defined, we get the opportunity to identify in detail the environmental costs, also those related to strictly connected planning choices. The philosophy of this rules considers the actions of the process as a cyclic sequence where you have the control and re-control of data, both aimed to a continuous improvement and opportunity to minimize the impacts for a certain product.

The analysis includes the stages of conceiving, planning, service-life[5] and waste of the product. Therefore the useful data which can be afterwords employable in the planning, necessarily include the life of the product after the function it has been planned for. We know a lot of models "from cradle to grave" which plan the use of the product for a different purpose after the end of their life in their primary function and subsequent waste. Nevertheless a criticism sometimes addressed to the LCA model is that it does not include data about specific products thus having a high level of abstraction. This limit is also due to the impossibility to collect a huge amount of information even if it uses database instruments. We usually refer to middle industry data which can be obtained from general studies and publications.[6]

3.0 Structure of the life cycle of the materials – Characteristics of data system

Products employed in the building sector (materials and building techniques) fully meet the aforesaid analysis. A model of LCA is possible for them as to fix the possibility of the product to be integrated and combined with the aim of giving life to a complicated product like a building. The model chosen for the single material could be very difficult to apply or maybe totally inefficient just because. in terms of environmental resources, it is interesting to analize the complicated product. Not to talk about the interrelations among different products which do not allow an easy management of the huge amount of data we are supposed to work with.

A partial answer has been defined by the study of a building where the techniques used for the construction are mostly homogeneous, choosing a typology represented by industrial pavilions built with reinforced concrete panels.

The study has made use of almost homogeneous existing data already defined in similar researches on concrete handmade articles and its components, with the aim to defin▪

the consumption of raw materials and energy in each stage of the process;

▪ the toxicity of the building components during the stages of the production;

▪ the assessment of environmental costs due to mainly aesthetic planning choices with more additives in the mixture;

▪ the durability and maintenance of the components in the façade and external walls;

▪ the possibility of a new use and the assessment of the recyclable fraction of the product.

3.1 Life cycle of the concrete and concrete hand-made articles

A first collection of data for inventory purposes has been done (in a repetitive process)

defining the main stages of the treee of the life cycle. Then we accomplished a refinement of the data deeply analysing in detail some general characteristics and (planning) interactions with other elements in the façade and external walls;
▪ prerequisites of a component and the entire façade and external walls;
▪ planning (making requisites clear) the façade and external walls;
▪ planning the production of the building components;
▪ role of the detailed planning aiming to the production of particular components on the basis of planning choices for the façade and external walls, thus defining also the components of the concrete mixture;
▪ requisites of the anchorage systems and joints;
▪ general maintenance algorithm considering the pathology of the materials.

The analysis has offered the opportunity to define the nature and entity of the environmental threats thus requiring a scale to compare them and define their relations. It is therefore necessary to get a Functional Unit of Reference we can relate all data to.

As we do not have all the data which are linked with the aforesaid stages (raw materials used, energy needed in the process, dusts, carbon dioxide given out), for most of them we analysed some studies already accomplished underlining the environmental impacts from a qualitative point of view.

A research carried out by the Danish Building Research Institute – Energy and Indoor Climate Division – has set out a system to store data related to concrete, structuring a very accessible database, with these fixed points:[7]
▪ the huge amount of data can be employed only if you have the possibility to make them "readable" and accessible following organized schemes;
▪ the database is structured with an interface which facilitates the approach to the problem and realized with the widely known program Microsoft Access;
▪ You have got a calculator which permits to express numerically the environmental balance with reference to a Functional Unit where every single environmental input or output is related to and give the opportunity to interpret homogeneously the reading of the processes.

The production of cement in Denmark is equal to 1.5 tons per inhabitant; the production of equivalent CO_2, related to a ton of cement, is included betwee 0.1 and 0.2 tons for a total included between 0.6 and 1.2 million tons per year, corresponding to about 1.2% on the total of CO_2 emission in the country.[8]

On the basis of these results, the Danish cement industry has pointed out that investing on the research to improve the productive process in the production of concrete is like improving and pulling down the environmental costs with interesting results also from an economical point of view. Several studies on reinforced concrete carried out in Finland since the mid-90s (with the ISO 14000 technical norm still on a planning stage) have offered the opportunity to identify the percentages of environmental threats in each phase, in relation with the total emission of carbon dioxide for the whole process, thus laying emphasis on the fact that about 10% of the emissions is due to the transport of the materials. [9]

The analyzed data which have been collected in Italy are the ones published by Buzzi-Unicem[10] and Italcementi[11], and some of them are finalizedto obtain the environmental certificate: the approach to the research from these companies has shown the process improvement has been carried into effect mainly by the settlement of new facilities to pull down the acoustic emissions and give way to a possible re-use in the cycle of some waste product of the process (water, dusts).

3.2 Results and observations

The different experiences point out how the environmental approachto the problem has seen a very slow starting phase but also the limits of the method are still quite weak: we intervene in different ways and we often re-think about the factory instead of the production process.

Nonetheless the method has appared consolidated also for the analysis of the stages of useful life and waste of the panels, also pointing out some other limits not to be attributed to it:

- no clear rules on the possibility of reconverting some waste products within the pro ductive process (New environmental regulations – DLgs 152/2006 and ex "Decreto Ronchi" – DLgs 22/1997);
- difficulties in the definition of an employment as recycling aggregates of the reinforced concrete components: uncertain regulations and research still to be developed on the structural resistance of these second raw materials, with prevailing use mostly for roadbeds;
- new opportunities offered by the regulations on structures issued in September 2005 which concentrate their attention on the cement durability and therefore on a good planning and better achievement of the components (mainly as far as the abutement stone and the pathologies of the cement imputable to it are concerned).

4.0 Qualitative buildings and sustainable development of the landscape

The environmental debate involves at different levels different institutions and personalities besides different professions. The Sardinian case introduced by the Description of the contents of the PPR (Regional Landscape Plan) is symbolic because it introduces in a very strong way the sustainable development of the territory respecting the landscape which is considered as a primary resource. Data related to the analysis on
cement say that, as far as the athmospheric emissions and the environmental input are concerned, we cannot refer to a spatially circumscribed system but we have to make use of instruments linked with wide areas. Therefore the insular territory could be a good laboratory for such a study because it meets the condition of a sufficiently wide system. Such a research based on the environmental input-output of the building components, could contribute to define the parameters for the sustainable development of the territory together with the intervention provisions pointed out by the PPR.

Even if the life cycle of architectures made with building techniques different from cement offers dissimilar environmental input-output results, they appear qualitatively

similar. The production of bricks is quite similar to the production of cement both for the use of resources and as environmental output; buildings carrying metallic and glass materials draw mainly on the use of energy in their manufacturing but they have got the advantage of being totally recyclable. Finally the use of wood in architecture offers mainly numerous uses after the end of its service life. So understanding which materials used in buildings can really draw on the environment in a heavy way is to be considered a contribution to the sustainable development of the territory.
Generally applying this algorithm to the "Mediterranean style" buildings in Costa Smeralda, or in some other places thus defining the patrimony of the coastal landscape, it is evident that the building techniques used, also for the architectures built in these last few years, are to be dated back to the 60s with very few important innovations (mainly in the fastenings and in some systemof glass covering devised from the point of view of home energy savings). No relevant innovations for the rest of building techniques: bricks, rock, white plaster, cement, wooden parts in the coverings and waterproofing together with insulation made with plastic or synthetic materials.

5.0 Planning instrument

Any planning which evaluates, also on a wide intervention scale, the option of making use of materials with low quantity of energy employed for their production (embodied energy), could take advantage of models defined by the LCA technique. Besides measuring the environmental input-output from a qualitative point of view, we have the opportunity to make use of acquired results which correlate the quantity of embodied energy per unit of reference of the product. The definition of LCA models for the different materials permits to choose among materials with different environmental costs correlating these data with the ones referred to habitat energy saving, or managing thecontrol on the building choices and subsequent production stages, also having in mind their toxicity and consequences on human health.
The environmental approach to building, main aim of LCA policy, influences the same algorithm partly changing it into a building instrument: the implementation by levels of refinement of LCI data permits to work out and store the results of the different materials and compare them in further interpretations and evaluations. Data referred to different options can be stored in the same model and the building choice is really taken by comparing them and their meeting the wanted requirements.

6.0 Conclusions

The study on concrete and the application of the LCA model on it in a previous period (research made a few years ago) had offered clear and easily understandable data on the huge possibilities of improving the product (in environmental terms) by re-thinking the productive cycle and by working out the data referred to cement producers which were available at that time.
A first application of the model to different materials has given the chance to ascertain the previous results, to correct the planning of the model and to permit a first sedimenta-

tion for the other analyzed materials either. It seemed possible to make a planning model beyond the theoretical suppositions and the difficulties met in the setting up of the cycle of the first material analyzed.
We started building that model and the first results came up in a similar way as far as the re-definition of the productive process and the opportunities of improvement are concerned. The synoptical exam of these results, still in an embryonic nature,makes us optimistic about the use of the model as a planning instrument also for the planning in detail. The model seems to be a topical subject in a wide context where we do not only consider the pulling down of the emissions of carbon dioxide as an international right but we are also aware of environmental costs of the houses not only in terms of energy saving. The idea of sustainable development of a territory and therefore the preservation of the landscape makes this kind of approach more and more necessary just because besides the emissions in the atmosphere, the input of the system concern raw materials mined from a quarry and the use of water, whereas in terms of output the demolition of the buildings let the ruins be thrown in an inert rubbish dump. Just a small part will be re-used in the life cycle of the material.
In both cases the reference system is the territory and its landscape: this is an environmental cost which is not easily quantifiable but extremely relevant.

Notes

1. Facoltà di Architettura - Università degli Studi di Cagliari
2. Facoltà di Architettura - Università degli Studi di Cagliari
3. Regione Autonoma della Sardegna - DECRETO DEL PRESIDENTE DELLA REGIONE - 7 settembre 2006, n. 82. Concetti contenuti nelle Norme Tecniche di Attuazione della Legge Regionale 25 Novembre 2004, n.8
4. R. Borlenghi, “Guida alle norme ISO 14000”, Hoepli, Milano, 2000, Pag. 111
5. Deterioration refers to the product getting old in itself, evaluating the change of the performing characteristics starting from zero time; obsolescence indicates the product getting old compared to the standards of quality and cost; durability means the capacity of the product to completely save for a long time the performing characteristics it is used for (it is therefore based on the human perception of quality changing in time); service-life, finally, is the time the product is able to preserve the property of the system (with a higher or possibly equal standard than the minimum acceptable levels). Cfr. M. D’Alessandro, “Dalla Manutenzione alla Manutenibilità: la previsione dell’obsolescenza in fase di progetto”, Franco Angeli, Milano, 1994, pag. 22
6. ATHENA™ Sustainable Materials Institute – Canada, A LCA DECISION SUPPORT TOOL FOR THE BUILDING COMMUNITY, 1998
7. Danish Building Research Institute (SBI) - Energy and Indoor Climate Division, LCA Tool for Use in the Building Industry, 1999
8. M. Glavind, Survey of environmental aspects of the Danish concrete industry, DTI Concrete Centre, 1998
9. Nordic Concrete Research – S. Vares – T. Hakkinen (Technical Research Centre of Finland), “Environmental burdens of concrete and concrete product” in “Publication” N° 21/Gennaio 1998
10. Buzzi - Unicem, “La produzione del Cemento” “La produzione del Calcestruzzo” - “Rapporto Ambiente e Sicurezza 2001”
11. Italcementi Group, “Italcementi e lo Sviluppo Sostenibile - La cementeria di Calusco d’Adda”, 2002

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QUALITY EVALUATION OF RESIDENTIAL BUILDINGS OF HISTORICAL CENTRES OF THE MEDITERRANEAN

1.0 Introduction

The revaluation of historical centres of the various Mediterranean countries is the subject of much research and thought. The reasons that push scholars and local governments to deal with such issues reside in the need to regenerate abandoned town quarters with huge potential. Numerous interventions aimed at repopulating buildings and entire districts that were slowly losing vitality. Moreover, if we are to consider the requests of residents for constantly higher standards of quality, it will be necessary to provide instruments that are able to address the requalification interventions in order to obtain the desired quality. First of all it is important to understand the potential of such buildings and how it is possible to adapt them for modern living without losing sight of the conservation of its historical heritage. In order to achieve this we must consider multiple aspects that affect various disciplines. This entails the definition of flexible and dynamic evaluation methods that are able to represent at the same time both various contexts and application typologies. The solution to the problem was approached following the representation of the building in a systematic way in order to suggest a key to the reading that links the technological components to the fundamental requirements, going beyond the limits imposed by local legislation. Various methods of measuring the items in question are thus reconciled, putting on one side objectively measurable performance and on the other the ability to meet the requirements and perceptions of the level of quality. If, the method also gives the possibility of modifying the choice of interventions on the buildings it will be possible to meet quality objectives at all levels of the scale, from the use of a single residence, to the building to the entire district. The overall level of quality will therefore be enhanced but in any case proportional to the specific objectives. Therefore, the level of quality attained or attainable for every residential unit or building will be controllable.

2.0 The theory of quality and its measurement

One of the most used terms in the promotion of a good or a service is the word “Quality.” There are many ways to intend quality and to define it. The meaning of the term has an easily describable history because it changes depending upon the environment and the



Final table for the comparison of the case studies. On the left: Palazzo Carboni-Boi
Centre: Palazzo Barrago, On the right: Palazzo Aymerich

culture. Over the years international regulations have modified the terminology and the definition of the concept bringing it into line with the realities of the moment. The first meaning of the term has been referred to the correspondence of the characteristics of the product, which we will call requisites, defined in the conception phase of the product. Subsequently a variable temporal is also introduced through the insertion of the concept of reliability and durability of the products. However the attention has to be moved from the product to the production chain with the implementation of quality systems which generally regulate the production stage of the manufactured articles.
Making explicit reference to the UNI ENs ISO 9000-2000, we can underline that “quality represents a judgment of value, based on psychological character, functional, aesthetical, economic and managerial expectations - typical of the culture that expresses them and of the relationship man, family unit and environment.”
Quality is not referred to the product and the production only anymore, but it regards the whole cycle of life of the product or service and its impact on the environment[3].
The new approach defined by Vision 2000 identifies itself with the introduction of the possible level of quality, in how much it foresees “the degree of correspondence” also in relation to the more or less expressed demands which define the “expectations” of those people who will use the product. Therefore it is related to the ability of the same to be perceived as decisive as all those psychological, functional, aesthetical or economic demands.
A further and interesting aspect to be considered is that in the case in question quality of

Tab 1	[illegible]	[illegible]	[illegible]	Prestazioni	Indicatori di Prestazione		P	[illegible]
Sistema Ambientale Edificio	Comfort	Benessere microclimatico	Esposizione	Superficie esposizione fronti principali	SE/E : SO/O : S : O	4	4	20,50
					NO/O . NE/E	2		
					N/NE . N/NO . N	1		
					N	0		
			Soleggiamento	Soleggiamento ore al giorno del fronte principale (almeno 80%)	più di 6 ore	4	4	
					tra 2 e 6 ore	2		
					meno di 2 ore	1		
					mai	0		
			Isolamento termico (invernale)	Isolamento termico pareti opache: esistenza di sistemi per l'isolamento termico e prestazioni secondo i limiti di legge	ottime, oltre lo standard	4	4	
					nessun sistema, prestazioni al limite	2		
					nessun sistema, prestazioni sotto il limite	0		
				Isolamento termico coperture: esistenza di un sistema per l'isolamento termico e prestazioni della copertura secondo lo standard normato	ottime, oltre lo standard	4	4	
					nessun sistema, prestazioni al limite	2		
					nessun sistema, prestazioni sotto il limite	0		
				Isolamento termico pareti vetrate: utilizzo di vetri e tipologia infissi	vetrocamera / infissi acusticamente isolanti	4	3	
					vetrocamera / infissi recuperati	3		
					vetri normali / infissi recuperati	1		
		Benessere luminoso	Controllo Campo visivo	distanza in m (considerare il fronte principale o effettuare la media dei punteggi per fronte)	Nessun ostacolo	4	2	10,50
					>5	2		
					<=5	0		
			Comfort Visivo	Percentuale della unità abitative (U.A.) per edificio direttamente soleggiate almeno per 2 ore in inverno	80%< U.A. =100%	4	4	
					40%< U.A.=80%	3		
					0%< U.A.=40%	0		
			Illuminazione ambienti comuni	Illuminamento medio artificiale e naturale	Ottimo	4	1	
					Buono	2		
					Scarso	1		
					Inesistente	0		
		Benessere uditivo	Isolamento acustico	Livello di trasmissione del rumore attraverso l'involucro (opaco): sistemi per l'isolamento acustico e prestazioni della copertura e delle pareti in relazione allo standard normato	ottime, oltre lo standard	4	4	15,00
					nessun sistema, prestazioni al limite	2		
					nessun sistema, prestazioni sotto il limite	0		
				Livello di trasmissione del rumore attraverso i solai intermedi e le pareti perimetrali delle u.i.: sistemi per l'isolamento acustico e prestazioni in relazione allo standard normato	ottime, oltre lo standard	4	4	
					nessun sistema, prestazioni al limite	2		
					nessun sistema, prestazioni sotto il limite	0		
				Livello di trasmissione del rumore attraverso l'involucro (trasparente): isolamento acustico di infissi e pareti vetrate	vetrocamera / infissi acusticamente isolanti	4	2	
					vetrocamera / infissi recuperati	2		
					vetri normali / infissi recuperati	0		
		Benessere psicologico	Panoramicità	Il numero maggiore di affacciamenti	Veduta panoramica	4	3	10,5
					su piazze/vie principali	3		
					vie secondarie	2		
					corti interne	0		
			Regolarità di aspetto (DEGRADO)	Stato d'uso	Ottime condizioni	4	1	
					Buone condizioni, scarso degrado	2		
					Il degrado incide sull'aspetto estetico	1		
					Pessime condizioni degrado elevato	0		
			Riservatezza	Numero degli alloggi nel condominio	<5	2	1	
					tra 5 e 10	1		
					<10	0		
				Numero degli alloggi nel pianerottolo	<3	2	2	
					3	1		
					>3	0		
	Sostenibilità ed ecocompatibilità	Sostenibilità dell'involucro	Controllo del ciclo di riuso	Recuperabilità	si	3	1	6
					no	1		
				Smontabilità	si	3	1	
					no	1		
				Smaltimento	si	3	1	
					no	1		
			Risparmio Energetico	Esiste uno studio che attesti il bilancio energetico dell'edificio e ne dimostri i risparmi?	si	3	1	
					no	1		
		Qualità dell'aria	Emissione di co2	Combustibile impiegato x riscaldamento	gasolio/elettricità	1	1	7,5
					metano	2		
					Energie rinnovabili	4		
			Presenza di radon	Presenza di strategie per il controllo o la misurazione di radon esistenza e misurazioni	si o le misurazioni sono negative	4	4	
					no, o/o le misurazioni sono positive	0		

Fig. 1 - Table for the evaluation of environmental quality

Tab 5	Esigenze	Requisiti	Requisito	Prestazioni	Indicatore di Prestazione		R	R (ER)
Sistema Tecnologico Abitazione	Sicurezza	Protez. al fuoco	Protezione propagazione incendi	Presenza di rilevatori di fumo e fiamma e di sistemi di spegnimento	si no	2 0	0	0
			Ininfiammabilità dei materiali delle unità ambientali	Utilizzo di materiali di rivestimento per le finiture interne ignifughi	si no	2 0	0	
		Protezione generica	Protezione da cadute scivolamento urti nelle unità ambientali	presenza/assenza di sistemi di protezione per le attività di pulizia, cadute da scavalcamento (presenza ed altezza dei parapetti) ecc. che riducono il rischio di incidente	ottima buona nella norma bassa	4 3 2 0	3	15
			Protezione da guasti incidenti	presenza/assenza di sistemi di protezione o materiali utilizzati nei sistemi tecnologici che riducono il rischio di incidente	ottimi nella norma inesistenti	4 2 0	2	
			Protezione elettrostatica	Gli elementi tecnici dell'impianto elettrico impediscono il contatto diretto e indiretto	si no	4 0	4	
				Il progetto dell'impianto risulta essere rispetto alla normativa vigente	si no	4 0	4	
			Innocuità	Presenza di spigoli vivi e parti taglienti	no si	2 0	2	
		Protezione da intrusioni	Protezione da intrusione di persone	Presenza di sistemi di protezione attiva (sistemi di allarme)	si no	2 1	1	4
				Presenza di sistemi di protezione passiva quali infissi antiscasso, vetri speciali, grate,	si no	4 1	1	
			Protezione da intrusione di insetti e animali nocivi	Presenza di sistemi di protezione dall'intrusione di insetti e animali nocivi	si no	2 0	2	
	Manutenzione	Affidabilità	Affidabilità	Mantenimento prestazioni impianti tecnici	>10 anni 5-10 anni <5 anni	4 2 0	2	6
				Durabilità infissi (intesa come primo step manutentivo)	>10 anni 5-10 anni <5 anni	4 2 0	2	
				Durabilità finiture (resistenza all'attrito, urti, uso ripetuto e al degrado)	>10 anni 5-10 anni <5 anni	4 2 0	2	
		Manutenzione (parti comuni)	Operatività	Pulibilità dei materiali e soluzioni architettoniche che facilitino l'uso di normali mezzi di pulizia	buona accettabile difficoltosa	4 1 0	1	8
				Porosità dei materiali utilizzata nelle pavimentazioni	no si	2 0	2	
				Lavabilità dei materiali di finitura delle pareti	buona accettabile difficoltosa	4 1 0	1	
				Lavabilità delle superfici vetrate e degli infissi	buona accettabile difficoltosa	4 2 0	4	
		Manutenzione	Manutenzione	Esistenza del manuale di manutenzione degli elementi tecnici e dei sistemi tecnologici	completo parz. Completo inesistente	4 3 0	0	4
				Esistenza del manuale d'uso contenente le informazioni specifiche sulla collocazione degli impianti, descrivendoli, rappresentandoli graficamente ed indicando le modalità di uso corretto.	completo parz. Completo inesistente	4 3 0	0	
				Possibilità di accedere agli elementi tecnici per eventuali riparazioni	buona accettabile difficoltosa	4 2 0	4	
	Dotazioni	Dotazioni	Gas di città		si no	4 1	1	23,00
			Riscaldamento	solo se autonomo	centralizzato split nessuno	4 3 0	0	
			Condizionamento	autonomo	centralizzato split nessuno	4 3 0	0	
			Elettriche	Presenza di un quadro elettrico per sezionare tutte le utenze con interruttori bipolari	si no	4 1	4	
				Suddivisione dell'impianto dell'unità abitativa in almeno due circuiti, uno destinato ai punti luce e punti presa a spina da 10A, e uno per punti	si no	4 1	4	
				presenza di almeno una presa non specificatamente destinata, in ciascuna parete dell'unità ambientale	si no	4 0	4	
				Esistenza/Assenza di un illuminazione di emergenza, nei punti strategici dell'unità, con apparecchi al dotati di batterie che entrano in funzione	si no	2 1	1	
			Telecomunicazioni	Antenna TV o Satellitare	+ prese 1 presa nessuna	2 1 0	2	
				Linea Telefonica	+ prese 1 presa nessuna	2 1 0	2	
			Impianto citofonico		videocitofono citofono no	4 2 0	2	
			Acqua	Riserva idrica	condominiale privata non presente	4 3 1	3	

Tab 6	Esigenze	Classi di Requisito	Requisito	Prestazioni	Indicatore di Prestazione	Punteggi I	F	R	LM	B	Sa	IA	n	R	R (CR)
Sistema Funzionale Spaziale Abitazione	Fruibilità	Accessibilità	Barriere architettoniche nelle unità ambientali	Accessibilità (da norma): percorsi e dislivelli e tipologia pavimentazioni	ottima 4 da norma 3 bassa 1	1	1	1	3	3	1		6	1,67	11
				Assenza interferenze arredi e strutture, gli arredi non devono costituire ostacolo al passaggio di persone che si muovono su sedia a ruote.	ottima 4 media 3 bassa 1	1	1	1	3	3	1		6	1,67	
				Praticabilità spazi d'uso: gli arredi possibili per le unità ambientali dovranno da permettere lo svolgimento delle attività previste anche da "disabili"	ottima 4 da norma 3 bassa 1	1	1	1	3	3	1		6	1,67	
				Accessibilità (da norma): dim. e tip. porte e maniglie (es: dim. e senso di apertura delle porte, pressione da esercitare per l'apertura, tip. maniglia); accessibilità ai comandi degli impianti e degli infissi.	ottima 4 da norma 3 bassa 1	3			3	3	3		4	4,00	
			Bar. arch nelle terrazze ad uso eslusivo	Accessibilità (da norma): percorsi e dislivelli e tipologia pavimentazioni	ottima 4 media 3 bassa 1	1	3	3	3	3	3		6	2,67	
		Ergonomia	Ergonomia nelle unità ambientali	Facilitare lo svolgimento delle attività previste nell'unità ambientale: tipologia mobili e attrezzature	ottima 4 media 3 bassa 1		4	4	4	4	4		5	4,00	25
				Spazi di manovra e posizionamento di attrezzature e mobili fissi per lo svolgimento delle attività previste nell'unità ambientale	ottima 4 media 3 bassa 1		4	4	4	4	1		5	3,40	
				Tipologia e posizionamento di comandi per gli impianti: Manovrabilità, presa e comodità d'uso	ottima 4 media 3 bassa 1	3	3	3	3	3	3		6	3,00	
				Tipologia e sistemi di apertura infissi e posizionamento comandi. Manovrabilità, presa e comodità d'uso	ottima 4 media 3 bassa 1							3	1	3,00	
				Comunicazione diretta con spazi aperti ad uso esclusivo	si 4 no 1							1	1	1,00	
				Illuminazione puntuale di punti strategici, es. zona lettura, piani di lavoro, o tavoli per il pranzo	si 4 no 1		4	1	4	4	1		5	2,80	
				Organizzazione e relazione tra gli spazi delle unità ambientali per ottimizzare lo svolgimento delle attività: es collegamento tra il soggiorno-pranzo e la cucina	ottima 4 media 3 bassa 1	4	4	4	3	3	4		6	3,67	
				Arredabilità degli spazi in relazione alla distribuzione delle aperture nelle pareti	ottima 4 media 3 bassa 1							1	1	1,00	
		Caratteristiche geometriche	Superfici e rapporti tra gli spazi	La superficie utile dell'abitazione deve essere proporzionata al numero di abitanti, 2 persone 80 mq/ 3 persone 95-100/ 4 persone 100/120	ottimo 4 medio 3 basso 0							4	1	4,00	20
				La superficie utile dell'unità spaziale deve rispettare il minimo previsto da norme e regolamenti (es: 14 mq letto M; 9 mq letto singolo)	> alla norma 4 da norma 3 < alla norma 0		3	3	3				3	3,00	
				Proporzioni tra gli spazi adibiti ad attività specifiche e l'abitazione	si 4 no 1							4	1	4,00	
			Dimensioni e rapporti tra i lati	La dimensione del lato minore è maggiore di: letto M=350 cm; letto S/D=200 cm; cucina=200 cm	si 4 no 1			4	1				2	2,50	
				Il rapporto tra il lato minore e quello maggiore è compreso tra: Pr,Sogg. e L. =0,50 e 0,80;	si 4 no 1			4	1				2	2,50	
				Il rapporto tra fronte arredabile e perimetro è compreso tra: K= 0,1 e 0,7, L M= 0,5 e 0,7, L= 0,6 e 0,7.	si 4 no 1			4	4				2	4,00	
		Flessibilità	Flessibilità degli spazi nelle unità ambientali	In assenza di uno spazio specificatamente destinato nell'ambiente soggiorno deve essere possibile inserire tra gli arredi una scrivania per poter utilizzare un PC.	si 4 no 1							4	1	4,00	11
				In assenza di uno spazio specificatamente destinato a letto ospiti, nell'ambiente soggiorno, prevedere la possibilità di inserire tra gli arredi un divano letto e verificarne gli spazi	si 4 no 1							4	1	4,00	
				L'ambiente cucina deve permettere la possibilità, da parte dell'utente, di disporre gli arredi in più di una configurazione (scarichi su due pareti)	si 4 no 1			1					1	1,00	
				Gli arredi dell'ambiente cucina sono smontabili o spostabili (evitare a tal fine gli elementi in muratura)	si 4 no 0			0					1	0,00	
				Gli ambienti letto devono permettere la possibilità, da parte dell'utente, di disporre gli arredi in più di una configurazione. Nella camera matrimoniale possibilità di inserire una culla.	si 4 no 1				1				1	1,00	
				Gli ambienti letto sono separati da pareti in cartongesso con pavimento continuo sotto le stesse	si 4 no 1				1				1	1,00	
		Comunicazione	Ricreazione, intrattenimento gioco	Spazi adeguati per svolgere le attività ludiche e ricreative. Esempio: l'ambiente soggiorno deve poter contenere poltrone o divani dove sia possibile ricevere ed intrattenere	ottimo 4 medio 2 basso 1						2		1	2	2

Fig.2 (opposite page) - Table for the evaluation of technological quality
Fig.3 - Table for the evaluation of functional spatial quality

the new definitions is tightly connected to the performance of the subject building in its entirety without intervening in the production chain.
Quality will be defined by the objective characteristics of the good that must answer however to a minimum requisite laid down in legislation and by the level of satisfaction of the consumers who determine its value.
If we refer to the occupiers of the residential buildings we can affirm that in general the solutions asked for are not always those that are technologically advanced but those that conform to the cultural and economic situations. It is not said that a residence completely developed according to the rules of home automation is perceived by the inhabitant as the best solution, rather it could be considered absolutely inadequate for the target and not qualitatively valid.
If in particular we are interested in the restoration of the historical centre we can't ignore such matters because quality is a factor that can act as economic indicators for the evaluation of the residence, because it helps us to promote living in buildings, which with opportune changes can fulfil the requirements of our century.
To be able to speak of quality it is necessary to know how to define it and to distinguish and identify its causes and its value. Only with such a premise will we be able to measure the quality of the product subsequently operating with methodologies of evaluation and objective measurements which can be compared to the expectations of the consumers.

3.0 Base criteria for the definition of the methodology

The evaluation of quality in the residence has to consider multiple aspects that interest different disciplines: humanistic, technical and economic. The objective of every method of evaluation must be such as to find some objective criteria that correspond to the appreciation of itself.
On the other hand the methods of evaluation of quality, that have and have had a wide enough application overseas, involve in the majority of cases quite complex mechanisms of evaluation. If we want the method to be objective and open, that is applicable to a field of not pre-arranged solutions, we must refer to the performance theory, focusing the attention on the performance level methods of control of the object. In the specific case this is translated in the demands analysis of the lodging in relationship to the necessities of physiological and psychological character of the people who live in the historical centre of similar cities that look onto the Mediterranean.
If this is a basic criterion in the formulation of a method it is however necessary to recognize that some difficulties exist in its generalized application, whose priority aspects are:
- the evaluation of quality of an intervention is applied in the phases following its definition, but the instrumentation of performance control isn't always able to reliably appraise the levels of quality in the work on the basis of the project data or the data of the control of the performance of the components;
- the quality control instrumentation is insufficient in some cases; the testing methods are

not standardized, and the degree of reliability hasn't been verified sufficiently. Besides this, in some cases it is excessively onerous from the point of view of the required scientific-technical competences in demand and of the necessary instrumentation. On the other hand the control of the materials and manufactured articles, of their characteristics and ownership, which is a simpler check and therefore applied generally, can be a verification tool of the performances as a whole or as an only component in the circle of an experimental construction practice, for which the formalities of installation and use of the products themselves are known;

- finally the performance control is applicable for aspects of quality in a distinct way, while the judgment concerns the technical solution in its whole and therefore it is necessary to operate some syntheses through a choice of priority and diversified values among the different aspects.

A way to try to resolve the problems that can be verified is to move the judgment of quality to the very end, or privileging quality of the whole rather than of the single component, therefore in a certain sense "ignoring" the products that compose the requisite that is being analyzed, and only appraising if overall they satisfy their function.

This is an aspect contemplated in the performance requirement regulations, that establishes a narrow relationship among the performances of a building material and the demands of the use to which it is destined. It determines the building quality through the control of the behaviour, which establishes what is required by the building object without entering into the worth of how it is realized. The demands are seen as the expression of the needs and the expectations of the user of the building, keeping in mind the restrictions and the conditionings set by the context. They are individualized through the analysis of the needs to be satisfied, compared with factors such as legislation, environmental, cultural and economic.

The requisites, transposition at a technical level of the requirements, are individualized through the requirements of the demands, defining the spatial and technological parameters that describe the "ideal" environment in which to develop the activities of the daily way of living. From the analytical and operational transformation of the requisite we can define the performance of the system or the component. Even if the end user doesn't have to understand perfectly the formalities of the construction or planning of his/her property, whoever appraises its qualities cannot put aside the elements and considerations which are based on the technical disciplines. Thanks to these tools quality must become a conscious and transparent element in the relationship between citizens as consumers and the residential construction industry.

Then to proceed in the apparently more simplified direction: that which is of greater ease of understanding and reading even for those who are not professionally trained, and therefore from the end user of the product, that is he who has purchased or who will live in the building. This means entering as little as possible into the technical specifications of a component, which must have been previously valued and certified in the industrial production phase, through rigorous and complex controls in the laboratory. And to measure the performance furnished by the whole system of components instead.

3.1 The methodology of evaluation

The methodology that we describe is based on the principles of which we have spoken and is established to give an evaluation of the building and the private residence allowing the grading of the qualitative level, made easily legible through the assignment of a letter of the alphabet that renders explicit the classification it belongs to.
The approach has been to think about the building in systemic way finding a key of reading that relates to the technological components through the fundamental requirements linked to aspects related to the safety, to the comfort, to the usage, to the sustainability and the management and maintenance of the accommodation. In this way the building unit will be expressed according to its properties that can be defined and numerically valued.
The system to be analyzed is so complex that it requires simplification. In fact in the case of residential buildings a number of variables come into play, which are often interconnected among those that belong to different requirements, and vice versa several characteristics can be interested in a single requirement. For this reason an order and a classification of the demands considering the building as a collection of many systems was created, each of which characterised by behaviour or subject.
Following such criterion the study analyzes the residence and the building separately dividing it in three fundamental systems that represent some great requirement groups: Environmental, Technological and Functional-spatial. For every system the fundamental demands have been individualized, converted in requisites and in possible degrees of performance, objectively and qualitatively appraisable according to pre-arranged scale.
In the environmental system the identified fundamental demands are related to comfort, to sustainability and to eco-compatibility. Such demands are translated into requirement classes that represent the whole of all the characteristics able to satisfy a specific aspect of the requirement. For instance the microclimate, auditory, illumination and psychological well-being are the classes that have with them the elements able to satisfy the demands for comfort. But microclimate comfort is achieved by the concomitance of various events or conditions including the minimum hours of sunlight, the ventilation of the environmental units, the health of the walls, the inside temperature of the environments in summer and in winter. Such requisites can be connected tightly to one or more performance. For instance, in the case of acoustic comfort we must assess if in the environment more favourable conditions exist related to the issue, transmission and reception of sounds, so that in residential cases, the consumer will not be disturbed by external noise, will be able to converse without background noises disturbing the listener and will be able to correctly listen to desired sounds without disturbing neighbouring units. All of this is translated at a methodological level in the evaluations of performance that identify single aspects, for instance the acoustic performance through the horizontal and vertical structures, the verification of acoustic reflection of the finishing materials, the analysis of the level of transmission of noise through walls, windows and the adjacent housing units. The evaluation is done by introducing some numerical or qualitative values to which a score is assigned. (Example fig.1 tab1 b)

Valutazione qualità

Edificio	Sistema Ambientale	
	Sistema Tecnolocico	
	Sistema Funzionale spaziale	
	classe C	**51%**
Abitazione	Sistema Ambientale	
	Sistema Tecnolocico	
	Sistema Funzionale spaziale	
	classe B	**75%**

		Carboni Boi		Barrago ES		Barrago PR		Aymerich PR	
	Quota % sistema	Punteggio Sistema	Valutazione Sistema	Punteggio Sistema	Valutazione Sistema	Punteggio Sistema	Valutazione Sistema	Punteggio Sistema	Valutazione Sistema
Tab 4 **Sistema Ambientale Abitazione**	**30%**	**68,74** max 100	**20,62%**	**62,23** max 100	**15,56%**	**62,23** max 100	**15,56%**	**84,54** max 100	**21,13%**
Tab 5 **Sistema Tecnologico Abitazione**	**30%**	**73,00** max 100	**21,90%**	**60,00** max 100	**15,00%**	**60,00** max 100	**15,00%**	**92,00** max 100	**23,00%**
Tab 6 **Sistema Funzionale Spaziale Abitazione**	**40%**	**80,51** max 100	**32,20%**	**68,53** max 100	**17,13%**	**68,53** max 100	**17,13%**	**78,25** max 100	**19,56%**
Valutazione della Qualità della residenza =			75%		59%		64%		79%

Fig. 4 - Final table for the classification of quality; Fig. 5 - Images from the case studies

In the technological system of the residence we have inserted all the aspects related to safety, to maintenance and equipment. The classes of requirements associated with safety, valid for residences and buildings, are related to fire protection, generically intended as systems of active and passive protection and ultimately as protection from intrusions. The reliability, the maintenance and the operation of the fittings of the building and the residence are considered in the overall maintenance, making specific reference to the life time of the performance of the technical elements such as coverings, façade elements, fixtures and technological elements including private and communal systems, bearing in mind the presence and the effectiveness of the maintenance manual and the cleaning of

the materials. The characteristics of the communal fittings and those typically residential are considered in the allocation of the building.
In the spatial functional system the demands are analyzed relating to the usability of both communal and private spaces and to the possible communication between the two. To this end, all the elements able to resolve such demands have been identified, as in the specific case related to the accessibility of the environments for those people who have reduced motorbility, the ergonomics for the correct carrying out of the activities that need to be developed, the furnishing of the environmental units and the ergonomic characteristics of the finishing of the fixtures and fittings, of the doors, the identification of the paths, the relationship between the environments and their geometric characteristics as well as of the flexibility of the spaces in relationship to their use and their planimetric positions. (Example Image TAB5 B Fig.2 and TAB6 B Fig.3)
For every single system there are some calculations charts that allow the determination of the judgments on the requisite through an express score in hundredths of a unit. A partial evaluation of the single systems is performed in which the values are reached through the assignment of a score that will always be expressed in hundredths both for the residence and the building as a whole.
To simplify the use of the methodology, the use of a spreadsheet is foreseen that after the assignment of all the scores in the charts elaborates an algorithm studied to reach the partial evaluation (single systems) and the final one. The final evaluation is separate for building and residence. To such end a specific chart has been devised in which the values of the single systems are reported and where the percentage quotas are defined according to the importance of every single system, subsequently the score is proportionally compared to each value (we find the chart in the case study).
The method respects the dynamism required by the qualitative analysis of a system; in fact the grade and the final value depend on the importance and on the weight that every system, in its entirety, bears in the definition of the qualitative level.
As a result, the following classification has been established in relation to the value found.
Class A = from 90% to 100%
Class B = from 70% to 90%
Class C = from 30% to 70%
Class D = from 10% to 30%
Class E = from 0% to 30%
The methodology has been applied to different case studies that show their potential in different situations. This technique of evaluation gives in fact the possibility to intervene both in the control phase (post-work) and in the planning phase, indicating and defining the possible qualitative values of the projected choices (Figure 4).

3.2 Application to the historical district of Castello (Cagliari)

The methodology has been applied examining three historical buildings in the historical district of Castello, the most ancient of the four districts that compose the historical cen-

tre of the city of Cagliari. In it, it is possible to find a lot of the intrinsic characteristics that characterize the Italian and European historical centres that face onto the Mediterranean. Among the aspects that unite such centres is the inevitable exodus of the population and of the commercial activities toward the zones of expansion of the cities; emphasizing the obsolescence of the buildings of the historical centre.
The choice of the buildings to study has not been accidental but has been the result of an accurate analysis completed in order to have a diversification and consequently an immediate verification of the methodology used, in fact they possesses all the necessary characteristics for the evaluation of quality of the historical centre, but at the same time introduce substantial differences that allow the evidencing of specific aspects which influence quality, causing it to increase or to decrease considerably.
Carboni-Boi Palace has been restored recently, with interventions concerning above all the façade, this factor together with the notable architectural merit and its important planimetric position are the reasons behind the choice, in fact the desire was to analyze a building that not only introduces notable qualities from the historical point of view, but also under the aesthetical and functional profile. This building is the application example of the methodology in the case where an intervention must be appraised after it has been carried out. The application of the methodology to the project definitions took place on the Aymerich building where a new building will rise from the ashes of the old one; while the Barrago building has been analyzed for the case in which interventions take place on communal parts with elements that will modify their typology (Figure 5).
The result of the application to the case studies shows the great potential for use of the buildings in the historical centres provided that one proceeds to a rigorous restructuring in relation to the technical and technological systems, which bear notably on the perception of quality determining the degree of comfort. The value that is obtained is influenced notably from the positioning of the housing unit inside the building, and in the same apartment of the spatial distribution of the environmental units (figure 6). All of this is also involved in the definition of the values of spatial functional quality, with notable differences among real estate units restructured to their inside, in which a new planimetric setting is able to satisfy the demands of the consumers of our century.

Notes

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3. The demands can include aspects such as: performance, facility of use, trustworthiness (availability, reliability, maintainability), safety, environment, economic and aesthetical aspects. ..... The obtainment of a satisfactory quality involves all the phases of the circle of the quality in its entirety". ISO 8402 Regulation "Quality management – terms and definitions" amended 1994.

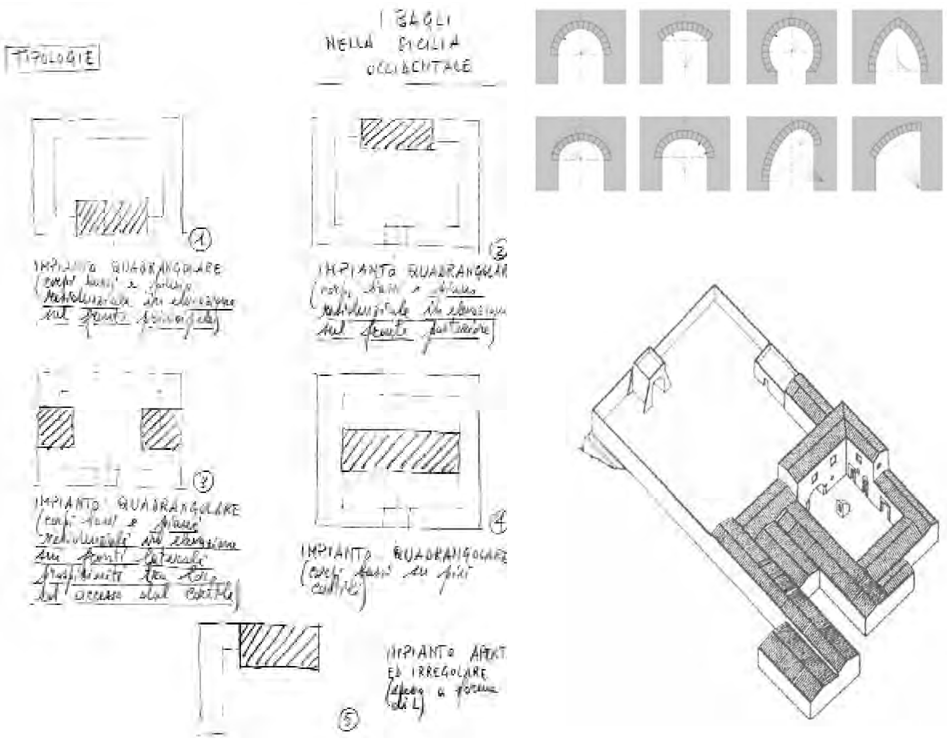


Fig. 1 - Types of portal and arch used in bagli (left) (source: website http://www.scoprimarsala.it/bagli/, January 26, 2007). Axonometric view of Baglio Rinazzo in Marsala (center) (source: CORRAO Rossella, Dal Baglio rurale alle fattorie vinicole dell'Ottocento. Vicende dello Stabilimento Hopps di Mazara del Vallo, Arti Grafiche Giordano, Palermo, September 1999). Typical baglio layouts found in western Sicily (right)

Fig. 2 - View of the tree-lined drive leading to a baglio, and a typical entrance (source: web site http://www.scoprimarsala.it/bagli/, January 26, 2007)

F. Astrua [1], E. Genna [2]

ARCHITECTURE AND HUMAN SETTLEMENTS IN THE MEDITERRANEAN BASIN: TYPOLOGICAL RELATIONSHIPS BETWEEN THE "BAGLI" OF WESTERN SICILY AND THE MOZABITE HOUSES OF ALGERIA. THE "BAGLI"

part I

1.0 Introduction

Since time immemorial, the Mediterranean basin has been a crossroads of many different peoples, cultures and ways of life. Its shores breathe a distinctiveness that stands at the foundations of contemporary society's values. It is a distinctiveness that is also – and most forcibly – expressed in the ways people live, work, and come together. It is an area where we find innumerable urban spaces that can be seen and interpreted as "systems of places", "concatenations of spaces", "sequences of identities"[3].
Our intention here is to discuss one aspect of this distinctiveness: Sicily's *bagli*, fortified farm- or manor houses unique to the island. This, however, must be seen as the first and introductory section of a more overarching attempt (which also includes a second article by the same authors, *Architecture and human settlements in the Mediterranean basin: typological relationships between the "bagli" of Western Sicily and the Mozabite houses of Algeria. The houses of the M'Zab Valley (part II)*) to identify the links between the *bagli* and Mozabite dwellings. The latter will be analyzed in the second section, which will conclude with a number of general considerations that will endeavor to place the two building types in a common perspective.

2.0 Mediterranean architecture: a few general features

Today and historically, Mediterranean architecture revolves around two nerve centers: the sea (*water is the backdrop that stretches behind each idea of a building and gives it its scale and perspective, and the horizon is the non-limit to the picture thus formed*[4]) and the sun, with all of the questions of lighting, heat and humidity control associated with it. These two factors, along with the economic and productive system, are the chief determinants behind the architecture and clustering patterns we find in the settlements and production centers lying outside and beyond highly populated urban areas. As for the spatial layout of Sicily's rural architecture, many authors are confident that its origins, reminiscent of the courtyard houses of ancient Rome, are to be found in the building types of the countries ringing the Mediterranean, the areas of

Islamic culture where climate conditions and the entire economic, social and religious context have ensured their continued existence and survival. Nevertheless, the fact that it has an internal court makes us suspect that the courtyard-type building (at least in the case of single-family dwellings or blocks of houses inhabited by related families) derives from the practice of erecting a wall to enclose the plot on which individual dwellings – built piecemeal or all at once – were grouped facing a common center.
In Sicily, many of the place names in the countryside have Islamic roots, as does the *closed form of the houses, the use of innovative technologies in agriculture, the introduction of innovative horticultural and fruit-growing techniques that gave rise to the citrus "gardens" surrounding the farmhouses that are not so very dissimilar to the sprawling Roman "masserie" or the Byzantine "konai". Set into rocky outcroppings, perched on hilltops or overlooking the sea, the farmsteads are "presences" that mirror an ideal "pattern" shifting back and forth between "inside: home and work" and "outside: collective space" in constructing a conceptual "architectural margin" which blurs the boundaries between the urban system and the rural system, betwixt the city as the center of trade and markets and the country as the center of agricultural production and farming*[5].

3.0 Symbiosis between city and landscape in Sicily

This dichotomy, this polar contrast and opposition between city and country, arose with the Greek *polis* and widened with the Roman *urbs*. And yet, much of the distinctiveness of how live is lived around the Mediterranean hinges on a perceived continuum between urban and rural.
In certain parts of Sicily, as indeed in other rural or mountainous areas of Italy (as, for example, the steeply terraced slopes where *Carema* winegrapes are grown at the mouth of the Val d'Aosta) *we still find images, designs, textures, colors and geometries that man has created to make the best, most rational possible use of the cultivable soil, like the hills with their shelved terraces shored up by mortarless walls of local stone that follow the lay of the land, and the other, more rigid geometries of the citrus orchards and vineyards that grow atop these terraces*[5].
The buildings, be they in the urban clusters or the countryside, likewise follow the lay of the land they stand on, clinging to the slopes, bridging the inclines and striking root in the rocks: Sicily is dotted with the signs man's hand has made, like notes in a musical score in accord with the landscape around them.
In this boundless repertory of rural architectural wisdom, whose basics, with their bucolic marriage of form and function, are repeated again and again, uninterruptedly, we can descry certain key features – recognizable; catalogable – in the infinite series of *bagli* that, varied as they may be, nevertheless *draw on the same vocabulary*, the *masseria* (heir in form to the Mycenaean courtyard building); the tower, standing alone or rising in the buildings' midst, square, rectangular or round.

4.0 Architectural and typological characteristics of the "baglio"

The term *baglio* comes from the Arabic *bahal*: small stone fortresses in the heart of a vine-clad countryside or surrounded by seemingly endless acres of age-old olive groves. Once the country seats of the old land-holding aristocracy, many have now been preserved and restored under the patronage of local administrations, becoming hotels, villas, museums. Motivated largely by a desire to tap Sicily's venerable traditions of hospitality, these conversions have also drawn impetus from the buildings' unique character and undeniable architectural merits.

Some scholars see the origins of these constructions in the *villae rusticae* of Republican and Imperial Rome, widespread in Rome's *provinciae*, of which Sicily was one of the first to be established. Historically, most were built in the seventeenth and eighteenth century, though some date from the beginning of the second millenium.

These construction are a unique feature of the countryside in western Sicily: buildings surrounded by thick walls, many still in an advanced state of decay. The typical center of these old farmhouses is the courtyard, and "arranged around it are the buildings housing the grape press and the olive press, the wine cellar and the oil cellar, the granary, the hay loft, and so forth: a hub of activity based chiefly on stock raising and the products of the soil"[6] (fig. 1).

The *baglio* springs from particular and essential relationships between man and countryside, between work and the dwelling-place, that are intimately connected with the spirit of place we find here, blending the needs of farming with those of defence. Almost systematically, *bagli* were built near freshwater springs, in a dominant position at the highest point of the property, where they were easy to keep an eye on the estate and the farm workers at their toil (fig. 2).

Certain *bagli* may also have grown up around an earlier tower at a given site, or even simply a sheepfold or a barn. Most have a choreographic impact all their own, with a tree-lined drive leading up the entrance on the main elevation. The structure's defensive structure is clear at first glance: a single point of entry, in the form of a large, massively constructed portal, flanked in most cases by loopholes (to strike at the enemy at the gate); high walls; few outward-looking windows, and those small and guarded by thick iron bars.

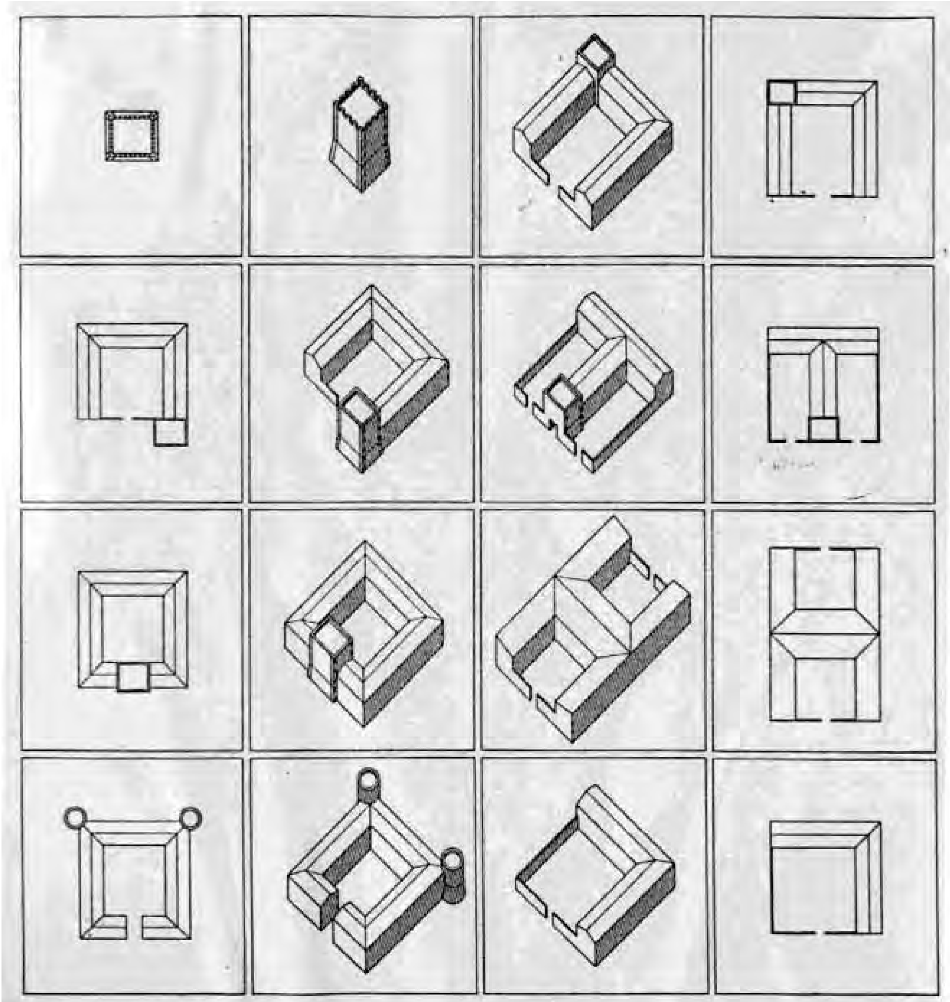
In their essentials, *bagli* can be classified on the basis of their groundplan and layout as follows:

1. *Baglio* with four-sided layout delimited by low structures, with first-floor living quarters at the front (examples include *Baglio Spanò, Baglio Musciuleo, and Baglio Pulani*). In general, these types tend to have a single courtyard.

2. *Baglio* with four-sided layout delimited by low structures, with first-floor living quarters at the rear (examples include *Baglio Alfaraggio* and *Baglio Logonuovo*). They generally have a single courtyard.

3. *Baglio* with four-sided layout delimited by low structures, with first-floor living quarters at both sides, facing each other and accessed from the courtyard (e.g., *Baglio Anca*). Like the others, this type generally has a single courtyard.

4. *Baglio* with four-sided layout delimited by low structures and featuring two or more



courtyards (as in the case of *Baglio Rinazzo* and *Baglio Nuccio*). There are usually two courtyards.
5. *Baglio* with open, irregular layout, in most cases L-shaped (fig. 3).
Thus, the complex is generally arranged around a large central space bounded by buildings and called a *bagghiu*, or courtyard. This quadrilateral form allowed work to go on inside, regardless of whatever might be happening outside the walls. The larger *bagli*, moreover, might have two courtyards: one for the owner's family, and another for the farm laborers and their work.

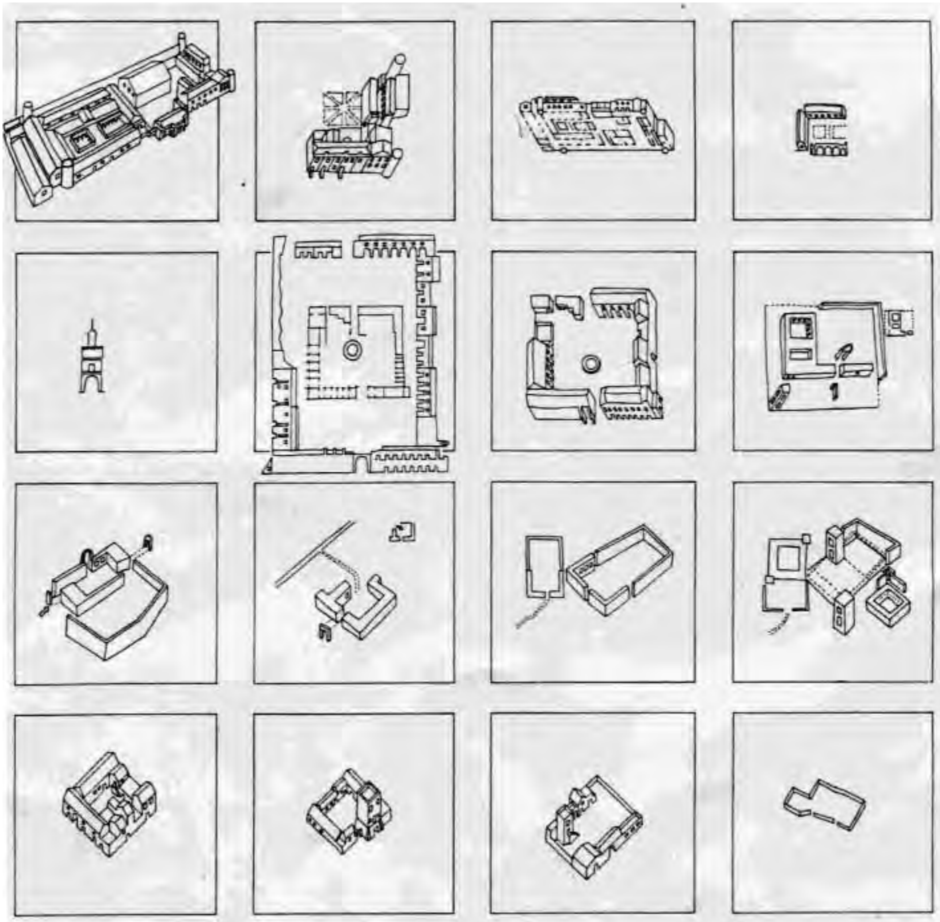


Fig. 3 – From the tower to the baglio (source: web site http://62.77.63.182/isn_liceomeli_it/htm/torre-baglio.htm, January 30, 2007)

4.1 Construction and materials of Marsala's bagli

In addition to its *bagli* with traditional layouts, Marsala also has *bagli* featuring an "open" structure, or in other words without the typical central courtyard, and complexes commonly known as *bagli di case*. Whereas the *baglio di case*, consisting of a group of houses belonging to different owners and arranged so as to form a closed structure around the *chiano* or courtyard, continues to serve a defensive function, the open *bagli* have lost that function entirely and, unlike the others, were built and continue to be found today only in the territories once occupied by the great landed estates.

It is likely that this is the final stage of the *baglio*'s evolution, when it had already lost

one of its two major functions – defence – but still retained its other distinguishing role, that of an agricultural unit. Even the latter function, however, was to be lost towards the end of the nineteenth century, when the growth of Marsala's wine industry radically changed the nature of the countryside, as the wheat fields that had always blanketed the great landed estates were plowed up and replaced with vineyards. This, then, was the period when the baglio form came to the end of its life cycle and was abandoned.
In addition to the classification by layout indicated above, *bagli* can be further broken down on the basis of their functional and distributive characteristics:

1) Open irregular layout with low structures:
Baglio (B.) Falconiera, *B. del Tappeto* in the Contrada (or district) of Conca, *B. Mamuna*, *B. Nasco*, *B. Tonnara* at San Todaro, in Contrada Altavilla.

2) First-floor living quarters over the main entrance:
Baglio Woodhouse in Contrada Baronazzo Amafi, *B. Montalto* in Contrada Berbaro, *B. Buttagana Nova*, *B. Spanò* in Contrada Canale, *B. Capofeto* in Contrada Capofeto, *B. Chitarra*, *B. Padonello* in Contrada Ciavolo, *B. 'Ntunnu* in Contrada Florio, *B. Catalano* in Contrada Genedolfo, *B. Ribici* in Contrada Granatello, *B. Bufalata*, *B. Oliva* in Contrada Madonna dell'Alto Oliva, *B. Musciuleo*, *B. Perino Maletta*, *B. Manzo* in Contrada Selvaggi, *B. Spanò* (*Balata*) in Contrada Zizza. (fig. 4)

3) First-floor living quarters at the rear:
Baglio Alfaraggio, *B. Buscami* in Contrada Berbarello, *B. Chiusanova* in Contrada Bufalata, *B. Logonovo* in Contrada Ciavolo, *Baglio Oneto* in Contrada Conca, *B. Cozzogrande*, *B. Granatello* in Contrada Dara, *B. d'Anna* in Contrada Fiumara San Onofrio, *B. Cavarretta* in Contrada Madonna Cava Bufalata, *B. Grignani-Montagnesi* in Contrada Mandriglie, *B. Lipari* in Contrada Pecorume, *B. Pellegrino* in the contrada of the same name, *B. Inferno* in Contrada Perino, *B. Perino Spanò Sala* in Contrada Rassallemi, *B. Sparta* in Contrada Stazzone, *B. Milazzo* in Contrada Torreggiano, *B. Villapetrosa* in Contrada Ventrischi, *B. Aglio* in Contrada Zizza. (fig. 5)

4) First-floor living quarters at two sides:
B. Berbaro in the contrada of the same name, *B. Sala* in Contrada Canale, *B. Alagna* in Contrada Casazze, *B. Grillo* in Contrada Colombaie Lasagna, *B. Anca Omodei* in Contrada Conca, *B. Messinello* in Contrada Mesinello, *B. Roccazzello* in the contrada of the same name, *B. Ciavolo* in Contrada Scacciaiazzo, *B. Spanò* in Contrada Spagnola, *B. Zuccotto* in Contrada Torreggiano.

5) Multiple courtyard layout:
Baglio Genna in Contrada Biesina, *B. Sceccu d'Oro* in Contrada Florio, *B. Rinazzo* in the contrada of the same name, *B. Nuccio* in Contrada Selvaggi.

6) Baglio – castle – fortress
B. Piana Albania in Contrada Birgi Novi, *B. Digerbato*[7] in Contrada Digerbato.

*Fig. 4 - **Baglio Woodhouse.** Now falling into ruin, the baglio still bears the name of the family that built it. The complex once stood at the center of an estate covering nearly fifteen hectares or 37 acres, entirely surrounded by a dry-stone wall, several sections of which are still in fairly good condition today. The main house consists of eleven ground-floor rooms and the same number on the first floor reached via two staircases. Over the centuries, the property has been divided many times over, the main reason for the dilapidated condition we find it in today. A shell of its former self, the baglio now stands roofless; whole sections of wall collapsed; its doorframes and windows gone. And yet, derelict as it is, the baglio's architectural style is still clear: eminently a part of its surroundings but bespeaking the English origins of its founder, Woodhouse. The baglio sits on the broad coastal shelf that encompasses most of the contrade, or districts, in Marsala's uplands, and consists of calcarenites deposited on top of the Pleistocene Trubi Formation of deep marine chalks. On the same heights and not far as the crow flies, several other interesting bagli are to be found: Oneto and Anca to the south, Musciuleo and Sceccu d'Oro to the north, Catalano and Perino-Spanò to the northeast. An extensive outcropping of calcarenite rock known as "Le Scarie" can be seen as the visitor exits from the main gate and goes down the drive that leads directly to the entrance of the baglio. (source: CORRAO Rossella, Dal Baglio rurale alle fattorie vinicole dell'Ottocento. Vicende dello Stabilimento Hopps di Mazara del Vallo, Arti Grafiche Giordano, Palermo, September 1999; web site http://www.scoprimarsala.it/bagli/, January 26, 2007)*

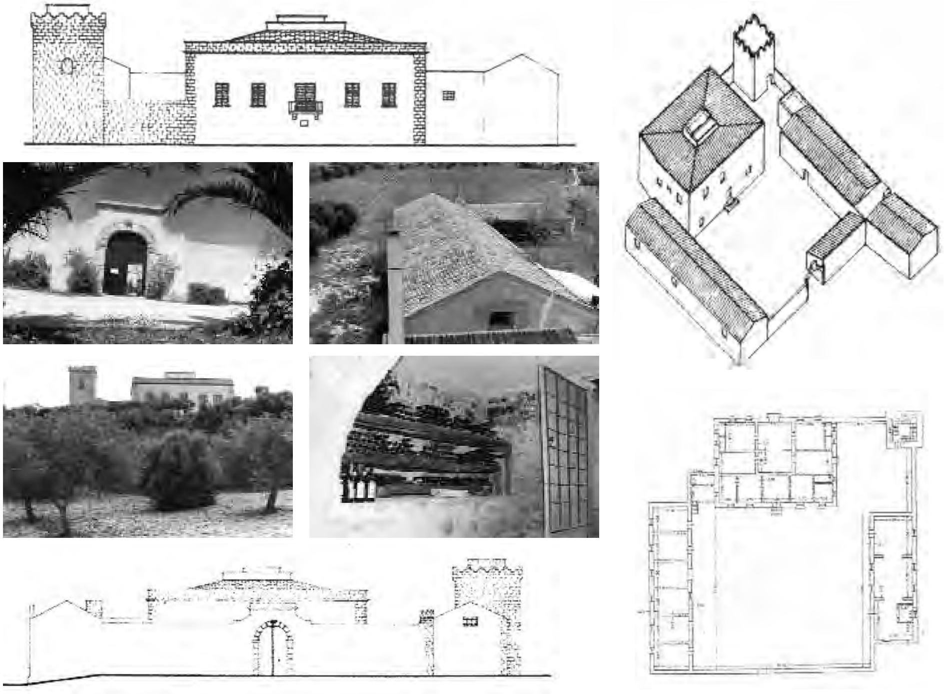


*Fig. 5 - **Baglio Oneto.** Baglio Oneto is located around 12 kilometers from Marsala, at the rim of a plateau that stretches from Contrada Bufalata towards Contrada Amafi. Its position dominates the Fossa Dara valley, the entire Stagnone di Marsala basin and the islands in it. The baglio is reached by the Santi Filippo e Giacomo road, after passing the cluster of houses making up the contrada of the same name; to the right runs a stone wall, former boundary of the estate, flanked by a lane that leads to the baglio after approximately 400 meters. The main entrance consists of a portal that opens onto the inner courtyard. The sizable complex was built in the eighteenth century. It was owned by the Oneto family, originally of Palermo and later allied by marriage with the Spanò,-Caracciolo, whose arms are frescoed at the center of the vaulted ceiling of the entrance hall. Architecturally, it is typical of the eighteenth century baglio, with buildings ranging around the entire perimeter with the exception of the entrance side, where the portal stands at the center of a wall over three meters high. The tower, in excellent condition and occupied by the owner, rises among the perimetral buildings.*
The complex is dominated by the main hall, a massively constructed square block that stands out from the other buildings and occupies part of the central court, which is thus C-shaped. Recently restored, the baglio of the Princes of San Lorenzo continues the winemaking tradition begun by the Oneto family in the eighteenth century, its vineyards producing some of Sicily's most notable vintages. The historic cellars where the wines are aged and the "Segreta" where the reserves are stored are part of what is now the Resort Baglio Oneto: the region's first example of luxury wine tourism, run by the well-known hotel chain Fra mon.
(source of plan, elevations and axonometric view: CORRAO Rossella, Dal Baglio rurale alle fattorie vinicole dell'Ottocento. Vicende dello Stabilimento Hopps di Mazara del Vallo, *Arti Grafiche Giordano, Palermo, September 1999; photos sources: web sites*
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http://www.baglio-oneto.com/frame.html, January 29, 2007)

The *bagli*, then, are "islands", fortress-like on the outside and featuring an interior layout with a large central space rimmed by buildings arranged to form a quadrangle.
Either inside or outside the courtyard, but always near the main entrance, a chapel enabled the area's inhabitants to attend mass and receive the sacraments, bolstering the estate's role and influence as a local center. The courtyard invariably had a well, a cistern where rainwater was collected, a watering trough for the livestock, and the *pila*, a stone basin where the women would wash clothes. This central space was ringed by all of the *baglio*'s living quarters and storerooms: in most cases, it is covered with large paving stones, called *cuti*, hewn from hard rock and forming a checkerboard pattern over the entire surface.
From the main entrance, a vaulted passageway led to the courtyard. The main block of the *baglio* was the owner's quarters, where the landholder and his family would reside in the summer months. Standing above the other, lower, buildings, and adorned with larger windows, balconies and terraces, this block's prominence, and its more lavish decoration and construction, denoted its high status. The storehouses and other buildings adjacent to the master's quarters were often floored, plastered and provided with large sunken bins for storing grain. A large area was used to store tools and farm wagons, while the remaining buildings were living and sleeping quarters for the laborers and domestics. Another extensive area of the complex was occupied by the stables and cowsheds. The land itself supplied the construction materials and encouraged their use: the masonry walls of the various buildings consist of rubble and blocks of local tuff bound with a mortar of lime and sand. Building materials were quarried at the site, removing the layer of topsoil and cutting the underlying tuff into blocks. The small pits that remained were roofed over and used as rabbit hutches, or filled in and planted with citrus trees. The walls, which vary in thickness from 50 to 100 centimeters, are not generally plastered, but are whitewashed on the inside, and occasionally on the outside as well. The ceiling of the living quarters are almost always vaulted. Domical vaults of squared tuff masonry – called *volte a dammuso* from another typically Sicilian building type – are often preferred to lath-and-plaster vaults. Roofs are almost always flat and topped with brick-paved terraces covered with cement mortar to waterproof them to a certain extent. The lower buildings generally have double-pitched roofs with cane framing covered with terracotta tiles.
Thus, the functional distribution of the *baglio*'s various structures can be schematized as shown below, where we see that that the secondary courtyard, stables and storehouses were of central importance until the eighteenth century, and were supplanted in importance by the main courtyard at the end of that century (fig. 6).

5.0 Conclusions

In this first section, we have discussed the *baglio* and the two stages of its development: an initial stage that depended on purely economic needs, and a second stage where these needs were pushed to the background as the *baglio* became predominantly a place of residence.
We have also seen that, as the *baglio* became a country seat for its owners in the second

period of its development, it also became a way for the landholding families to display their wealth, especially in the decorations around the entrance and the architectural motifs employed for the family's residence. The question we will now turn to is this: "Can other spontaneously organized systems in the Mediterranean basin provide us with additional examples of courtyard structures whose characteristics are similar to Sicily's *bagli*? Or which perform comparable social functions in linking people and creating a sense of community?"

In the second part of the article, which will address the African building types found in Algeria's M'Zab Valley, our objective is thus to determine what relationships exist between the two approaches to construction. As we will see, the buildings in Sicily and North Africa are surprisingly similar in certain respects. And not surprisingly, they also have profound differences.

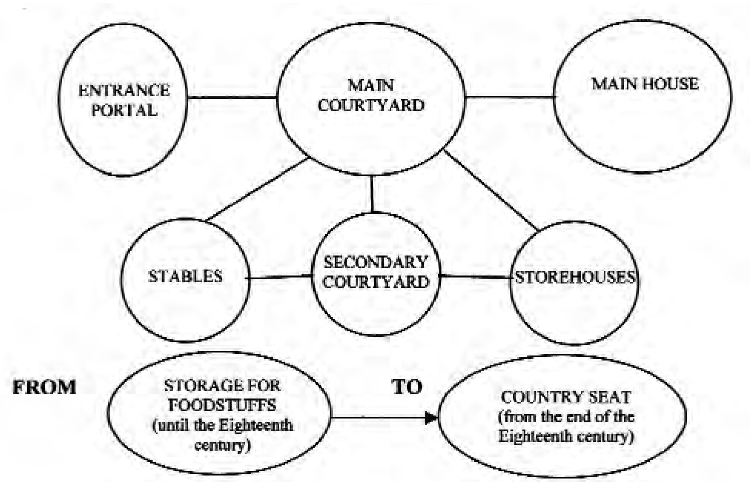

Fig. 6 - Functional schematics of the baglio

Notes

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3. Taken from the website http://architettura.supereva.com/coffeebreak/20001127/, January 12, 2007.

4. Taken from the website http://www.archphoto.it/IMAGES/bianchi/bianchi.htm, January 18, 2007.

5. Taken from the *Catalogo tipologico degli elementi dell'architettura mediterranea*, Progetto SUN & WIND, Provincia Regionale di Palermo, pp. 10-11
(source: http://www.sunandwind.it/documenti/catalogo/CatalogoS&W.pdf, January 23, 2007).

6. Taken from http://www.scoprimarsala.it/bagli/, January 26, 2007.
7. The *Baglio Digerbato* (or *Baglio Barbarà*) is located in Contrada Digerbato, approximately 12 kilometers from Marsala, and is reached by the Ciavolo-Digerbato road. It sits on the Piazza of the Contrada of the same name, dominating the other houses around the square with its bulk. It is a towered baglio with central courtyard, massive in size and geometrically severe in structure. The complex consists of a series of storehouses originally used for grain and wine barrels, and which are ranged around all four sides of the rectangular central courtyard. The owner's residence is at the front of the complex, on the first floor; today, all that remains is a single central room over the entryway and reached by means of a steep, narrow staircase. Throughout the baglio, neglect and decay are everywhere apparent. The chapel at the front corner, however, is in fair condition, and Sunday mass continues to be celebrated there for the district's churchgoers. The tower stands over the main entrance, and at its top has a *buttatolo*, i.e., an opening guarded by a masonry balcony whence boiling oil could be thrown on attackers. The baglio was founded in the late 1500s by the Barbarà, an old Marsala family. Since then, it has passed from hand to hand many times, and the property is thus now parceled out among many owners (source: http://www.scoprimarsala.it/bagli, 26/01/2007).
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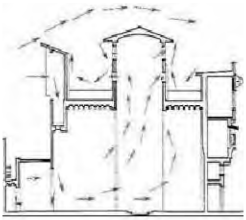


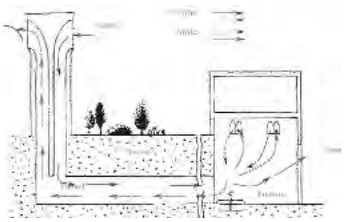


Fig. 1 - Traditional methods for creating natural ventilation in buildings: Top left and center, ventilation system in an Egyptian qa'a; top right, an Iranian wind tower connected to an underground duct (sources: AMARA Ornella architetto, Presentazione del Progetto. Project Manager Sun & Wind. Premesse*, web site http://www.sunand-wind.it/documenti/catalogo/0_Premessa.pdf, February 15, 2007; GROSSO Mario*, Il raffrescamento passivo degli edifici, *Maggioli, Rimini, 1997). Bottom left, a malqaf at Suheimi House (source: web site http://ocw.mit.edu/ans7870/4/4.615/images/16/image14.html, February 27, 2007); Top right, a baud geer or badgir (wind catcher), typical of Middle Eastern countries (Iran, Pakistan) (source: web site http://www.liutprand.it/torrivento.htm, February 27, 2007)*




Fig. 2 - Views of several cities in the M'Zab Valley. The Mozabite Pentapolis consists of five cities: El Atteuf, Ghardaia, Melika, Beni Izguen and Bou Noura (sources: web sites http://www.fotoaleph.com/Exposiciones/ArgeliaProfunda/ArgeliaProfFotoPortada.JPG, January 30, 2007, http://www.liutprand.it/gharda.htm, January 30, 2007)

F. Astrua [1], E. Genna [2]

ARCHITECTURE AND HUMAN SETTLEMENTS IN THE MEDITERRANEAN BASIN: TYPOLOGICAL RELATIONSHIPS BETWEEN THE "BAGLI" OF WESTERN SICILY AND THE MOZABITE HOUSES OF ALGERIA. THE HOUSES OF THE M'ZAB VALLEY part II

1.0 Introduction

The following article is the natural and necessary continuation (as well as the completion and conclusion) of the discussion of the Sicilian *baglio* introduced in section 1, *Architecture and human settlements in the Mediterranean basin: typological relationships between the "bagli" of Western Sicily and the Mozabite houses of Algeria. The Bagli (part I)*.

Many different lands face the Mediterranean basin, including those of the North African shore. In the cities of these Mediterranean lands, open areas and buildings public or private are joined together in closely concatenated systems, shading each other and forming the public space.

In this section, our intention is to analyze the factors that all of the areas bordering the Mediterranean have in common, and that are thus shared by the cities of western Sicily and North Africa. In doing so, we will investigate the building type exemplified by the houses of Algeria's M'Zab Valley, attempting to postulate the links between building types whose form and function arise in response to everyday needs.

2.0 Relationships between Sicilian and North African architecture

In Sicily and the countries of North Africa, there can be no doubt that the successive periods of Roman and Arab domination left profound marks, and equally profound cultural affinities.

Our question, then, is whether these areas' architectures also show functional and distributive analogies, and whether or not similar functional and construction elements can be found on both shores of the Mediterranean Sea.

We will attempt to answer this question by analyzing certain types of residential building on the North African shore from the functional standpoint.

In hot climates, ventilation is a fundamental consideration, one of the first issues to be tackled in any design process. In some types of Egyptian building, ventilation is ensured by independent structures integrated within the construction that generate air movements in its interior: an effective way of cooling buildings in the hot, dry climates typical of the Middle East.

Thermal comfort, however, does not depend solely on the temperature of the air, but is also a question of air humidity and movement. Determining how buildings are to be laid out is thus the

first step in limiting or taking advantage of sunlight and wind (depending on whether the intention is to shield the building from their excesses, or to enhance their beneficial effects) and in providing drainage. Buildings can be laid out to screen each other from the burning sun, i.e., arranged to improve ventilation and the quality of interior lighting. Similarly, the narrow, winding streets typical of Mediterranean cities, for example, help channel cooling breezes but block high winds. Thus, the architecture of the Mediterranean countries developed the *patio* house, centering on a courtyard with porticoed sides, while in humid subtropical climates, the houses consist of several distinct rooms, each a separate block, with overhanging roofs whose broad eaves protect an outer corridor running around their perimeter, or often a veranda. Certain *suuq* (Arab markets) and some small squares and streets in the Mediterranean area – Spain, Italy and Greece – can serve as examples of public spaces covered with awnings, mats or canopies to protect those who work in or pass through these areas from the heat and glare of the summer sun. The choice of materials, finally, provides a guarantee against infiltration by rain or groundwater, and ensures protection against the wind as well as ventilation for the inner rooms.
The vernacular architecture of these hot countries discovered this interplay of openings like the *mashrabiya* or latticework window screens that filter the hot sunlight and provide privacy, of shaded courtyards, of the many ways of capturing the wind or drawing hot air upwards: the "wind towers" of Iran, or Egypt's *malqaf*.
In general, most of the buildings' thermal mass is concentrated around the horizontal elements: hence the need to provide abundant ventilation at the roof and floors so that pockets of hot air do not accumulate in the space between the window and door lintels and the ceiling. Trapped air in this space can create an impenetrable pall[3], so that heat continues to build up in the room. Natural ventilation calls for openings a few centimeters from the ground (or along the ceiling) to ensure that the entire mass of air in the room will move.
In the Egyptian qa'a, or traditional reception hall, this ventilation function is performed by the *malqaf* mentioned earlier. The malqaf is an air intake shaft rising high above the roof and connected with a *maziara*, a porous earthenware jar full of water whose purpose is to cool the air by evaporation. The *malqaf* opening faces the prevailing wind, usually to the north, while a second, air-escape opening is placed on the leeward side. Both openings are directly connected with the rooms to be cooled, with air circulation continuing day and night. In the wind tower, by contrast, the structure that captures the wind is generally separate from the rooms to be ventilated and connected to them by means of an underground duct which further cools the air before it enters the building. Hot air is expelled through the windows. Air flow is reversed at night, as the tower walls release the heat they absorbed during the day, thus warming the air inside the tower. This causes the air to rise, creating suction which draws cooler air along the underground duct and into the rooms from the open windows[4] (Fig. 1).
In other types of building, such as those in the desert oases, architecture uses courtyards as "reservoirs of cool air". Combining a wide courtyard with a narrower one, where the sun's rays hardly ever penetrate as far as the end, makes it possible to have two such reservoirs at different temperatures, creating air flow through the rooms between the courtyards that makes them cool places to rest during the hot hours of the afternoon.
In some cases, the courtyard in the *bagli* of Sicily (*cf.* the article *Architecture and human settle-*

ments in the Mediterranean basin: typological relationships between the "bagli" of Western Sicily and the Mozabite houses of Algeria. The "bagli" (part I)) can also be seen as a means of generating cool air.

3.0 The architecture "on a human scale" of Algeria's M'Zab Valley

As we move deep into the heartland of Algeria, we find a significant example of "architecture on a human scale" in the oases of the M'Zab valley, listed in 1982 as a UNESCO World Heritage Site: a traditional human habitat preserved intact and perfectly adapted to the environment.
The valley of the Wad M'Zab is located in the middle of the Sahara desert, some 600 kilometers south of Algiers. Here, the climate is typical of the desert, the winds cold and relatively moist in the winter, strong and burning hot in the summer.
From a distance, the houses of the ancient Mozabite cities are like staircases climbing the slopes, each step a set of bright blocks of tinted plaster: blue, pink yellow, ochre and blinding white[5] (Fig. 2).

3.1 Urban layout and architecture in the M'Zab Valley

The towns of the Valley are densely packed, with few open areas tightly wedged between the buildings. In the Valley, life revolves around two hubs: the mosque and, second to it in importance, the *suuq* or market, placed near one of the city gates in a position that ensured that the settlement and the community could be defended. Apart from the market, the public spaces are the narrow streets, widening in places just enough to admit a well or a tree. They frequently run in arcades, covered by the upper storeys of the houses, the better to protect them from the heat and glare of the sun. Masonry benches along the walls of the houses serve as neighborhood meeting-places.
In the Valley, the fundamental rule is that no house must block another's light: the sun here is sought after and beloved. This basic principle limits the height of the buildings and determines the form of their roofs (Fig. 3).
The facades are all very similar, stripped bare and essential, showing no signs of distinction or display to impress the onlooker. Clearly, this simple, essential character of North African construction was an inspiration to architects of the caliber of Le Corbusier (whose theory of architecture on a human scale was rooted in just such buildings) and Fernand Pouillon[6].
Much could be said of the Mozabite houses' architectural features, the materials like *timshent* – a hard gypsum plaster – they use, the construction techniques employed for arches and vaults, held up by palm fronds as the bricks are laid. But all this is beyond our scope here, which is to analyze their typological, distributive and functional characteristics (Fig. 4).
Typologically, the houses in the palm groves are of particular interest. Earthly paradises in miniature, they are used chiefly in the summer, when the Valley's inhabitants leave the sunny hillsides for their lush shade. Their porticos, frequently sporting an arbor, open onto the garden, planted with headily perfumed flowers and often spotted with small pools. At the center of the house, the patio is ringed with small bedrooms and the kitchen.
Palm trees grow through the floors and ceilings, casting a bit of cool shade on the house. During the day, the Mozabite families live on the ground floor, more sheltered from the hot sun; when

evening comes, they mount the spiral stairs to the rooftop terrace, perennially refreshed by the night breezes.

3.2 Function and spaces "modelled on man" in the Algerian house: relationships with its forerunners in Italy

The general structure of the Algerian house, with its most noticeable feature, the central patio, is well suited to the climate conditions typical of the Mediterranean area, where high temperatures and hot sun are interrupted by rains that are often all too rare and by no means uniformly distributed. This structure reflects a social organization where family life is relatively reserved and women are to a certain extent secluded: likewise a characteristic common to much of the Mediterranean that is accentuated in Muslim society (Fig. 5).

The Mozabite house has taken the layout of the Mediterranean dwelling with its central courtyard, adapting it to the desert light and climate, and to the social customs of its inhabitants. As in all North African houses, the entrance is at a corner, through a zigzag *sqifa* whose doors are offset so that there is no direct view to the interior from outside. In general, the ground floor courtyard – the *shebeq* – is almost completely roofed over, leaving only a small central opening to let in light and air, thus making the interior cooler and shadier and increasing the size of the roof terrace.

The *sqifa* leads to the *patio*, almost always square and surrounded by galleries giving onto the inner rooms, accessed through double doors. These rooms, which extend along the entire length of the galleries on both sides facing the *patio*, are quite shallow, as the timber available for roof beams was not long enough to span long distances between bearing walls.

Facing the entrance, there is usually a flat-backed alcove, often furnished with a sofa or armchair for receiving guests. Additional alcoves along the sides serve as closets or shelves.

The main entrance door is generally decorated with bronze or wrought iron knockers, and is protected by a porch roof which is either cantilevered out from the building or supported by small angled beams at the sides (Fig. 6).

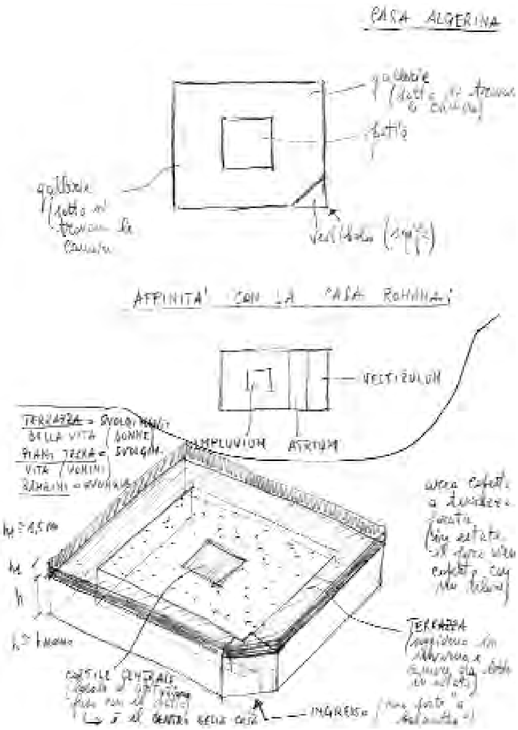
The life of the household centers on the roofed ground-floor patio and a room set aside for meetings and prayers – the *tizfrit*. As the play of light changes, hour to hour and season to season, the rooms will be put to different uses, selecting whichever provides the most comfortable climate conditions: an excellent example of "bioclimatic architecture" that confirms our earlier remarks (Fig. 7).

The ceilings of Mozabite houses are only slightly higher that their inhabitants' heads, enough for the needs of everyday life providing that ventilation is good. Traditional houses in the area, in fact, are not furnished: for a person sitting on a rug laid out on the ground, a 2.2 meter high room is as spacious as an ordinary Western European room seems to a person seated in a chair (Fig. 8).

The central area of Mozabite houses, moreover, is not a courtyard or *patio* in the accustomed sense, but a sort of "living room merged with a patio"; in Arabic, it is called *west-ed-dar*, or the "center of the house". It is covered by a roof terrace with a central hole and, in the periods of greatest heat, even this hole is covered with an awning. All the other rooms in the house open off this central spaces, as if they were niches in a thick wall, seemingly carved out by an artist's hands and guiding will. The terrace is the most pleasant place to while away the time in the winter

Fig. 3 - Right, aerial view of Ghardaia (one of the five cities in the Valley), showing the distribution of the houses and their roof terraces)
(source: web sites http://www.djamila.be/Documents/Images/Algerie/ghardaia10bis.jpg, February 15, 2007, http://ag.arizona.edu/OALS/ALN/aln28/aln28gifs/solieman1.jpg, February 15, 2007).
Center, diagram of summer and winter usage patterns for Mozabite houses (source: web site http://ag.arizona.edu/OALS/ALN/aln28/aln28gifs/solieman1.jpg, February 15, 2007).
Left, cross section through a typical Mozabite house (source: web sites http://www.pixelcreation.fr, February 15, 2007, http://images.google.it, February 27, 2007)

Fig. 4 - Photographs of the Maison d'Hotes (M'Zab Valley)
(source: web site http://www.pbase.com, February 15, 2007)c



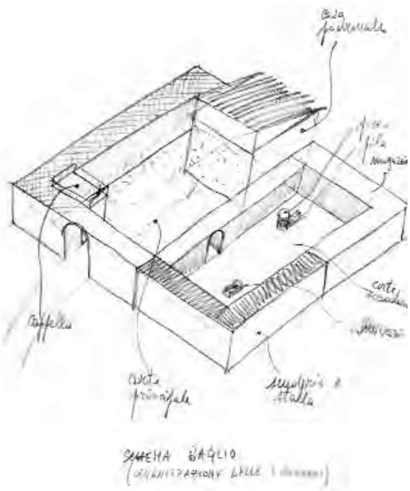


Fig. 5 - Axonometric views comparing functions of the Sicilian baglio and Mozabite house, indicating their similarities to the ancient Roman house type

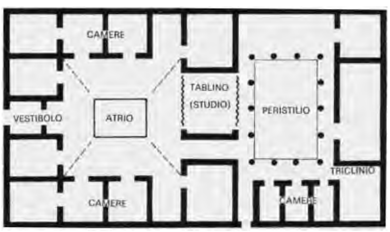


Fig. 6 - The Algerian house is strongly reminiscent of the functional layout of the ancient Roman house, with its vestibulum, atrium and patio (which, in the Roman house, was the impluvium), though functions differ. At the front, the Roman domus had a large inner court, the atrium. The roof of the atrium sloped inward on all four sides towards a central hole, the compluvium, from which rainwater was drained into a rectangular tank, the impluvium, located directly below.

Entry to the domus was through a street door - the ostium - that opened onto a corridor or vestibulum leading to the atrium, though in the Imperial period a secondary entrance or portico, was built in the longest wall. At the bottom of the atrium, directly in front of the entrance, was a large room, the tablinium, separated from the atrium only by curtains.

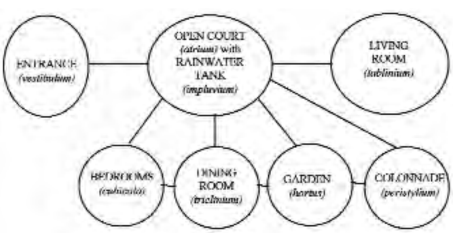
The household's private life usually centered on the rear of the house, around a well tended garden, which in some cases was surrounded by a colonnade (peristylium) and adorned with statures, marbles and fountains. The cubicula, or bedrooms, were usually small (image source: web site http://www.homolaicus.com/storia/antica/roma/domus.htm, February 01, 2007) months, and is used for sleeping in the summer.

4.0 Conclusions

As this article has shown, there are many undoubted affinities between the *bagli* of western Sicily and the houses of the M'Zab Valley in northwestern Africa. These affinities can be traced to common goals and the fact that both building types satisfy common needs, needs associated essentially with the climate, but that are also a question of observing the principles of functional architecture, of solving the basic problems of day-to-day life: hence the need for spaces on a human scale, spaces modeled on man. In its form, in fact, the Algerian house is driven by these needs, to the extent that the arrangement of space on the first floor often does not match that of the ground floor. In addition, the desire for display that Sicily's *bagli* so clearly show in the period of their development as country seats for the landed gentry is conspicuously absent from the Algerian houses, aspiring as they do to the pure and the essential.

In this article, we have attempted to compare and interpret the possible relationships between the two building types. From what we have seen, it would appear that building methods in western Sicily and North Africa had a "precursor" (in terms of primordial functional layout) in the ancient Italic house type (as will be recalled, both areas were under Roman rule – from 264-241 BC to 535 AD for Sicily, and from 204 BC to around 300 AD for Algeria – and both fell later under Arab sway: from 827 AD to the twelfth century in the case of Sicily, and from the mid-seventh century onwards in the case of Algeria). This precursor, in fact, fulfilled the major uses of the two later building types: the Sicilian *baglio* that served first as a place to store foodstuffs, and later as a country seat, and the Mozabite house whose role was primarily that of a dwelling-place.

The affinities that we have seen in the history, climate, construction methods, functional distribution of space in a building and the economy of the two areas we have discussed point to the need for further investigation of the North African settlements, valuable both as a legacy of the past, and for the role in fostering a sensitivity towards the design of new "pieces" of the city that several parts of North Africa risk losing. In these areas, though it is indeed necessary to encourage new construction, it is equally necessary to respect what has gone before: the traditional building stock that is far more than an asset and a heritage. Above all, it is the background and the context from which all new work must start: work that must rediscover history as the prelude to the new.



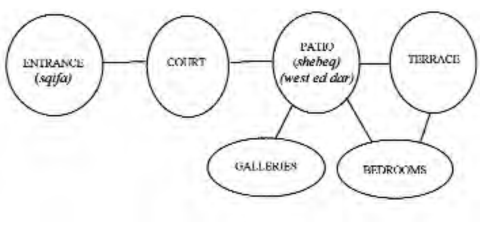


Fig. 7 (left) - Functional schematics of the Roman house
Fig. 8 (right) - Simplified schematics of the Mozabite house (M'Zab Valley, Algeria)

Fig. 9 - 1955/57 - F. Pouillon, Quarters for 3500 residential units, Climat de France, Algeria (source: web site http://web.mac.com/jean.luc.michel/iWeb/ACDD2771-39CF-4F26-B7B2-E8DC183AED54/790548CE-F92C-469A-8DD1-E6C4A56EEC02.html, February 14, 2007)

Notes

1. Associate Professor of Architectural Engineering at the Politecnico di Torino First School of Engineering, Department of Building Engineering and Territorial Systems.
2. PhD student in *Technological Innovation for the Built Environment* (XXI cycle), Politecnico di Torino, First School of Engineering, Department of Building Engineering and Territorial Systems (born in Marsala, she has profound ties to the Sicilian city's history, architecture and ambience).
3. Information taken from the website web http://www.liutprand.it/torrivento.htm, February 27, 2007.
4. Information taken from AMARA Ornella, *Sun & Wind Project Manager. Presentazione del Progetto. Premesse* (source: website http://www.sunandwind.it/documenti/catalogo/0_Premessa.pdf, February 15, 2007).
5. The cities were protected by walls or stronghouses, with watchtowers and towers for defence (some of which remain today). The gates in the city walls were protected by guard-posts with a room on the floor above. The walls were not simply defensive in function, but also ensured that the community remained ideologically closed to the outside world. The Mozabite cities were long sealed within their walls. In the mid-nineteenth century, the French colonial forces occupied the south of Algeria and swore mutual respect with the Mozabites, allowing them to retain administrative control over their own community. Only the "summer villages" in the oases, where the families repaired in the hot season, continued to grow. Industrial development and its onslaughts have profoundly changed the "medieval" character of the settlements in the M'Zab, though a certain respect continues to be shown for the urban fabric of each historic center (source: website http://www.liutprand.it/gharda.htm, February 15, 2007).
6. Fernand Pouillon was born in Rodez, son of a building contractor. He was educated at the *École des Beaux-Arts* in Marseilles, and later at the *École Nationale Supérieure des Beaux-Arts* in Paris. Though he was able to erect his first building at the early age of 24, he did not receive his degree in architecture until 1942, after spending a year in the army and a period dealing in antiques and second-hand goods. He started working in the office of Beaudouin in Marseilles, but left in 1944 to set up his own architectural firm in partnership with René Egger. In Marseilles, he was responsible for several sizable constructions, and between 1950 and 1953 he worked with Auguste Perret to rebuild the old port, destroyed by bombing during the war. In 1953, he left his partnership with René Egger, going to Algiers at the invitation of then-mayor Jacques Chevallier to work on several public housing projects in the capital. In the period following this move, he was increasingly engaged in large-scale construction, not only in Algeria, but also in France and Iran, where he seems to have found his inspiration for the 200 columns in the *Climat de France* complex. In the period from 1965 to 1984, he worked chiefly in Algeria, where he was appointed consulting architect to a number of the country's Ministries (Tourism, Higher Education and Scientific Research, Posts and Telecommunications, Railways, and the Environment), institutions for which he erected a large number of buildings. As well as his construction projects in many countries (in addition to France, Algeria and Iran), he also edited several books and published two of his own, *Mémoires d'un architecte* and *Les pierres sauvages*. In 1985, he was appointed to the Légion d'Honneur by France's President François Mitterrand. He died at his castle in Belcastel (Aveyron) on July 24, 1986. In Algeria, he was responsible for the following projects:

1953/54 – *Housing project with 800 residential units and school*, Diar es Saada, Algiers; 1954/55 – *Housing project with 1800 residential units*, Diar el Mahçoul, Algiers; 1955/57 – *Neighborhood with 3500 residential units*, Climat de France; 1966 - *Hotel de Caïd*, Bou-Saada; 1967 - *Hotel Marhaba*, Laghouat; 1967 - *Hotel el Montazah*, Seraïdi; 1968 - *Hotel Plaza*, Annata; 1968/69 - *Hotel el Mekter*, Aïn Sefra; 1968/72 – *Tourist complexes*, Tipaza; 1968/73 – *Tourist complex*, Sidi-Ferruch; 1969 - *Hotel Gourara*, Timimoun; 1971 - *Hotel des Rostémides*, Ghardaïa; 1972 – *Craftsmen's village*, Sidi-Ferruch; 1972/82 – *Thirty-seven single-family houses*, Algiers; 1974/82 – *Port construction and hotel*, Skikda; 1974/82 – *Port construction*, Sidi-Ferruch; 1975 – *University of Social Sciences*, Algiers; 1979/82 – *University campus*, Mostaganem.
(Fig. 9)

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Fig.1 - Janelas Verdes, residential condominium in Lisbon (FG+SG - Fotografia de Arquitectura)

J.F. Baganha

REGIONAL ARCHITECTURE IN PORTUGAL THREE PROJECTS

1.0 Introduction

In preparing this paper, following the kind invitation of my friends Luigi Mollo and Gabriele Tagliaventi, whom I warmly thank along with all the organisers of this conference, I set out to choose three projects developed by Atelier José Baganha Arquitectos that fitted well into the various themes suggested. They consist of works already completed or still in the planning stage that illustrate the present Portuguese reality in terms of urban design and land use. They deal with urban land (the consolidated city); rural land, including the nuclei on the outskirts of the large agglomerations of populations (the small towns and villages "swallowed up" by the urban sprawl); and agricultural land (more and more deserted, due to the migrations of populations seeking better living conditions - whether illusory or not - and as a result of the disastrous European Common Agricultural Policy).

Bearing this in mind, we have chosen three very recent projects, one already completed and built, and the other two still in the planning stage:

I. A residential condominium in Lisbon called "Janelas Verdes";

II. An urban development in Aldeia de São Silvestre, on the outskirts of Coimbra;

III. A tourist complex at Herdade da Agolada de Cima, in Coruche – Master Plan.

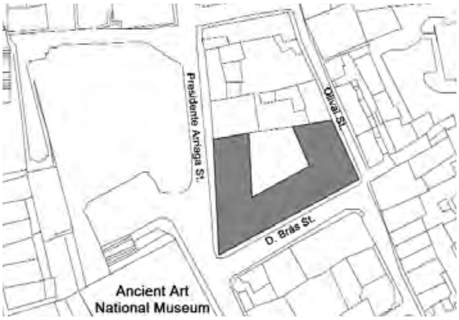
These three projects also reflect (to a large extent) the tendency in the commissioning of projects in Portugal in the area of architecture and urban design. This tendency contains a series of challenges and difficulties that in terms of ethics, coherence and professionalism confront all those of us in Portugal who are striving to produce work along the lines of the so-called "Urban Renaissance". By this we mean the continuity of the architectural and urban design tradition of the European city, with all the peculiarities that this tradition contains, an extremely rich individuality that represents the most effective antidote I know against the "poisons" of the internationalisms that during the 20th century have spread with catastrophic results at all levels. They have done this not only in our cities and territory, but also in the way we eat and dress, affecting everything we consume, even in our free time, and doing away with the richness of the cultural peculiarities of the "Old Continent". I can honestly find no advantage in the fact that we are all the same, eating the same things, in or out of

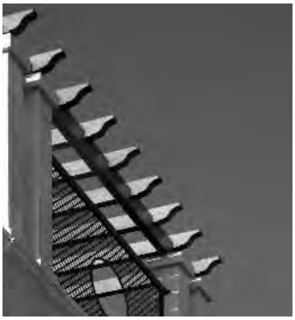
season, living in the same cities and buildings, in whatever part of the world – I really can't. I don't want you to think that I suffer from some kind of allergy to the inventive capacity of the Human Being. This is one of the most fallacious arguments used by all those who, driven by I know not what instinct of repulsion for all kinds of tradition, try to invent the wheel every five minutes and are obsessed with innovation as the only purpose of their lives: the different being, the innovative being, the brave new world. Innovation, however, is no longer what it was and we are lucky that today we are all becoming aware of the importance of picking up again the thread of history, putting the "river of time" back in its bed, innovating and always improving in the preservation of what is essential in our cultures.
That is why I mentioned the difficulty that may face us in these types of commissions, as it may be thought, at first glance, that the concepts they embrace – condominium / development / tourist complex – do not constitute some of the main "evils" from which our lands suffer.
In fact, the tendency has been this:

- Residential condominiums – "ghettoes of the rich" – tend to be large, walled properties of opulent, isolated dwellings, snuggling amid golf courses, equestrian clubs, etc., leaving outside their gates the miseries, shantytowns and rundown neighbourhoods, and linked to the big office centres by ever more congested motorways;
- The urban developments in the suburbs have been, along with the aforementioned residential estates, one of the most obvious evils in the outskirts of our cities, taking over land often rich in landscape and agricultural potential with "duty-free garden cities" – pastiches of depressing suburbs, imported from North America, in which we isolate populations, prisoners of the car, of consumption in the nearest large shopping centre and of the soul-destroying way of life that models of this type produce and by which they have been produced;
- The tourist complexes, or "resorts", are another of the scourges that have been ravaging the country since the 1970s, transforming our shores and coastlines (and now our countryside as well) into a stockroom of supposedly "traditional" architecture, much in fashion, produced by people who understand nothing of traditional architecture and much less of traditional urban planning. These specialists in "resorts", together with specialists in the "market", golf and an array of consultants, set up "fantastic" teams able to produce a "master plan" or a "layout" in a fortnight (this type of "specialist's" favourite terminology, which dazzles most of the less-informed developers and nearly always produces results that are too artificial).

What can we do then? Reject this type of commission? Of course not! The projects we present here are proof, in our view, that it is possible to provide a quality solution to the challenges posed by this type of commission.
In the first example we set out to install a luxury condominium in the grid of a historical district of Lisbon, using traditional urban design and architectural language. In the second example we succeeded in developing an area of land in a village on the outskirts of Coimbra, giving continuity to the existing urban fabric, creating streets, squares and blocks of buil-

Fig.2 - Janelas Verdes, residential condominium in Lisbon (FG+SG - Fotografia de Arquitectura)


Presidente Arriaga St.
Olival St.
D. Brás St.
Ancient Art
National Museum



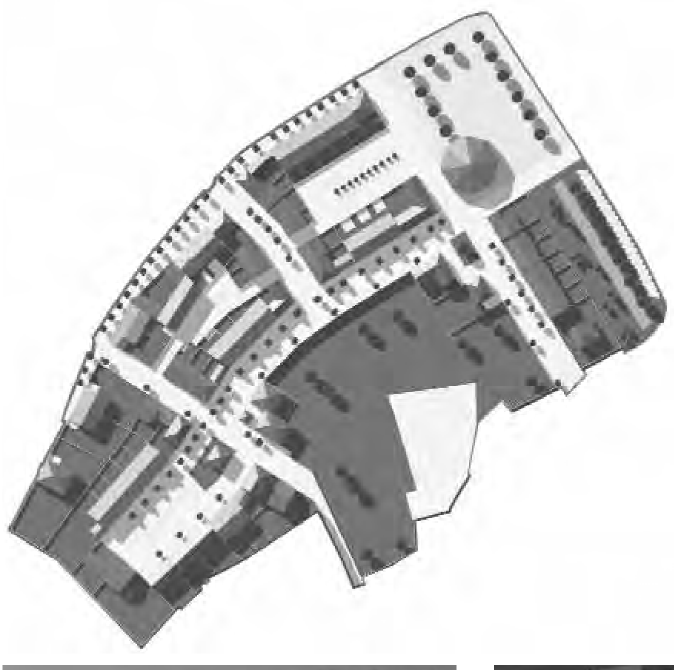


Fig.3
The urban development
in Aldeia de São Silvestre
on the outskirts of Coimbra

dings with architecture inspired by local models, and integrating commerce and services with the various levels of housing (for various social strata);

In the third project we developed a Master Plan for a tourist complex for mainly residential tourism – providing housing for populations from other countries is one of the latest trends in Portugal. In doing this we preserved the traditional cultures of the region, the Ribatejo, such as oak plantations, creating dense nuclei of concentrated new construction. Instead of building on large plots, dotting the landscape with architecture unsuited to the region, we created "villages" from scratch, modelled on the regional nuclei in terms of scale and shape and integrating the tourist facilities, including hotels, harmoniously into the landscape, and searching for solutions, shapes and systems belonging to the regional culture.

To sum up, therefore, we present three projects with a very contemporary theme in the places where they are situated, which are contrary to the trend of the offer, of the more ordinary and "passé" models, returning to solutions and languages that belong to the local region in which they are installed.

This choice undoubtedly entails extra work, since it is not enough to use any old "recipe" of the more or less "picture postcard" type, superficial and false. Instead, it involves the careful study of typologies, history, culture, habits and local customs. This certainly means work, but the results are infinitely more satisfactory, not only for us but mainly for those for whom the work is intended and everyone else who will benefit from it.

2.0 Residential condominium "das Janelas Verdes" (Lisbon)

The condominium called "das Janelas Verdes" is located on the southern boundary of the Lapa district of Lisbon, close to the Museum of Ancient Art.

Facing three streets (Rua Presidente Arriaga, Travessa de D. Brás and Rua do Olival), it is situated in an area formerly occupied by very rundown buildings of various types. On the southern side there used to be a 18th century mansion, also very rundown, of which we managed to preserve only two floors of the side facing the street, adding on a floor with a mansard roof in the language of this type of 18th century Portuguese building.

In the new project we included three diverse blocks, thus solving a problem of scale. In fact, in view of the size of the programme, which envisaged a large built area (roughly 6,500 m2 above ground level), it would have been inappropriate to have uniform typology and volumes.

We therefore decided to "break up" the original plan into three distinct blocks with a shared lower-ground floor and internal courtyard. This resulted in volumes and an appearance that were more diversified and on an urban scale more appropriate to the setting (consisting of a series of "small" façades in a sequence, interrupted now and then by a more sizeable building – the mansion, the church – or by a small square).

In the design of these new blocks we included the characteristic typologies of the location, the Lapa district, which, like other Lisbon districts of the period, had very plain lines and simple volumes, derived from the Pombaline model created just after the great earthquake of 1755. Here, in these districts with their rather more vernacular flavour compared with the original models of the period from the downtown area of the city, the proportion, the inter-

play between the “full and the empty”, the materials (the plaster smoothed with a trowel, the “pipe” tiles, the eaves, the square blocks of limestone), the jaggedness - everything contributes, together with this interplay of volumes and scale, to a whole that entirely fits the setting (“as if it had always been there”).
Inside the blocks there are fifteen apartments with very generous areas, intended for a section of the population with considerable purchasing power; apartments with sophisticated facilities, high-quality finishing materials and large number of parking spaces. A good many of these apartments have excellent views of the River Tagus.

3.0 Urban development in São Silvestre (Coimbra)

This project concerns an urban development study being implemented in São Silvestre, Coimbra.
The area that is the object of the study is part of an old farmstead in the centre of the village of São Silvestre. Its boundaries are marked by buildings, mainly for single-family housing, that are characteristic of the oldest part of the village, to the southwest; by the main farmhouse, still inhabited by the family owning it, including gardens and outbuildings, to the south; and by municipal streets to the north, west and east. It does not contain any features worthy of mention, or even any notable vegetation, apart from a small watering-pond. The site is completely walled in and crossed by a watercourse in its eastern boundary, which is piped downstream.
The study we present results from the application of a typology whose model or archetype is the one that is characteristic of the villages or smaller urban nuclei of this region, of which São Silvestre still conserves some remnants, particularly in the more central areas adjoining the plots that are the object of this study.
In the urban design we tried to reconcile, as harmoniously as possible, the original model or archetype, the context, with present-day needs (more dependent on the car) and with the applicable legislation and regulations in force. We envisage blocks in an organic grid, with buildings of two or three floors above ground level (mainly two floors), streets (“canal spaces”) and squares, making use of paths, thoroughfares or streets already existing in the surroundings, and providing inside these blocks, whenever possible, public areas for the enjoyment of residents and/or a car park.
The buildings planned, which form a dense nucleus of blocks in continuous strips, are intended mainly for single-family housing, although there are also some buildings for multi-family housing and units for commerce and/or services on the ground floor. They thus provide for a variety of uses that will help to make the urban environment more humanised, less segregated, safer and more convenient, providing the residents with their more basic needs (which is indeed a key characteristic of the original model on which this study was based).
The public area is covered with stone pavement, ensuring, however, that the regulatory distances for pedestrian and motor traffic and the car park are adhered to. The differentiation or separation between these areas is achieved as subtly as possible, using posts, railings and metal or other items whose design will be defined in more detail in a later stage of this project. This complies with another basic, fundamental premise for conformity with the ori-

Fig.4 - The tourist complex at Herdade da Agolada de Cima, in Coruche – Master Plan

ginal typological model adopted.

The proposed land structure also follows the model of the surroundings, with plots for single-family dwellings or buildings (the majority) and/or mixed ones (including commerce) with the rear façade facing the street, as in the whole village, and with an open internal area, with gardens or paved, and including at least one parking space per home within the block (in a garage or in this internal open area). This aspect is key to the urban planning model adopted and contributes to a more humanised enjoyment of the public area, creating more solid neighbourhood relations.

It also avoids the single-purpose models of "dormitories", isolated single-family dwellings, which have proliferated on the outskirts of Coimbra as well as here in São Silvestre. These, rather than encourage neighbourly relations, lead to isolation and segregation in which the residents are prisoners of the car for their most minor needs. We intend to create here an urban atmosphere in the true sense of the term.

The size of the plots and the areas of occupation and construction envisaged were also based on the study of the typologies existing in the locality. We have identified certain types that can later freely adopt the variants that their owners prefer, always using criteria of integration through sympathy, respecting the context and contributing towards an environment that is intended to continue, or follow on from, the more original nucleus of the village.

The farmstead and its gardens, also walled, will be preserved. This will maintain a free "buffer" area between the garden and the new development, which will also be surrounded by walls, including an access through a main gateway.

Following meetings with the representatives of the local parish council, two plots or areas are set aside as green spaces and for communal facilities, which may be complementary. They are situated in the extreme northeast of the site, and incorporate the watercourse that may also be piped or form part of the landscape design to be developed in a later stage of this project. In accordance with the wishes of the council representatives, the chosen location provides for a more effective relationship with the surrounding areas, facilitating access routes and uses.

4.0 Herdade da Agolada de Cima tourist complex (Coruche) – Master Plan

Herdade da Agolada de Cima is an agricultural estate with an area of approximately 929.48 hectares. It is situated in the municipality of Coruche, north of Vale do Sorraia and about 6 km from the town of Coruche, in the Ribatejo region of Portugal.

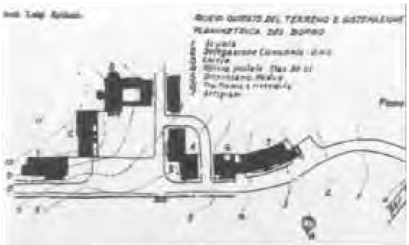
The Master Plan (DP) for Herdade da Agolada de Cima resulted from an investment project in the tourism area, which the present owner intends to develop. The owner is supported in this by the local authorities, on account of the development it will bring to this region due to its nature and size.

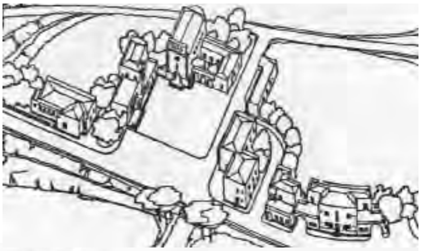
Furthermore, agriculture in this region has been heavily impacted since the reform of the CAP, and it is urgent to find alternatives for the resident population by creating employment opportunities and ways of creating wealth. Tourism is obviously one of the more viable activities these days, and indeed successive governments have been promoting this as a planning policy.

Within the scope of the review of Coruche's Municipal Regulatory Plan (MMP), proposed alterations arising from this Master Plan have already been considered, even though they appear to have very little relevance, due to their one-off nature and their practically null impact on the site and on the municipality.
The Herdade da Agolada de Cima Master Plan considers three distinct and at the same time complementary types of occupation:

a) Areas allocated for tourism;
b) Low-density developable areas;
c) Agricultural production areas.

The areas allocated for tourism cover various Execution Units – Rural Hotels, Tourist Villages (urban buildings suitable for tourism) and other hotel facilities – Golf Hotels, "Charm Hotels", etc., Equestrian Centres, Nautical Centres, Golf Courses, etc. – which may eventually be developed in phases, integrating the tourism component and real estate [depending on the type of enterprise(s) to be developed], and also including a component that is booming in the south of Europe – Residential Tourism.
These Execution Units will be situated mainly in the surrounding area north and east of the estate's dam, and here and there in the western and south-western areas. The buildings will occupy the areas that are not part of the National Ecological Reserve.
The tourist occupation will, furthermore, meet a condition that is also its major attraction: it will be fully integrated into the present environment, preserving its qualities and benefiting from its potential; it will improve the quality of the land, re-create the characteristic landscape of the locality, preserve water courses and water-producing areas, re-plant native species and so forth. The green recreation area (including private and public golf, a theme park or parks and other attractions) will be the element that links and improves the occupations of a more "urban" character.
Extensive agricultural-forest areas will thus be preserved, and the agricultural activities continued (the oak plantation in the west and the eucalyptus in the east), and these areas will form an integral part of the tourist enterprise to be developed.
In the area bordering the estate, adjoining the municipal roads to the east, in the places where the urban expansion of the town of Coruche has been carried out more recently with low-density occupation and a certain amount of dispersion or fragmentation (the "forums"), it is proposed to implement an occupation with a denser nucleus, next to the municipal road and the neighbouring agglomeration. This will continue the area's improvement through an "urban" quality that, though still "rural" in character, will have other uses that are not exclusively residential: in the tertiary area – commerce and services – and infrastructure, providing a certain "centrality" and humanisation to an area that, by being too fragmented, shows a poor quality of urban design.
This Master Plan, taken as a whole, represents a valid, quality alternative to the models of dispersed construction that have been appearing in Portugal, as in other regions of southern Europe.





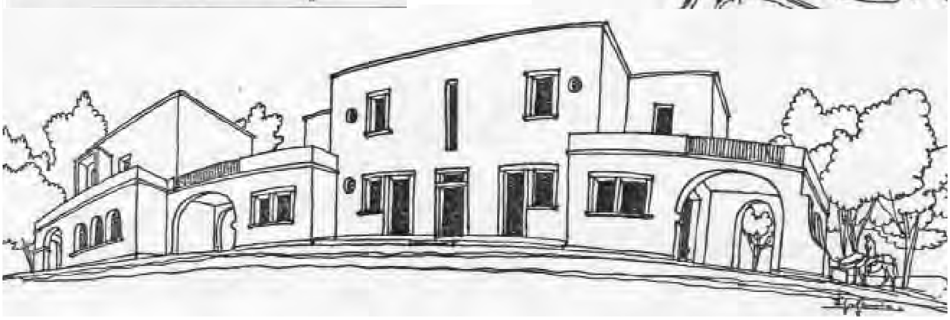


Fig. 1 - (top-left) Fazio suburb planimetry; Fig. 2 - (top right)Fazio suburb axonometry
Fig. 3 - Artisans restaurant and houses

Below: Fig. 4 - RR.CC. center and dispensary; Fig. 5 - Artisan shops and houses; Fig. 6 - Hollow tile floor; Fig. 7 - Wood roof of local Fascist branch

T. Basiricò [1]

THE RURAL SUBURBS IN TRAPANI - FAZIO SUBURB

1.0 Introduction

The rural suburbs realized during the fascist period were very often projected by known architects, so it is possible to reconstruct part of the italian architectural and constructive history of the thirties, through a study of the aesthetical lines and constructive techniques. The suburb buildings introduce, in the typical Sicilian landscape of one floor houses, saddle roofs covered by "*coppi*", new architectural typologies recalling besides traditional architecture characters, architectural elements typical of the housebuilding fascist of the cities (towers, arcades, etc.).
The principal aim of the present paper is to individualize and analyze the suburbs and the existent rural houses in the territory of Trapani, today less used or in state of abandonment. It's impossible to expound the matter in exhaustive way in few pages, we will deepen only the constructive events of the suburb Fazio.

2.0 An outline of the history of rural suburbs in Sicily

Little time before the beginning of the second world war, 20th of July 1939, Benito Mussolini organized the "assault" of the Sicilian latifundium. It concretised with the first law of 2 nd January 1940, entitled "*Colonization of the Sicilian latifundium*", founding the Colonization of the Sicilian Latifundium Office, with the assignment to assist, technically and financially, the land owners in the work of transformation of the productive agricultural system and to directly proceed to the colonization of the lands the corporation should have acquired the ownership or the temporary possession. The project was brought ahead up to 1943. As to face in the best way the "*assault*" to the Sicilian latifundium, the corporation with the Palermo section of the National Institute of Fascist Culture, organized a course of lessons, six month lasting since January to June 1940, showing the negative aspects of the Sicilian countries situation, proposing some solutions. The course involved a group of researchers and technicians among which the Luigi Epifanio and Edoardo Caracciolo architects. The first one took action concerning the rural architecture in Sicily as a patrimony to draw in the planning of the new rural buildings, while the second one analyzed theoretically the rural city "*to establish a real rural urbanism*"[2] for the reclamation of the Sicilian latifundium. From such studies it emerged the principal problem of the Sicilian latifundium was the distance that the farmers had to cross between the place of living and working.

So the colonization of the Sicilian latifundium was realized under the directives of the Minister for agriculture and Forests, Dr. Tassinari, with buildings strewn in the land with the support of the so-called "*rural suburb*".

The intent of the plan was to create a "*rural city*", "*an all in one harmonic extremely spaced out in the country*" as to annul the distances between city and country.

The rural suburbs had also the function to attract families of farmers in areas staying nevertheless few desirable for the distance from urban centers or aggregations of already existing houses and, therefore, deprived of the most elementary services. They were conceived as small villages in a modern architectural version, endowed with principal services (school, church, postal office, policemen's station, etc.). It's important to underline that the farmers "coloni" lived in agricultural houses, and not in the suburbs. The suburbs contained only the residences of those were destined to maintain the essential services of the suburb. Only in the first year of realization, from 1940 to 1941, eight suburbs were built, one in each of the eight provincies of Sicily and 2507 rural houses. These first eight suburbs (consecrate in the name, to the memory of a war or of the fascist Revolution fallen) are: Bonsignore in Ribera (Ag); Gattuso in Caltanissetta; Cascino in Enna; Fazio in Paceco (Tp); S. Giuliano a Messina; Pietro Lupo in Mineo in (Ct); Rizza in Carlentini (Sr); Schirò in Monreale (Pa).

Their planning, for choice of Mazzocchi Alemanni, manager of the corporation, was assigned to Sicilian architects so that "*banished the deaf language and the common place of the project of an office, they were respectful of the environment and the local character of the new Sicilian architecture, within the limits of a free interpretation of island forms, penetrating its spirit and suiting it for the modern functions of the suburb buildings*[3]" So as Carlo Emilio Gadda in 1946 wrote, "… *the new aspects of the housebuilding stuck ab auctore to the climate and the color of the island, also in the funtional sketch of our time*[4]" Such suburbs were just projected by the architects most interested to the studies of Sicilian architecture. Towers, arcades, town hall, in Sicily bring the signatures of Epifanio, Caracciolo, Mendolia, Marino, Marletta, Baratta, Manetti-Cusa, Gramignani architects[5].

After the war other two laws, particularly the 104th on December 27 th 1950 and the 9 th on April the 5 th 1954, gave a strong impulse to the reclamation of the Sicilian countries. With the second one the Sicilian Region submitted the realization to ERAS of a series of works turned to the reclamation of the countries as the construction of aqueducts, hilly overruns and roads over the construction of other rural suburbs. According this law, some suburbs were completed and others were built: particularly in the land of Trapani were realized: Binuara and Livio Bassi suburb in Ummari and Badìa and Bruca ones in Buseto Palizzolo. As time goes by such suburbs lost their function. Almost the suburbs were transferred by the ESA to the reference municipality, with the tie of the perpetual desti-

From the Top:

Fig. 8.a, 8.b - The headquarters Fascist in 1940 and to the actual condition with collapsed stairs

Fig. 9.a, 9.b - The church and arcade in 1940 and to the actual condition

From the Top:

Fig. 10.a, 10.b - The school in 1940 and to the actual condition without windows

Fig. 11.a, 11.b - The Colonization corporation offices in 1940 and to the actual condition with a collapsed part

nation to public utility, according to the art. 1 of the Law 890 on 8/6/1942. Most part of the suburbs have been depopulated and left in abandonment state; only some are still used, lived by the legitimate heirs of the agrarian reform farmers or used by cultural institutions, institutes, foundations or associations (es. Red cross, Catholic Community etc.) as services of cultural interest.

3.0 Actual state of the suburbs of Trapani's latifundium

The rural suburbs building in the territory of the Trapani's province and the rural houses, we can see today, were realized in the sign of a well defined government politics. According to the directives of Minister Tassinari the distance between the suburbs is 10-15 kilometers, so to assure all the essential services to the people living in the rural houses realized within a ray of influence of 5 or 6 kilometers.
On the road from Trapani to Palermo, the S.S. 113, in Ummari, Binuara and Livio Bassi suburb were found. The first one consists of an aggregation of rural houses while the second one introduces the typical conformation of the rural suburb with the service buildings. Badià and Bruca suburb are, even though to few kilometers from the precedents, in the Buseto Palizzolo territory, along the road that brings to Scopello from Trapani. Livio Bassi suburb is still vital. It has maintained one formal autonomy; it still results, in fact, clearly recognizable in comparison to the city fabric. Some houses are still used. But thanks to the presence of the church, where the masses are celebrated, the suburb live again in the festive days, welcoming the believers of the neighboring zones.
Regarding to Fazio suburb for the unhappy geographical position and following the depopulation of the lands of the '60s, the suburb remained a cathedral in the desert and it stays in an advanced decay state due to the abandonment[6].

4.0 Fazio Suburb

Fazio suburb is among the first eight ones realized in Sicily in 1940, projected by Luigi Epifanio architect. The suburb was built at the border of an existing road, from Paceco to Castelvetrano; in proximity to the Rubino lake. Along this road, a consistent number of rural houses are located, in bad structural conditions (collapsed coverages). Fazio suburb follows morphologically the suburb scheme type with the buildings around the plaza as the place of collectivity life. On the plaza, in fact, the principal buildings are built: the church with the parsonage, the local Fascist branch, the PNF, GIL and OND, the labor unions and Podesta delegation, the post office and the Real Policemen Station, the Colonization corporation offices and the medical dispensary seat. Slightly behind, but always on the plaza we find the school. While the restaurant, the shops with the relative artisans houses are situated in a building block in a side road (fig. 1, 2, 3, 4).
Fazio suburb shows the rural suburb ideologies of Luigi Epifanio. It has "… *justly unity of conception, as a new building complex, it's not only a solution of an urbanistic and building problem, but the testimony of an historical moment and a great social event and this has to express with the shut composition of its volumes that, also in the variety, to agree and melt each other as song strophes*[7]."

From the architectural point of view, the suburb, in fact, is an imposing two floors building complex, convex building surfaces and games of archs. The buildings are different each other. Some are inspired to rural constructions as Corporation offices . The other buildings are, instead, mostly influenced by their use, both in the plant and in the volumetries and in some façade elements; they were inspired to analogous models proposed in the cities as the circular windows of the church.
Other recurrent element in these architectures is the arch. Epifanio, in fact, during the studies on the Sicilian housebuilding, had found the recurrent use of the arch.
He proposed the solution of the arch in various building parts and with different function. Sometimes in isolated solution, as in the artisans houses, to introduce in a courtyard (fig. 5), sometimes in sequence, as in the case of the long line of archs that constitutes the sacristy arcade, as a filter between the parsonage inside and outside space. In the local Fascist branch, the arch is not only a formal element that acts as entry to the terrestrial plan but it also sustains the external staircase to the first floor.

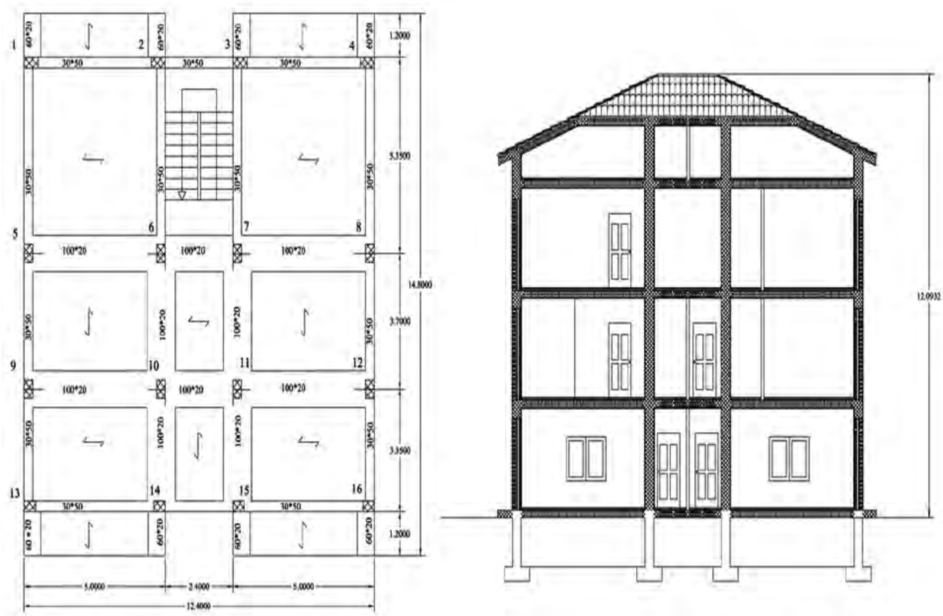
5.0 Materials and constructive techniques

In the Fazio suburb both traditional and innovative constructive materials were used. All the suburb buildings present a mixed structure, that is carrying structure in masonry and hollow tile floor and wood roof.
Despite the corporation instructions were turned to the use of traditional materials, easily available on the place (to avoid transport costs), and excluded the use of reinforced concrete and metallic materials, all the floor are realized with hollow tile and reinforced concrete. Besides, reinforced concrete has been found in the church, both in a kerbstone to the height of around 6 meters that encircles the elevated height carrying masonry, and in the carrying structure of the church coverage. The church saddle roof, in fact, is realized with roof trusses in reinforced concrete and beams and wood boarding and roof covering of marseilles tiles and with a wood drop ceiling.
with roof trusses in reinforced concrete and beams and wood boarding and roof covering of marseilles tiles and with a wood drop ceiling.
In the local Fascist branch we can see a hollow tile floor (fig. 6) and a hip roof with trusses, beams and boarding in wood and roof covering of marseilles tiles (fig. 7).
A particular technique has been found in the hollow tile floors, realized without cage and with a prefabrication constructive procedure. To simplify and make more economic, the floors were realized with precast joists, assembled on site. Particularly they are special tile double Y shaped pieces, used as formworks to lose.
The special tile pieces were approached, assembled to joint and completed at work with the insertion of the armors, prepared in the special grooves and settled with mortar as to realize a joist with superior and inferior armor. These pioneer prefabricated beams had very rapid times of seasoning and allowed to avoid the wood scaffoldings. The floor was completed with two layers of channelled flat tile.
To the joists set to a distance of around 30 cm, the channelled flat tile were leaned and on these a throw of levelling mortar and the flooring were realized. The floor intrados

resulted plain and directly plastered. This floor type has the advantage to be light and introduced some good characteristics termo-acoustics thanks to the empty space creating among the two layers of channelled flat tile.
Regarding to the vertical carrying structures, all the buildings were built with limestone carrying masonry with blocks of equal length and thickness, but different width.
The masonries result all due with plaster, except for some ornamental parts dressed with square stone as the church arcade that introduces a covering up to three meters with irregular stone, and as for the building basement and the doors and windows lintels of the principal prospectuses. (fig. 8-9-10).
Regarding the finishes: the inside floors are in cement tiles and the outside ones in calcareous stone; the external plasters are the type Li Vigni and Terranova; the inside and external fixtures and shutters are in wood.
Currently the buildings are damaged both for natural events (earthquakes) and for work of man. Particularly we found some collapse of: coverage, underlying floor and some walls of the local Fascist branch, floors of the artisans buildings, over the lack of fixtures, plates of marble and all the materials easily removable and reusable (fig. 11).
A problem to be faced is, over the restauration of these testimonies of modern architecture, their use destination that can vary for every single suburb, in reference to location and tipological and morphological characteristics.

Notes

1. She is a search check holder of MIUR at the "DPCE" of the University of Palermo.
2. Caracciolo E., *La nuova urbanistica nella bonifica del latifondo siciliano*, in Ministero dell'Agricoltura e delle Foreste, "Bonifica del latifondo siciliano", Palermo 1942-XX.
3. Mazzocchi Alemanni, *La redenzione del latifondo siciliano. Opere e problemi*, in Ministero dell'Agricoltura e delle Foreste.
4. Gadda C.E., *La colonizzazione del latifondo siciliano,* 1941.
5. The plan of the eight susurb were exhibited in Massimo Theatre of Palermo in 04-02-1940.
6. Actually Fazio suburb is used as a game field, where are simulated war strategies.
7. Epifanio L., *La nuova architettura rurale in Sicilia*, in Ministero dell'Agricoltura e delle Foreste, "Il latifondo siciliano", Palermo 1942-XX.



ACTIVITY	MACHINARY	TOTAL TIMES Hours
Preliminary site works Fencing of the construction site, connection to utilities, wiring and water systems for the site, assembly of crane and huts	Truck - Crane	148
Excavation General cleaning and excavation	Excavator – Truck - Shovel	147
Building of the foundations Layer of weak mix, reinforcing and casts layer cement beams, drainage system, French drain dismantling	Cement mixer – pump - bender – truck - shovel	182
Creation of the horizontal structures Reinforcement work and casts laying of the small beams layer for completion of dismantling	Bender – crane – mixer - pump	1180
Creation of the vertical structure Preparation of the reinforcements and casts layer of cement dismantling	Bender – crane – mixer pump	431
Building of the external and internal walls Masonry with perforated bricks, insulating panels and hollow bricks	Crane – pan mixer	648
Creation of the systems and finishing work Water system – wiring – floors and coverings – plastering – fixtures – painting – guttering and balconies	Crane – pan mixer	1248
N.B. the hours shown indicate total time dedicated to the work including time when the machinery and equipment were not in use.		

Fig. 1 - caperntry plan and section of the building
Tab. 1 - Work Breakdown Structure of the production process

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LCA IN EXECUTION PHASES OF THE BUILDING PROCESS

1.0 Introduction

Life-Cycle Assessment (LCA) evaluations have been focussed on the building sector for some years now. Investigations of the building process, seen as the full life cycle of a building, have not, however, focussed specifically on the construction site phases.
This study aims to evaluate, in simplified terms, the contribution of the construction site phases on the total impact of the process.
To this end we identified a typical building/construction site built according to current planning and building practices. We then calculated energy and resource consumption by machinery and tools used on the construction site in relation to current available technology and ways of producing energy.
This data has enabled us to calculate the input for the LCA analysis carried out using three of the internationally most commonly used methods.

2.0 LCA for the construction site phases

Recent studies have quantified the proportion of the impact on the life-cycle of a building made by the materials and energy consumption during the running of it: energy consumption during the running phase of the building is responsible for approximately 50% ~ 70% of environmental damage, while the materials used make up about 25% of the damage.
LCA allows us to see the processes or activities that cause the greatest amount of environmental damage within the life cycle of a product or service; consequently investments for quality improvement are aimed at these processes. This is the focus of the evaluations of this study.
Estimates of consumption were made on the basis of currently available technology, the average quality of machinery currently used by contractors and energy production methods used today. To do this it was necessary to define a working model using a strict analysis of the results given by methods used on the basis of input data, which was deliberately and necessarily simplified.

3.0 Simplified model of the construction site for LCA analysis

The first evaluation for this work was the definition of a building/construction site model able to give interesting results, which could be extended to other situations as much as possible. For the objects of this work we imagined a four-storey building, with two apartments on each floor, a reinforced concrete frame and brick outer walls. We also imagined the standard procedures for the phases of the building work. The phases of the building work followed a traditional logic with a preliminary logistic phase of preparing the construction site with its provisional structures followed by the excavation works. The very common type of construction is suitable to act as a model for the LCA evaluations. The foundation structures chosen are ground beam and column foundation in reinforced concrete cast in situ. We have imagined the walls in thermally insulated brick, the roof with a layer of cement tiles, placed on a layer of thermal insulation (cork) protected by shock dispersing blocks.

4.0 Input data for LCA analysis

4.1 Destructuring of the building and definition of the working phases and sequences

The building/construction site model was destructured to define the phases, the sub-phases and the resources used. A productive cycle was identified defined by:
Fixed machinery installed in the initial phase of preparing the site, such as the tower crane, equipment for preparing mortar (mixer); the rod bender; the circular saw;
Mobile machinery used at times according to the development of the work, such as the excavator, the scraper, the truck mixer, the cement mixer, the bulldozer and the trucks.

4.2 Inventory

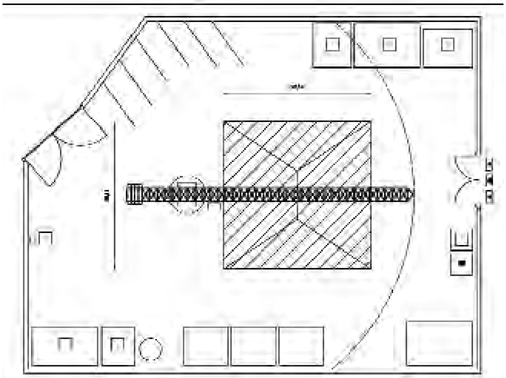
ISO 14041 regulations (1998) require the creation of an inventory, which includes many data. In the case of the building/construction site case study we gathered data for the whole process regarding:

- Materials used (including their production processes)
  in the construction
  during the maintenance phase.
- Energy consumption during the use of the building
- Site activity, seen as the sum of the materials making up the machines and the energy consumption necessary for them to function.
  (Note: the maintenance phase includes data relative to machinery used for maintenance).

5.0 Life-cycle assessment analysis

The building/construction site was subject to life-cycle analysis using the Life-Cycle Assessment method defined by the series of ISO 14040 regulations (ISO; 1998-2000).
Various methods have been drawn up to conduct the “impact evaluation” phase (Life-Cycle Impact Assessment), defined by the ISO 14042 (2000) regulations. The various

Fig. 2 - plan of the construction site



		Consumption Litres/HP·h	HP	Working conditions	Consumption [Litres/h]
Excavator		0,2	200	70%	28
Scraper		0,2	350	55%	38,5
Truck mixer	Auxiliary engine	0,18	115	90%	18,63
	Main engine	0,2	340	40%	27,2
Bulldozer		0,2	140	70%	19,6
Trucks		0,2	300	40%	24

Table 2 - Table of average consumption HP/h considered in the analyses

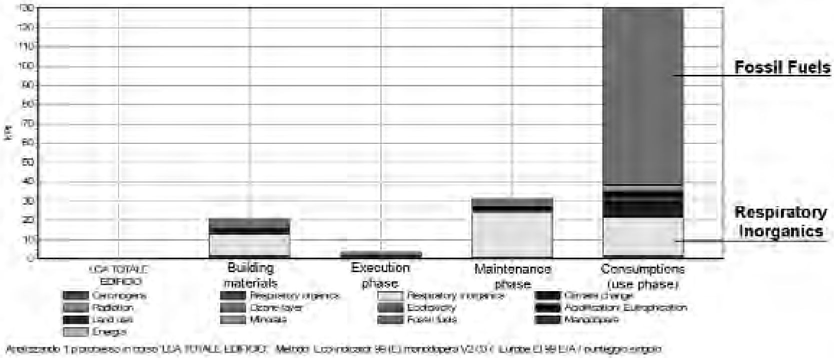


Fig. 3 - Analysis with Eco-Indicator '99: Single Score results

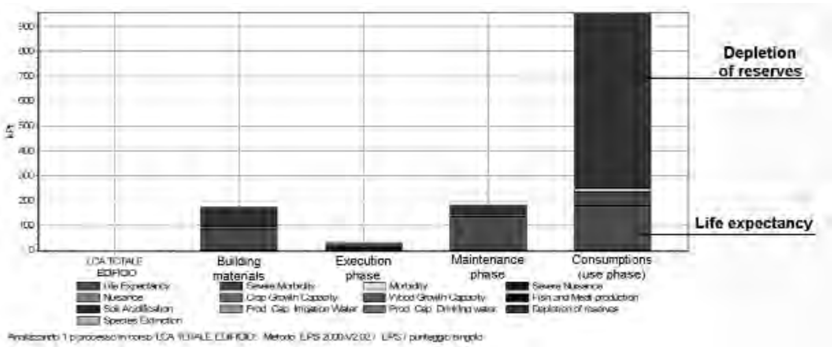
Total Impact score	**$1{,}87 \cdot 10^5$ Pt**
Construction materials	11.3 %
Site phase	2.03 %
Maintenance phase	16,8%
Use phase (consumptions)	69,8%

Table 3 - Analysis with Eco-Indicator '99: Impact scores by process

Energy (MJ)	$3{,}47 \cdot 10^{6}$
Construction phase	9.64 %
Site phase	0.41 %
Maintenance phase	2.18 %
Use phase (consumptions)	87,8 %

Table 4 - Inventory of Energy by process contribution

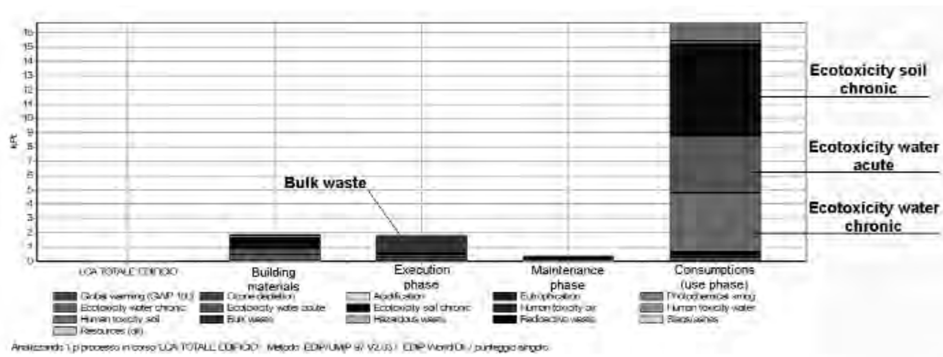
Figure 4 (below) - Analysis with EPS 2000: Single Score results



Total Impact score	$1{,}34 \cdot 10^{6}$ Pt
Construction materials	13 %
Site phase	2,33 %
Maintenance phase	13,7 %
Use phase (consumptions)	70.9 %

Table 5 - Analysis with EPS 2000: Impact scores by process

Figure 5 (below) - Analysis with EDIP 97: Single Score results



Total Impact score	$2{,}14 \cdot 10^{4}$ Pt
Construction materials	9,38 %
Site phase	8,76 %
Maintenance phase	2,02 %
Use phase (energy)	79,8 %

Table 6 - Analysis with EDIP 97: Impact scores by process

methods are calibrated in different ways, so that the environmental problems are "weighted" differently in each. We therefore used three methods: Eco-Indicator '99, EPS 2000 and EDIP 97, and the results are given and interpreted throughout the work.

5.1 Eco-Indicator '99 Analyses

The results of the Eco-Indicator analyses show that the site phase, made up of the data related to the machines and energy consumption on the construction site, represents 2.03% of the total damage. Most of the environmental damage (69.8%) is due to consumption of resources (gas, electricity and drinking water) during the 80 years of use taken into consideration, and resource consumption accounts for a total of 58.6% of the damage. The Characterisation (ISO 14042) shows that, in the "Resources" category of damage, the site phase is responsible for 2.53% of the damage (out of a total of 58.6% for the category). The category of "Human Health" damage receives 37% of the total damage, 49% of which is due to the emission of particles <10?m, because of the dust created by raw material extraction. 45% of the damage from this category is due to CO_2, NO_x and SO_x emissions from electricity generation during the usage phase.
The Eco-Indicator '99 method, contained in the SimaPro 7.0 software, has been modified for the purposes of this study in order for it to return inventory data relative to:

1. Energy intrinsic to the various processes. The results are shown in Table 6.
2. The number of working days (man days) during the site phase, which is an indi cator of worker exposure to activities that can be harmful to health.
   The result is 1.12 10^3 Days.

The influence of this figure on the total impact score cannot at present be calculated because the databases do not show the processes involving direct exposure of the worker to emissions on the construction site, and also the methods used do not expressly declare whether the damage to human health is calculated taking into account exposure to emissions in the factories where materials are produced (for example cement), and whether they consider human exposure during handling of the materials.

5.2 Analyses with EPS 2000

The analyses with EPS 2000 give similar results to those with Eco-Indicator '99, with regard to the share of damage attributable to each phase of the life cycle. The different organisation of the impact categories within the method shows that it attributes most of the damage to the depletion of resources, created in all phases, among which there are:

- 82.3%of resource depletion is during the use phase
  (due to energy consumption)
- 3.01% of resource depletion is during the site phase

Other substances which cause a large proportion of the damage in the most common impact categories are NO_x and SO_x , substances that are created throughout each phase:

- NO_x: 72.9% during use (energy consumption) and 5.17% during the site phase

- SO_x: 98% during use and 0.224% during site phase.

5.3 Analyses with EDIP 97

The EDIP 97 method considers the impact categories that describe increased toxicity in water and soil as being extremely sensitive. The effect of this structuring of the method is very clear in the histogram bar for energy consumption, where substances released into water make the damage created by energy consumption equivalent to 90% of the total. In particular, both in the "Ecotoxicity water chronic" and in the "Ecotoxicity water acute" categories, Strontium is responsible for approximately 85% of the damage. In both categories, the site phase creates approximately 4.5% of the damage.
With this method the site phase accounts for 8.76% of the total damage. This is because of the great emphasis EDIP 97 puts on the dumping of the material excavated for the foundations (70% of the damage attributable to the construction site).

5.4 Life-Cycle Interpretation (ISO 14043)

From the analyses we can see that, for two of the three methods the construction site phase makes up 3% of the total damage created by the life cycle of the building/construction site. The EDIP 97 method puts great emphasis on the dumping of the material excavated for the foundations. This shows that we need to find a different way of disposing of this material, and by analysing the numbers we can see that if we eliminate the damage from dumping, the damage from the site phase becomes 2,6% ~ 3% of the total, exactly as described in the other methods.

6.0 Conclusions

The analysis conducted on the Life-Cycle of the building/construction site being studied, on the basis of a life cycle of 80 years, has shown that the environmental impact attributable to the site phase, under the hypothesis we have described, can be calculated as approximately 2~2,5 % of the total damage.
In particular, the Eco-Indicator '99 and the EPS 2000 methods show that 60% of the site phase damage is caused by fossil fuel consumption, both directly (from machinery with an internal combustion engine on site) and indirectly (through the production of the energy needed for the electrical machinery). The EDIP method also gives us suggestions for waste disposal, since it shows a high level of damage from the dumping of the waste produced during excavation.
The data relating to the effect on total damage of the site phase (2% of total environmental damage, referring to a building life of 80 years) shows the need to do further research into the critical impact of this phase on the environment. The difficulties we have encountered in this research are the lack of a method based on models that reflect the real situation in Italy and an appropriate database. When drawing up the inventory for the work phase of the site, like the one in this case study, based on the type of construction that could be defined as "cast in situ", we must recognise the great contribution that the labour factor gives to the creation of the system under analysis. Considering this great contribu-

tion we hope that elements and procedures that can quantify the damage to the health of the workers by the site activities will be integrated into the methods and especially the data bases, connecting this to the damage to human health caused during the whole life cycle of the building.
Without this type of data and the specific measuring instruments needed, we thought it right in any case to include in the evaluation system an indicator not just of the environmental damage but also of the sources of damage to human health. In this particular case we have introduced an indicator of the number of workers employed on the site.
In other words, the indication for future research is to create a factor that shows the impact, on a world or European scale, of the damage to health caused on the construction site and "localised" to this small group of people who are more exposed to the emissions of certain substances.

Notes

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3. PhD at the University of Basilicata
4. Professor at the Polythecnic of Bari, Department of Archtecture and Urban planning
5. International Standard Organisation (1997) *ISO 14040, Environmental management - Life Cycle Assessment - principles and framework*

6. International Standard Organisation (1998) *ISO 14041, Environmental Management - Life Cycle Assessment - goal and scope definition and inventory analysis*

7. International Standard Organisation (2000) *ISO 14042, Environmental Management - Life Cycle Assessment - life cycle impact assessment*8. International Standard Organisation (2000) *ISO 14043, Environmental Management - Life Cycle Assessment - life cycle interpretation*

9. International Standard Organisation (2002) *ISO TS/14048, Environmental Management - Life Cycle Assessment - data documentation format*

10. International Standard Organisation (2003) *ISO/TR 14047, Environmental Management - Life Cycle Assessment - examples of application of ISO 14042*

11. Weidema B., Fress N., Holleris Petersen E., Ølgaard H. (2003) *Reducing uncertainty in LCI - Developing a data collection strategy*. Environmental project no. 862-2003, Danish Environmental Protection Agency, Copenhagen.

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UNDERGROUND CITIES, CAVE DWELLING, CAVE HOMES: YESTERDAY, TO DAY, TO-MORROW

1.0 Introduction

In several parts of the world there are areas more or less extended where cities not constructed, but dug exist. The Mediterranean basin is rich of these takeovers. Spain, Italy, Tunisia and Turkey are the areas where the more interesting examples exist.
The cliff is constituted in calcarenite prevalence of a sedimentaria cliff than turns out tenderly and easy modellabile. This has allowed the formation of numerous coves, it has facilitated the digging and the finding of material from construction, and has concurred the excavation of channels and reserviors. Orography of the territory and the nature of the cliff have favorite the human takeover sin from the preistoria.
In Shaanxi Province of China there are more than 20 million people currently living in traditional cave dwellings in China, especially in the loess plateau along the Yellow River in the northwest part of the country, and people are still building new cave dwellings today. Although basic by modern Western standards, these dwelling provide residents with reliable shelter, making the best use of materials available with a minimum negative impact on the environment (Fig. 1).
Caves are ecologically-friendly houses. Arguably, they are the most ecologically-sensitive form of construction, and could be combined with an alternative energy system to become almost completely sustainable. They maintain a constant indoor temperature with natural earth insulation, which also keeps them quiet. They do not require large amounts of inputs in terms of bricks, concrete, mortar, metal, or wood, and do not demand costly synthetic or ecologically-questionable construction materials. In fact, earth caves must be able to "breathe" naturally to last. Costs are therefore kept to a minimum, except for the expense of labor. Requirements for a completed house are limited to a natural floor finish such as terracotta tile or brick, a thin stucco-type wall and ceiling treatment (usually whitewashed; preferably a form of hydrated lime), mechanical systems, and fixtures. Earth caves can also be built to specification. Within certain limitations, one can have high or low ceilings, large or small rooms, curvilinear walls, domed or arched ceilings, alcoves, built-in furniture, and a catalog of sculptural room effects. In fact, building this kind of cave house is like sculpting your house from inside out--a most

unique experience. No two cave houses are the same. Given enough land, you can also expand instantly and easily.
Through the reading of four cases study the Cappadocia in Turkey, Matmata and Bulla Regia in Tunisia and Gaudix in Andalusia, will come put in evidence similar cases and differences, the asset, the constructive techniques, the modalities of use and management.

2.0 Yesterday: Cappadocia (Anatolia, Turkey)

Cappadocia lies at the heart of Central Anatolia and occupies the region between Kayseri to the east and Aksaray to the west, Hacibektas to the North and Nigde to the South. The area was formed when three volcanoes (Erciyes, Melendiz & Hasan) erupted approximately 10 million years ago. The area became covered in volcanic ash which over time hardened into a porous known as tuff. Over the intervening years, erosion has landscaped the region into a beautiful area of valleys, high plateaus, rock outcrops dotted with the famed "Fairy Chimneys" for which the area became famous.
The porous stone was easily carved and man has used the natural wonders of the lanscape to create complex rock dwellings and churches. The best of which are to be found in the Zelve and Goreme Valleys. The main east - west trade route which crossed the Cappadocian plains saw not only silks, spices, gold and jewels but a constant stream of foreign armies travelling between Europe and Asia. To escape from these armies and the dangers thus posed, the population carved out elaborate and complex underground cities into which they disappeared when such dangers encroached.
As an important trade route developed, many different groups settled in the area. Christianity gained a hold from about 47 AD and large christain communities settled in the area carving out rock-cut dwellings, churches and monasteries. The open-air museums of Goreme and Zelve provide visitors with an impressive array of rock cut churches many of which are painted with frescos. The area has now been declared a world heritage sight Urgup.
For millions of years, the mighty volcanoes of the Central Anatolian Plateau erupted and spewed their contents across the land that would become the cradle of civilization.
Another great volcano rises in the distance to the east of Hasan Dagi. These two ancient volcanoes mark the western and eastern boundaries of a region known for its curious volcanic landscape that has been relentlessly carved by nature and by the people who have lived here. 'Fairy chimneys,' cones and strange rock formations have been sculpted by wind and rain while subterranean towns were excavated by a populace seeking shelter from the conquerors and would-be conquerors who crisscrossed the wide open steppes of the Central Anatolian Plateau. Ancient Anatolian tribes, Assyrians, Hittites, Phrygians, Turkic tribes from Central Asia, Mongols, Persians, Syrians, Arabs, Kurds, Armenians, Slavs, Greeks, Romans and Western Europeans have all passed through leaving behind some of their traditions as well as their genes and rendering Cappadocians as exotic as their surreal surroundings. The valley became an important center of monasticism that lasted from the 4th to the 14th centuries. There are an estimated 150 churches and several monasteries in the canyon between the villages of Ihlara and Selime.

The main churches are marked although a few have been closed to the public. The most popular churches are those in the canyon area between the villages of *Belisirma* and *Ihlara*. However, Yaprakhisar and Selime are more interesting architecturally with stone houses that extend into the rock caves. The village of Selime is named after the sultan whose conical tomb stands on the river's bank and numerous facades are carved into the cliffs at Yaprakhisar (Fig. 2).

2.1 Underground Cities

Although referred to as "cities," the underground communities of Cappadocia probably served as temporary shelters rather than as permanent hidden cities. The incessant darkness is hardly conducive to life and some of the passageways are little more than crawling spaces that would have been intolerable in long-term situations. No one is certain as to the number of underground communities that exist or even by whom they were built. The two largest communities that have been unearthed are located at *Kaymakli* and *Derinkuyu*, 20 and 30 kms. south of *Nevsehir*. It is thought that the Hittites may have excavated the first few levels in the rock when they came under attack from the Phrygians around 1200 BC. However, some archaeologists believe that the oldest caves, those hewn with stone rather than metal tools, are substantially older. These chambers were later expanded into an extensive troglodytic complex by Christians escaping the Arab invasions of the 7th and 8th centuries. Discreet entrances give way to elaborate subterranean systems with air shafts, waste shafts, wells, chimneys and connecting passageways. The upper levels were used for living quarters while the lower levels were used for storage, wine making, flour grinding and worship in simple chapels. Everywhere, walls have been blackened from the use of torches. There is a connecting tunnel between Kaymakli and Derinkuyu that allowed three people to walk through at the same time but it is not available to the public as parts of the tunnel have collapsed.

0nly 10 kms. to the east of Kaymakli is another cavetown at Mazikoy that may be connected with Derinkuyu, but this remains to be proven. This community was built within the walls of a cliff. Unlike Kaymakli and Derinkuyu, there are no stairs or grades that pass from one level to the next. Instead, the different levels are well defined with connecting tunnels through which people climbed up or let themselves down by means of footholds carved into the walls of the shafts. Mazikoy is often bypassed because it is a smaller community, its location is away from the main road and a certain agility is required to fully appreciate its features (Fig. 3).

2.2 Rock Cut Churches and Monasteries

Many settlements in Cappadocia were established primarily as monastic communities. As Bishop of Caesarea Mazaca in the 4th century, St. Basil the Great wrote the rules for monastic life that are still followed by monks and nuns of the Greek Orthodox Church. He advocated community life, prayer and physical labor rather than the solitary asceticism that was popular at the time and it was under his guidance that the first churches were built in *Goreme Valley*. Here, a number of small communities with their own chur-

ches formed the large monastic complex that is now the Open Air Museum. Hundreds of churches are reported to have been built in this valley but no churches from St. Basil's time remain. In Goreme, the *Tokali Kilise* or the "Buckle Church" is easily the loveliest of the churches with graceful arches and beautiful frescoes.
The most impressive monastery in Cappadocia is the Eskigumus Monastery to the east of Nigde off the Kayseri-Nigde road. It is the most southerly of the Cappadocian monasteries and lies close to the route taken by the invading Arabs who traversed the Tarsus Mountains from the south to plunder Kayseri in the 7th century. This route follows the Tarsus River through a precipitous defile called the Gulek Bogazi. It was known in the ancient world as the Cicilian Gates and was used by Alexander the Great in his eastward campaign against the Persians. The nondescript entrance to the Eskigumus Monastery was designed to shield the monastery complex from invaders passing by. It was so successful that the monastery was not discovered until 1963, having escaped the vandalism to which many of the Cappadocian churches and monasteries were subjected. The large inner courtyard boasts high walls surrounded by monastic rooms and storage chambers. The main church is spacious and airy and its well-preserved frescoes are considered to be the best example of Byzantine art in all of Cappadocia (Fig. 4).

2.3 Matmata (Southern Tunisia)

Matmâta (also spelled Matamata) is a small village in southern Tunisia. Some of the local Berber residents live in traditional underground structures. These structures are created by digging a large pit in the ground. Around the perimeter of this pit are artificial caves used as rooms. Some homes are comprised of multiple pits, connected by trench-like passageways. The history of this extraordinary place is not know, except from tales carried from generation. The most probable one says that underground homes first built in ancient times, when the Roman empire sent two Egyptian tribes to make their own homes in the Matmata region, after one of Punic wars, with permission to kill efery human being in their way. The dwellers of the region had to leave their homes and to dig caves in the ground to hide from those invaders, but they left their underground shelters in the night to attack invaders, which appeared to be very effective act in sending killer groups away from Matmata. A myth was made those days, that monsters emerge from beneath the ground and kill land usurpers. Anyway, the underground settlements remained hidden in very hostile area for centuries, and no one had any knowledge of their exstence until 1967 (Fig. 5).

2.4 Bulla Regia

The site of Bulla Regia lies 170 kms away from Tunis. The city of Bulla was first mentioned by Latin classical sources when the pursuing Roman armies caught up with the Numidian king Hiarbas at Bulla where he had sought refuge (in 81 BC). It also appeared, much later, (end of 4th century AD) in one of Saint Augustin's sermons when he reproached the inhabitants of the city for continuing to go to such places of debauch as the theatre" While their neighbours,the inhabitants of Chemtou, had long ago deserted them.In the writings of Arab travellers, Bulla Regia is referred to as Henchir bul. Archaeology and in particular Latin inscriptions , are much more generous in terms of information supplied.They enable us to trace the history of the city since the 4th century BC until the Moslem conquest in the seventh century AD. Ancient human occupation in the region is attested by the famous Kef al Agueb cave, situated about 5km West to South West of Bulla .This shelter dates back to the Neolithic age.The Dolmens situated to the south on a line of rocks visible from the site, are also ancient Although they have not been dated with precision.The Dolmens,about a hundred in all, are tombs that were known in North Africa during the whole of the1st millenary BC. The date of Bulla's foundation is not known but imported Greek ceramics dating back to the beginning of the 4th century BC have been found on the site. In the 3rd century, the city and the region of the great plains came under direct Carthaginian control; this domination was, however, preceded by a long period of human and economic exchanges. As a result, the inhabitants gradually became more Punic in their ways until they adopted the Punic civilisation with all its components : Religion, Language, Script funeral rites as attested by the votive and funerary stelae discovered on the site. Three quarters of the Bulla Regia site is still underground. Only a part of the city has been excavated. Neverthe- less, it presents a range of public and private monuments characterizing Roman cities. Bulla Regia remains the unique city to have two storied dwellings with one floor underground. This feature can probably be explained by the need for protection against excessive heat in summer and the cold in winter . Bulla Regia's most impressive portions lay underground. To escape the summer heat, the Romans built their villas here one story above ground and another below.

One of the few above-ground buildings remaining are the Memmian Baths, named after Julia Memmia, wife of Emperor Septimius Severus. Most of the buildings date back to the reign of the Emperor Hadrian (117-138 AD). In both the House of Fishing and House of the Hunt were an underground level. As we went down the stairs, our tour guide (who spoke loud, broken English) told us that those terra cotta openings (about the width of a drinking glass) were air conditioning vents. Imagine that the Romans enjoyed air conditioning nearly 2,000 years ago! Even though it wasn't warm outside, a definite difference of temperature was noted in the lower level. In the House of the Hunt, an elegant central courtyard was the focal point, providing light and welcomed air. Around the perimeter of the courtyard were large entertainment areas, several with well-preserved mosaics. In several of these buildings were mosaics left *in-situ*. In the House of the Amphitrite is a beautifully preserved mosaic of Venus and a cupid riding dolphins. My favorite mosaic was the Triumph of Venus. Like other mosaics, this one's true brilliance were revealed with sprinkled water. Although I had viewed many mosaics from the Bulla Regia site at the Bardo Museum, it sure added extra meaning to see some mosaics still in their original places.

Moving onward, we were led to the small, but well-preserved theatre. On the stage was a well-preserved mosaic of a bear. Near that was a small hole. Our guide demonstrated that this hole acted as an amplifier when speaking - an ancient microphone.

In addition to the Roman buildings, remnants of the Byzantine occupation of the area also exist. Recently excavated was a beautiful font covered with mosaics. About a stone's throw away was a girl tending her sheep which likely grazed on top of more ruins yet to be discovered (Fig. 6).

3.0 To Day: Gaudix (Southern Spain)

In southern Spain, however, cave homes are man made, and not natural formations that humans simply moved into. Some of the very earliest names for the city of Granada refer to its cave dwellings. In nearby Benalua, a suburb of Guadix, everyone lives in a cave, just as in the gypsy quarter of Sacromonte. There are cave theaters, cave hotels, cave restaurants, cave spas, and of course, cave houses, known in Spanish as casas cueva. At the other end of the Sierra Nevada mountain chain too, near Almeria but still in Granada Province, cave dwelling has existed at least since the Arab invasion of Iberia in the 8th century. Granada Province has the largest cave dwelling population in Europe.

Here cave buildings do not, as might be expected, exist inside natural rock formations, like at Capadoccia in Turkey or the Tarn Gorge in France. Instead, they are intentional dwelling spaces carved out of hard clay and earth. Buying, refurbishing, or creating a new cave house represents the ultimate in efficient and sustainable living--though please be advised that we would not suggest building a cave house outside of regions where it is common practice and the structural integrity of the earth is well known. In Granada, the ancient cave dwelling area extends far beyond the contemporary city, into the hills and ravines of San Miguel Park, where some squatters still live, laying claim to caves without running water or electricity and living rent-free.

In southern Spain, cave houses naturally maintain a steady temperature of around 19-20 degrees centigrade year round. This is quite exceptional in a montane climate like Granada City where summertime temperatures surpass 40 degrees and where it occasionally snows in winter. Building a cave dwelling is relatively inexpensive (though not necessarily cheap), cave houses can have all the amenities of a regular house (and more), electricity, plumbing, and HVAC are easy to install, and cave houses remain dry and habitable with normal ventilation, unlike many stone caves that can store dampness. Even those with claustrophobia find modern cave houses quite comfortable. After becoming accustomed to cave living, it is soothing to return to a home with the solidity of the earth and the silence of a church. In Granada, the most geographically diverse province in the Iberian Peninsula, there exist distinct concentrations of cave settlement, notably in the historic Albaycin and Sacromonte neighborhoods of Granada City, in Guadix, on the other side of the majestic Sierra Nevada mountains, and in the more mountainous region of Baza. The Albaycin and Sacromonte are adjacent hillside neighborhoods, both of which form part of a UNESCO World Heritage Site along with the Alhambra Palace. They are ancient settlements, with cave dwelling existing at least back to Arab times, well before the 15th century. Guadix and Baza are similarly ancient cities. One likely historical explanation of cave building is that the Arabs brought the tradition with them from the troglodyte abodes of North Africa, starting in the early 700s. The total cave-dwelling population of the three areas runs into the tens of thousands. Some cave houses are extremely large, having up to ten or more rooms. Here there are specialists in cave construction, renovation, and expansion (Fig. 7).

4.0 To Morrow: The Advantages Of Caves

Caves are ecologically-friendly houses. Arguably, they are the most ecologically-sensitive form of construction, and could be combined with an alternative energy system to become almost completely sustainable. They maintain a constant indoor temperature with natural earth insulation, which also keeps them quiet. They do not require large amounts of inputs in terms of bricks, concrete, mortar, metal, or wood, and do not demand costly synthetic or ecologically-questionable construction materials. In fact, earth caves must be able to "breathe" naturally to last. Costs are therefore kept to a minimum, except for the expense of labor. Requirements for a completed house are limited to a natural floor finish such as terracotta tile or brick, a thin stucco-type wall and ceiling treatment (usually whitewashed; preferably a form of hydrated lime), mechanical systems, and fixtures. Earth caves can also be built to specification. Within certain limitations, one can have high or low ceilings, large or small rooms, curvilinear walls, domed or arched ceilings, alcoves, built-in furniture, and a catalog of sculptural room effects. In fact, building this kind of cave house is like sculpting your house from inside out--a most unique experience. No two cave houses are the same. Given enough land, you can also expand instantly and easily.As the environmental impact of urban development and sprawl becomes increasingly evident, architects and designers are turning more and more toward “green” design. An Earthwatch-supported research project in Shaanxi Province, China examines traditional cave dwellings as an inspiring example of sustainable design. Examples of sustainable design features found in the caves include the fact that they are built entirely from materials acquired nearby and using simple hand tools, avoiding the added environmental costs of manufacturing, transport, and heavy machinery. They do not occupy valuable arable land, so are very efficient in their land use. The cliffs face south, and the thermal mass of the solid loess provides solar warmth into the winter and a cooling effect into the summer.

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A. Bianco

MEDIEVAL ARCHITECTURES IN THE PLATEAU OF JORDAN RIVER BETWEEN INTEGRATION WITH NATURAL ENVIRONMENT AND INTERACTION WITH ANTHROPIC TERRITORY: THE CASE STUDY OF THE MEMORIAL OF MOSES ON MOUNT NEBO

Abstract

The article exposes an historical excursus of anthropic and architectonic settlement, verified on the plateau of Jordan river (in Jordan and Palestine) in the course of Moyen age (IV-VII d. C.) as strategy to occupy and control this territory, but, at the same time, realized with a particular propensity to the integration with the natural context, characterised by both historic and naturalistic great suggestion.

Finally the articles exposes the case study of the Moses' Memorial on Mount Nebo, that is an extraordinary example of adjusted to the territory architecture, whose restoration plan originates really to re-estabilish this agreement between the monument and the natural context (1).

1.0 Premise

The plateau of Jordan river encloses a broad region, composed by a big fault, which crosses the Palestine and Jordan, until the Dead sea and until the borders with Syria and it is characterized by its extraordinary fertility, in a generally arid and improper to anthropic life context (*Figg. 1a e 1b*). The Jordan river traditionally is holder, in the religions of Jewish root, of a strong religious meaning, it is in fact the symbol of the catharsis because it represents the boundary line between the Promised Land and the desert. That, along with the fertility that this perennial water course donates to the region, allowed that the valley was steadily and densely lived from IV century AD to VIII century AD, when a disastrous earthquake determined its sudden obliteration. Majority of the architectonic evidences of this territory pertains to this specific period.

2.0 The architectural and archaeological heritage in the plateau of the Jordan river

The architectural heritage of this large plateau, located at above 1000 metres sea-level, is characterized by, in the historical period under discussion, essentially by presence of a lot of cities; in the first place certainly Jerusalem, the "heart of the world", but also Jerash, Madaba, Nebo, Animatea, today named Ramallah, Neblus and Hebron. The predominant feature of these cities, both in terms of distribution on the territory, lied in to rise beside the Kings Road, the foremost

and most ancient arterial street of the plateau, so to represent a break place of caravans and to exercise direct dominance on this area. Therefore these cities could not placed on summits, more defensible, but downstream, in all the plateau, often in proximity of wadi, little feeders of the Jordan river. So these cities involved of strong walls, in which the city evolved chaotically, without a program organization or a pecking order.
Outwardly of cities, although gravitating around these urban centres, lived the beduin nomad community (from the term bedu, in Arabian language nomad). The architectural peculiarity of the built of these cities was a absolute chromatic consonance to natural context , because realized with use of a yellow calcareous stone, in Arabian language named nary, taken out in situ and geological typical of this valley. (*Figg. 2a e 2b*).
Besides cities, the area presents an abundant archaeological heritage of little hermit churches, placed customarily far from the roads, often on high pinnacles, like the Saints Lot and Procopio church or the Saints Amos and Casiseos church, or afferent to little monasteries of ascetic monks, like the Deacon Thomas church or the Virgin Theotokos church, or still founded along a sacred rises, like the el-Keniseh church and the Kainaos church. Architecturally these are little churches with three aisles, with three apses, realized with thick walls of nary squared off stones and simple wooden roof with trusses, characterized by a light inclination fully concordant, in its volumetric compliance, with the orography of this striking territory (*Figg. 3a e 3b*).
So the common component of all these different architectural typologies is the particular feeling with the natural context, obtained with use if local materials and with the selection of shapes, volumes and lexicoms, these renders the built almost innate with this environment and represents an example of like the anthropic action on an area can happen in respect of its natural worthiness.

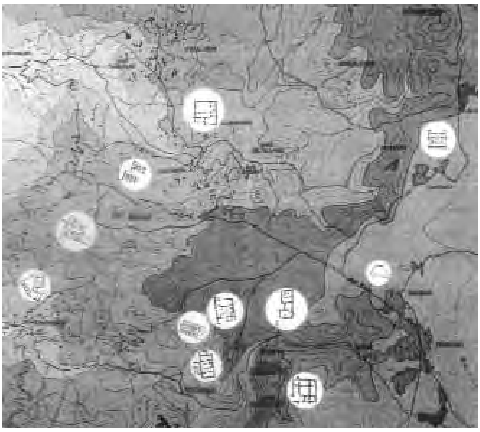
3.1 The Moses' memorial at Mount Nebo: the genesis and the relation with the natural environment

An important monument of the plateau of Jordan river is the Moses' Memorial, a architectural and archaeological complex, realized to celebrate the Moses' burial site and to keep his tomb. The Memorial rises in the area of the Abarim plateau, on 800 metres sea level, on the top of a hill, according to typical custom of this area (2), tied up with a symbolic and ideological meaning. Moreover the particular religious value of this place, that probably was the pinnacle from Moses saw the Promised land, but without to can accede to it.
Today the complex keeps, even if with deep reshuffles, only the church, and has a lot of ruins afferent the ancient monastery and its pertinences.
That condition made possible to reconstruct the whole facies of the monastery, in the phase of its biggest extent (century VII AD) and to comprehend an important characteristic of this complex, that is ability to integrate its compliance with natural context, that is particularly considerable (3).
This property is originated in the first place by a series of choices those today we could define of environmental planning, like to place the monastery on a not much leaning side, to organise the plan on different levels, respecting the orography of the hill (*Fig. 4*), to built the street to access to the monastery following contour lines of the top and to realize terrace gardens, with

Archaeological evidences of the Jordan

Figg.1a e 1b - The plateau of Jordan river

Fig. 2a e 2b - Jerusalm in the mosaic of the "World map" in Madama and today



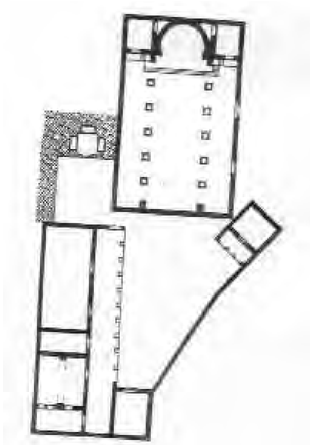


Fig. 3a e 3b - Archaeological evidences of the Jordan and the Saint Paul church in Dar Qita

Fig.4 - The top of Mount Nebo

the intent to propose a connection between the architectures and the hillsides (*Fig. 5*).
Also various architectural choices contributed, like to orientate the pitched roof according to natural direction of the inclination of the hill, to realize low buildings, to choose to use above all nary stone (*Fig. 6*), that composes the same hill, and to realize the church just on the top, almost to simulate with its pitched roof a natural crest termination (*Fig. 7*).
This harmonic connection produced an unicum anthropic landscape/architecture-environment, that represents a added value *per un piccolo luogo, che non gode di una terra generosa, ma affascinante e misteriosa, che concilia la meditazione ed il pensiero, in un'atmosfera che ha il gusto del remoto e richiama alla mente le memorie della sua storia millenaria* (4).

3.2 The present conservative state of the complex and the conservative restoration plan

The peculiar balance of this anthropic site was deeply wrecked by a disastrous earthquake, that produced its ruin and defection, until the arrival in XIX century of first explorers and archaeologist (*Fig. 8*). From then on it was submitted to a long and articulated excavations, to restorations consistent with the theoretical principles of their period, but today to consider not sustainable for the site. Between these there era essentially the realization of the new road, that does not follow the natural conformation of the hill and so as to cut it, creating a out-and-out hurt .
But the intervention that altered more the facies of Mount Nebo is certainly the realization of a new cover for the church. The building of this pitched roof became necessary in the mid-century XX, to provide to protect the extraordinary floor mosaics, those are the principal characteristic if this monument. The intervention realized by Oxford University since 1964 consisted to the reconstruction of large pieces of walls and to the realize a reinforced concrete riddle, with on a light roof, composed by metallic trusses. A intervention considered noticeable and reversible, but disturbing for the formal, material and proportional balance between the hill and the architectures (*Fig. 9*).
From here in the proposal of a new roof, that aspires to draw its rationales from a recognition of the extraordinary values of this site.
The principles of this proposal are evocation or original volumes, determined by means of a roof with four pitches, choice of compatible with the hill slopes, use of wooden trusses and clay tiles. Also the plan proposes simple, but necessary enhancements, above all for the global structural comportment to the seismic action (*Fig. 10*).
All this certainly not oriented to the utopian and historical improper aim to give back an unaltered original status of the building, that is always a being in evolution, but to evoke, as much as possible, that aura, that identity, that finds its foundation in the feeling between this architecture and the natural site in which its rises.

Fig.5 - The monastic complex on Mount Nebo

Fig.6 - The masonry in nary stone on Mount Nebo

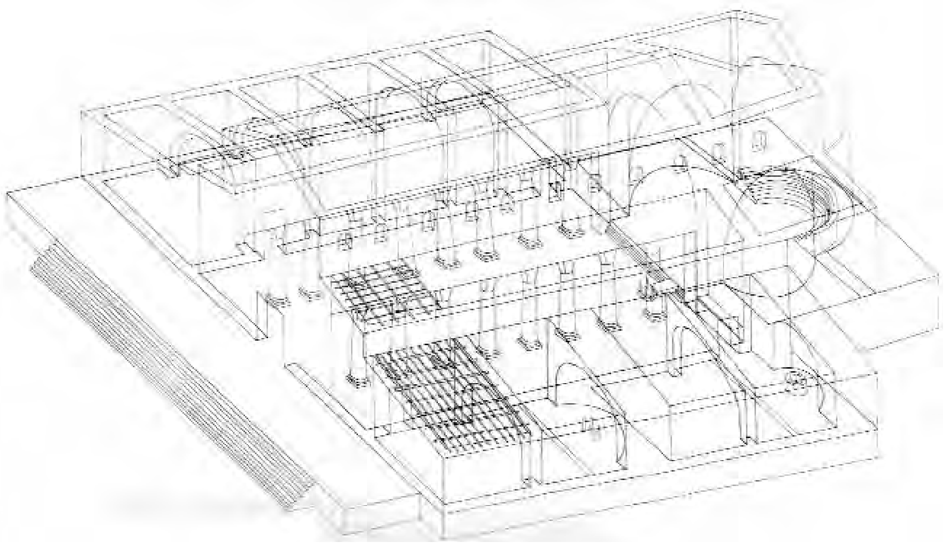
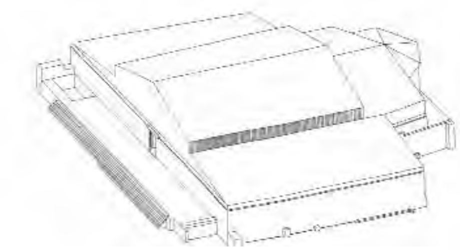


Fig.7 - Reconstructive hypothesis of the church (VII century AD)

Fig.8 - The ruins, beginning XX century

Fig.9 - The present roof



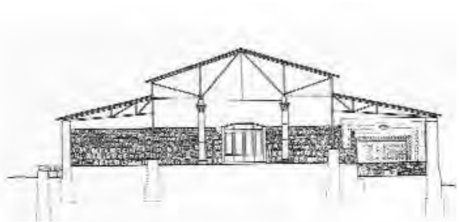
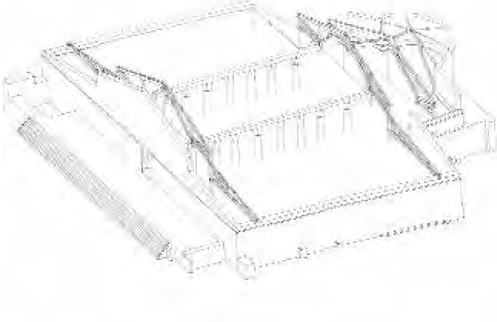


Fig.10 - The plan of the new roof



NOTES

1. This article is made out of the degree thesis in Storia e Conservazione dei Beni Architettonici ed Ambientali della Facoltà di Architettura dell'Università Mediterranea di Reggio Calabria, A. A. 1999/2000, titles "La basilica di Mosè sul Monte Nebo (Giordania): il progetto di conservazione", student Alessia Bianco, rsupervisor prof. arch. Enzo Bentivoglio.
2. On the top of the hill there are some other tombs, like that Patriarchs' Abram, Isacc and Jacob ad Hebron o that Erod's in Herodium.
3. The first ararcheologist on Mounto Nebo, Keller Werner, describes in this way the extraordinary capacity of this site to be in in tune with the natural context *(...) dopo una piccola ascensione tra le nude rocce, si giunge su un ampio e brullo pianoro (...). Il fianco occidentale cade ripido sulla depressione del Giordano. Una fresca brezza spira su quest'altura. Sotto il cielo terso si stende davanti all'occhio incantato dell'osservatore un panorama unico. (...) Con questa visione della Palestina dalle alture del Nebo Mosè conchiuse la sua vita. (...). E ora sono qui sulle rovine del suo tempio, che doveva essere così da sembrare della natura stessa.".* PICCIRILLO M., *Mount Nebo, new archeological excavation 1967-1997,* Gerusalemme 1998.
4. From the Pope's discorse, Giovanni Paolo II, durino a pastoral visit on Mount Neboin.

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The figures 2a e 3a are made out to: PICCIRILLO M., *Mount Nebo, new archeological excavation 1967-1997,* Gerusalemme 1998
The figure 3b is made out to: KHRAUTEIMER R., *Architettura paleocristiana e bizantina*, Torino 1995
The figure 8 is stored in the littel archivi on Mount Nebo
The other figures are of the author and are made out to her degree thesis.

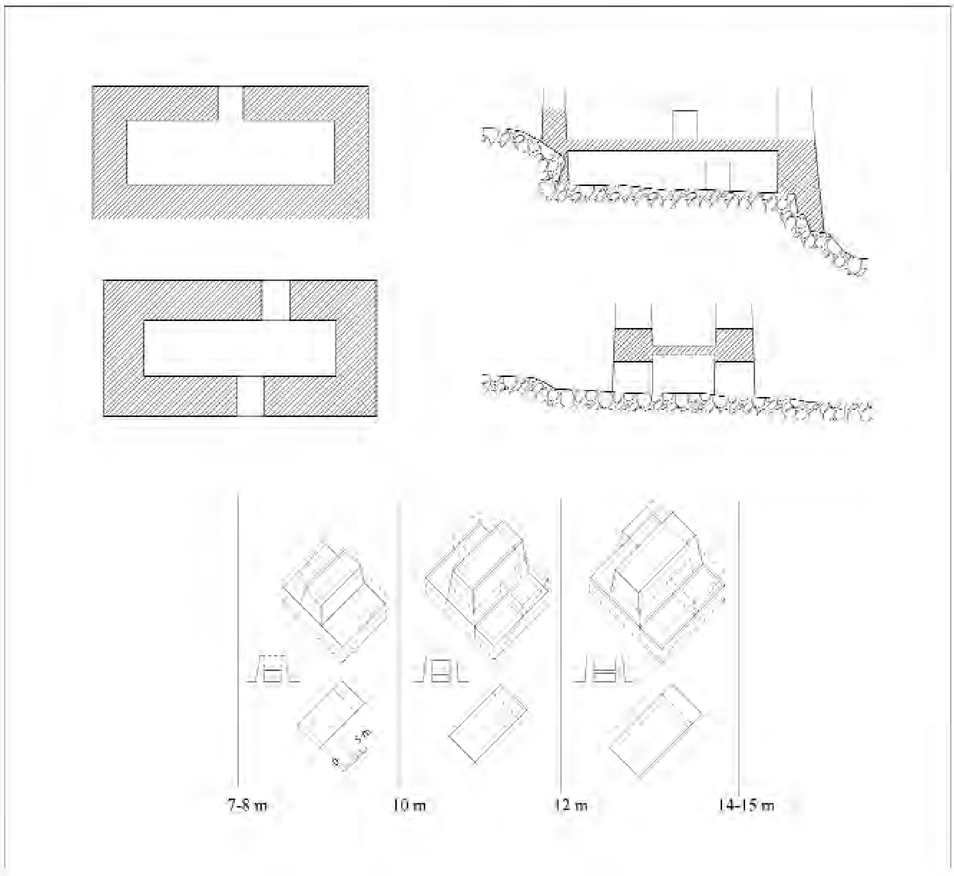

Fig. 1 - Megalithic house made up of two floors

M. Biolcati Rinaldi [1]

CHARACTERS OF SUSTAINABILITY IN THE TRADITIONAL GREEK ARCHITECTURE: MACEDONIAN'S AND ATTICA'S AREAS

1.0 Introduction

The plan of each house finds its origin in the "basic cell". They are houses made up of only one room, as in the megalithic house, which represents the minimum space for the family's necessities: to protect men, animals and the harvest. Later they are arranged with an additional room, the stable and the court. With the doubling of the width, depth and height of the basic cell, and on the basis of the dimension of the plot, are developed the different kind of houses which were designed and built up considering the climatic context of the place, the materials available, the technical knowledge of the period, the economic resources of the owner, the social and national tradition of the country.
The construction of the urban buildings is made up on two main technologies belonging to the traditional Greek engineering: the use of natural stone and wooden carpentry, strictly integrated to the process of construction. During the whole period the houses are built using different materials: the massive stoned walls with small windows and loopholes represent the fortified ground level of the construction, while the plan of the upper floor is made of wooden frame, the empty spaces of the frame are filled with several materials, using different methods. The wood is used to build the open galleries ("hagiatia") and the guest rooms, which are surrounded by thin walls with numerous windows to make the house more comfortable.
The use of stone in the construction belongs to the tradition and offers a good insulation, but it is more expensive than the wooden ones and it suffers more of the seism. The constructions made of wood are cheaper and have a higher elastic resistance to the seism. For this reason the most employed brickwork was called "argolithodomi" and was made of simple stones, using earth and water mortar mixture, which was jointed with wooden listels arranged horizontally called "xilodesies".

2.0 The house in the greek tradition

In the plain areas the different rooms are aligned on one side or two sides of the plot, often also in three sides and they are called houses type I, L, TT. The four sides walls houses are countered around a courtyard on which are exposed the windows, this space

is used as access from one room to another. On the contrary, the windows and the doors exposed toward the street are numerically limited.
The living spaces and the auxiliary ones are connected with ordering principles. With this disposal it is possible to recognize the plan of the ancient “oikos”, with an atrium and the court in the centre. In some Greek areas, the houses have three floors with rectangular shape or irregular rectangle: they are called Tower-house, in which the ground floor was built with massive stoned walls and a limited number of small windows.
In the mountainous areas, where the terrains have a strong slope, was built a half floor towards its lower side for the stable and the storage, while in the first floor was placed the room which could be accessed by the northern side. The rooms are arranged in straight line or they form a corner, and they can be entered or by an external covered corridor or by a covered veranda called “cayati”. Often the corridor or the veranda are totally closed by continuous glasses; sometime instead of the corridor or of the veranda, is arranged a covered or closed atrium, or with just one side open. In both cases the veranda and the atrium represent the transformation of the courtyard on the upper floor.
On the upper floor which is made up of wooden frame, are placed the summer rooms, which justify the presence of numerous windows placed close one to another giving the idea of an open space. They have the task to illuminate the space of transition between the closed and dark rooms of the stoned walls side of the house and the surrounding environment. On the top the eaves-hidden or exposed -store the rainwater in the cisterns, which are the organic part of the house. The best orientation laid out along a north-south axis, while an appropriate solution laid out along a north-north east and south –south west axis with a maximal deviation of 23° on the northern- southern axis.
The natural conditions of the mountainous environment impose a particular restriction not only in the design of the urban areas but also in the placement of the rural houses. Almost all the houses have blind walls in the northern or northern-easterly side. So they develop the openings surfaces toward the southern and western sides, for this reason usually in the northern sides are placed the winter rooms with the stoned walls, and in the southern sides the summer rooms made of wooden frame. In the back side of the ground floor are situated the stores which can be also placed in the underground to keep temperature and humidity at a comfortable level. On the prospects where the living room “odas” outstands the inferior profile of the house, the windows face the southern and western sides, while its angular shape towards the internal courtyard, protects from the north-south wind. The 75% of the houses type gamma set the “leg” G (C) towards the east, otherwise for urban reason they have a different shape due to the presence of a square or of an important street.
The knowledge of prior prototypes and the strict transmission of the experience of specialized teams which travelled around the entire Greece permits the creation of an unitary idiom both structural and typological, also in regions far from the others. The use of materials which were found closed to the building, and the creation of vertical structure made up of natural stone, of wooden frames and of bounds on the upper floor are prominent features of this architecture which is illustrated in the following pages in according to the geo-climatic context areas.

3.0 Typological standards in the different geo-climatic areas

3.1 Macedonian architecture

It is called all the Northern Greek continental architecture. It is an area characterized of mountainous chains and fertile valleys, with a rigid continental climate during the winter, and fresh or cold one during the summer months. The urban areas on the mountains are placed on the southern end for their better exposure to the sun, while the woods in the north side provide protection from the wind, the rain and the snow. The buildings faced rather the east to take advantage from the sunlight during the cold hours of the morning. In the valleys, the urban areas are placed close to the rivers. The houses, to reduce the thermal dispersions have a compact plan -maximum necessary volume for a minimum exposed surface- often their walls are directly against windbreak structures. The bordered walls protect from the wind. Outside the urban areas, the houses were rectangular and with the longest surface exposed to the southern side, and the northern wall shorter.

3.1.1 *Poor houses (almost uncommon)*

a) *Description of each floor and its function* – They are made of one floor, covered of a saddle roof and in front of the entrance a yard covered by a small portico. The inside is made of a single room, heated by a fireplace, with few openings in the walls, the most important of them are placed on the southern wall for a better illumination and for a natural heat. The floor is made of stone or of beaten earth, but it can also made of wood.
b) *Building materials* – The externals walls are made of stone, while the roof is made of wood and covered of terracotta tiles, or slabs of shist roughly made. The stone employed is chosen among the local sedimentary rocks of carbonate,- lime, lime-mortar- to provide high stability, easy working and profuse term resistance. The insulation is poor while is high the absorption of the humidity. The kind of wood employed on the attic and for covering provide high resistance to the efforts, excellent insulation and, if repaired from the rain, long term resistance.
c) *Bioarchitectural criteria employed to improve the well-being* – A surrounded courtyard covered by an eaves is used as protection from the winds and the sunlight, offering also a protected place for activities. It is oriented to the south and towards the hillsides slopes to do not suffer the strong currents. The walls are very thick to obtain a high thermal inertia. The openings-door and windows- are small for less heat loss during the winter months. The roof has a moderate slope which held some snow that acts as an additional insulation, while the cover made of shist is able to keep micro-ventilation.

3.1.2 *Upper class houses*

a) *Description of each floor and its functions* – They are made of two floors houses. On the ground floor are concentrated all the activities belonging to the country life: an internal covered court, the stable, the stores and the bathing rooms. On the upper floor are placed the dining room and the bedrooms which communicate through a veranda covered by eaves. On the other side of the house usually there is a balcony, while a steep stair leads to another veranda which covers part of the roof. The dining room, which is the

most important room, is enlarged with additional projected walls outside the volume of the building.
b) *Building materials* – The ground floor is made of stone, perfectly to create dark and wet rooms for storage, it is allowed to support the upper construction which is built with a lighter frame. Three main building criteria were in use: a) "dolma bulme": a frame made of pillars and wooden beams, where the beams run diagonally to stiff the frame; the filling material was made of stone; b) "bagdati": wooden frame with filling material made of a double layer of wooden tiles with an airspace and plastered surfaces; c)" tsatmas": another wooden main frame with closings made of reeds or sprigs covered of massive plaster.
c) *Bioarchitectural criteria employed to improve the well-being* – In these types of houses the veranda is used as summer room, for this reason usually faces the northern side, so during the summer it is the most refreshed area of the building. The house results more healthy because its situated in a upper level, far from the mud and the humidity, it also has the advantage of a better cooling and illumination because it is more exposed and its light construction permits more openings. The solutions on the inside provide optimal performances of cohabitation, beside the row clay plugged reinforced with straw, and the inner tubes left inside the wall provides transpiration to the construction. The dining room is placed towards the south to be exposed to the sun and the heat during the winter.

3.1.3 *Luxury houses*
a) *Description of each floor and its function* – They are made of many floors, some of them added in recent years. They have a defensive task, so their structure is very steady and massive. The ground floor is made of stone while the upper floor is made of wood. They have an internal stair, and usually there are numerous balconies or covered verandas. Typical is a veranda which covers part of the roof. Generally there are two dining rooms, one for the summer and the other one for the winter months, or summer and winter floors.
b) *Construction materials* – There are not particular differences compared to the other typologies. It is given more importance to the building details. The stones are worked to create isodomic walls. On the upper floor the windows have iron bars. The wooden attic can be finely decorated. The roof, as the balconies, can be particularly projected thanks to the wooden saddle beams.
C) *Bioarchitectural criteria to improve the well-being* – The roof is particularly projected to protect the wooden plastered wall exposed to the rain falls. The numerouses verandas and balconies give shade to the walls limiting the overheating during the summer months. The winter floor has few windows for less heat loss, while the summer floor is placed on an upper level and has many windows; so it is more exposed to the currents and more easier to refresh. The winter dining room faces the south, while the summer one the northern side privileging the several necessities of lighting.

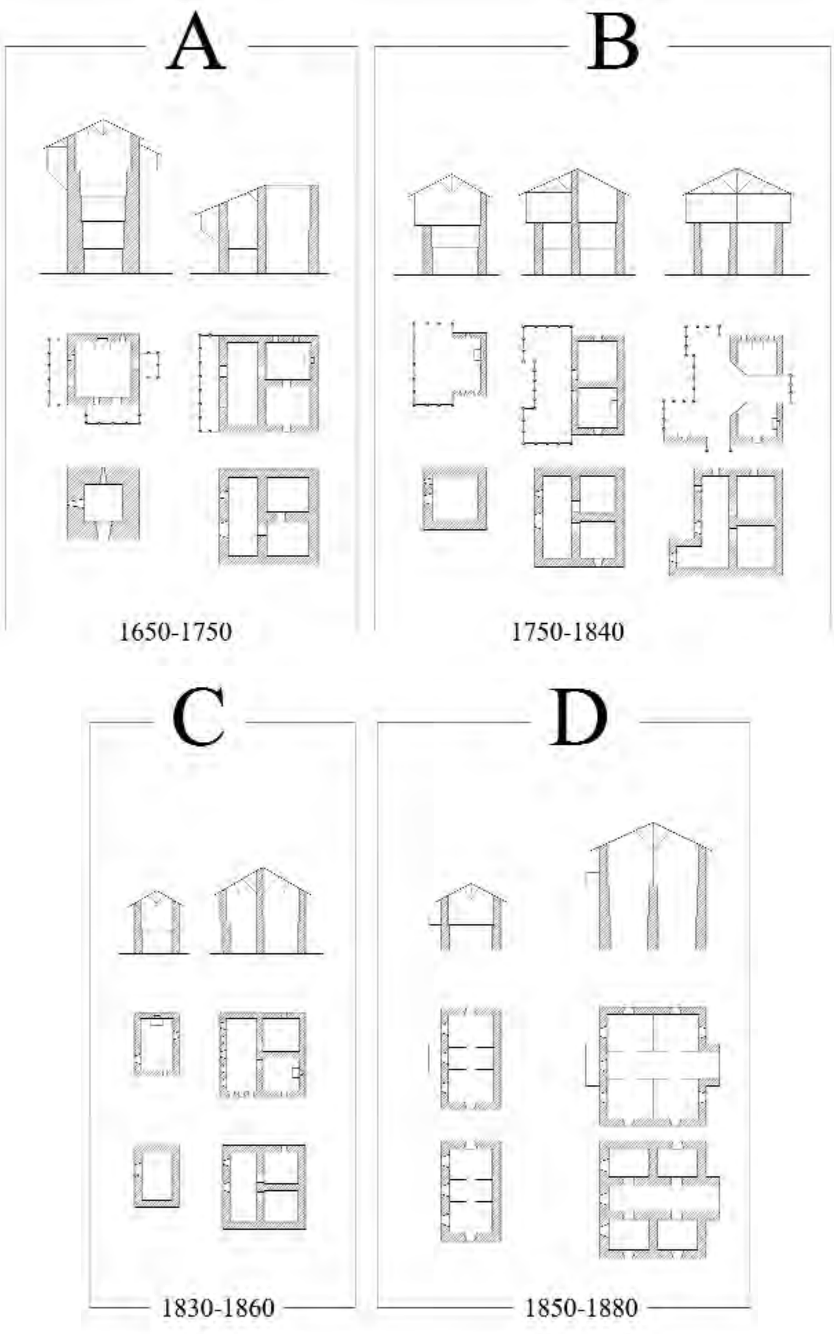

Fig.2 - Typological evolution of the Greek house

3.2 Attica architecture

It includes the Attica's area and the entire region belongs to it Sterea. It is an area characterized by plenty limestone and lack of wood, but the local cedar. A southern climate doesn't produce drastic swings in temperature. The urban areas were placed close to the sea, to take advantages from the summer sea breeze and warm winter breeze. The single-family house complex is made up of the residence and other auxiliaries external buildings inside the plot. The house is built keeping in mind the solar light, so it is built on the north side of the plot to have the facade towards the south, into the inside court. The rectangular plan has the sole openings to the south side to have a better exposure to the sun light the whole day.

3.2.1 *One floor houses*

a) Description of each floor and its functions – These houses have mainly saddle roofs, but also flat roofs. The house is made up of a single floor where the family has its meals, rest and sleep. At the beginning people and animals housed together, then it is added an adjoining room which communicate through a door. Later it is realized and independent building under the same roof. Also the oil-mill can be placed inside the house or in a independent building.
b) Building materials – The masonry is made of limestone, without or with a small amount of mortar. To build the saddle roof are adopted three solutions: 1) set a long and stiff trunk on the two sides of the house used as main beam; 2) employ as main beam a masonry arch; 3) increase the house's width employing a stiff trunk, but every 2-2,5 m cross joint two smaller beams placed on the longer sides. In all the three methods on the main beams are put secondary beams at the distance of 30-50 cm, the floor is closed with bundles of bush and branches of beaten leaves. A layer of clay and tiles complete the cover.
c) Bioarchitectural criteria employed to improve the well-being – Beside the appropriate orientation described before, the thermal-insulation is provided by the high thickness of the walls 50-60cm. The windows are few and of small dimensions. At that time the frames coudn't provide a complete insulation, for this reason few openings provide a better insulation to the internal rooms. The openings face the south, so the solar light can enter the house the whole day. Also the planted trees near the house provide comfort to the construction, in fact during the summer they shut-off the solar light and convoy the sea breeze inside, while in the winter, loosing their leaves, permit the solar heat.

3.1.2 *Two floors houses*

a) Description of each floor and its function – The two floors houses in this area born as additional buildings of the control towers. Later are included in the volumes of the simple constructions. The result is the disappearance of the towers as sole buildings. Usually each floor is made up of one room, while the stair room is external and the landing is made wider forming a veranda. There are also examples of several separated rooms per floor, in this case can exist living spaces in both floors, or only in the ground floor for

storage and the stable,
b) Building materials – In this kind of house is frequent the flat roof, made up with many parallel trunks in which are placed reeds with musk covered with a last layer of clay, hold by lower externals brickworks. The masonry of the house and of the auxiliary buildings is made of natural stone for the entire height. The pavement on the upper floor is made up with wooden tiles, instead the one on the ground floor evolved: at the beginning was made of beaten clay, then of clay and finally of wood.
c) *Bioarchitectural criteria employed to improve the well-being* – In this houses are frequently introduced fireplaces instead of the old basins for fire, which could fill the room of smoke and increasing the danger of burning, even limiting the internal heating diffusal. When both floors are living spaces, the upper floor is used during the summer months for its exposure to the sea breeze and it has more openings for a better ventilation, in the ground floor, instead, is placed the chimney with few openings to avoid the heat loss. The veranda covered by eaves, permits the wind circulation and view, protecting from the sunlight and the rain.

Notes

1. Professor at the University of Ferrara, Faculty of Engineering
2. Biolcati Rinaldi Maurizio, "Le costruzioni in legno nell'area nordica: aspetti tecnici e strutturali", in "Civiltà del legno - Per una storia del legno come materia per costruire dall'antichità ad oggi" a cura di Paola Galletti, CLUEB, 2004 .
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Fig.1 - Matera, Foreshortening

A. Calderazzi [1], T. Susca [2]

STONE ARCHITECTURE: ORGANICISM AND RATIONALISM IN THE APULIAN RURAL ARCHITECTURE

Wind and water were the first architects of history and the material they moulded, creating hypogeal caves, was rock. Man learned from nature to use stone, to carve it, to change it into slabs and blocks, making manufactured items in which the terms functionalism and minimalism were synonyms, in which scant resources were exploired to the maximum. Demiurge man appeared on the territory producing the local architecture, adapting it to his own requirements and his own requirements to the territory. It is from this new viewpoint that the rural world can no longer be observed as a merely aesthetic perception, an accidental presence, an exception in the landscape, but rather as the product of many centuries of work performed by man on nature in order to transform it, interpreting, using and explaining its rhythms, its laws, its conditioning. The atmosphere is thus characterized by the synthesis of a historical process in which nature and man's construction are interlaced, revealing signs of a *modus vivendi*.

This process acquires particular importance in the countries of the Mediterranean basin, which are joined by the sea. For these countries the sea is the common thread, the unifying and characterizing element. Ribeiro[3] says that the Mediterranean area is the land of stone and its origin is tectonic. It has history of agriculture and sheep-breeding that led to the disappearance of the forests, which uncovered the stone of the mountains and the terrain.

The Mediterranean civilization is, therefore, the civilization of stone, a consequence of the intimacy between man and this element which having eliminated from the cultivable lands, he now uses in most of his buildings. It is from this that "the constructed" character of the Mediterranean landscape, both in the layouts and shapes of the settlements and in the organization of the countryside derives.

The Mediterranean is seen as a fabric of interconnecting cultures of the same basin; it has an obvious common matrix which translates into spontaneous architecture, the architecture of the craftsmen-architects, which can be called functionalism.

The Mediterranean is the home of rural architecture, which of the single constructions and of villages. In Mediterranean architecture the dialectic that opposes artifice to nature, rules to exceptions, order to chaos, is clearly visible.

Rasem Badran[4] invites us to re-establish in contemporary architecture the relationship between man, his memory, and his specific place. Badran looks at history as a reservoir of

physical shapes to adopt and bases his planning method on the analysis of architectural heritage, read in the light of social, environmental and typological relationships.
In the '50's, Hassan Fathy recognized the value of roots and asserted: "When an architect has a specific tradition, to draw on like the village built by peasants, he has no right to destroy it with his personal fantasies". The New Gourna village in Luxor, in Egypt, designed by Hassan Fathy between 1948 and 1953, represents the attempt to introduce an ancient method of construction based on the employment of rudimentary and traditional technologies, but also and above all on resorting to city layout and building types derived from traditional Muslim architecture[5].
The same principles can be found again in the Potamianos House in the Filothei district in Athens, designed between 1953 and 1955 by Dimitris Pikionis, who asserts: "The job of the architect is not to invent ephemeral shapes but to find the eternal figures of tradition in the shape determined by the conditions of the present". Pikionis is a keen scholar of vernacular architecture and of the spirit of Greek tradition; therefore in his plan the rational use of space is blended with the stones of tradition, the material that the architect prefers[6].
If stone is the dominant landscaping element in the countries of the Mediterranean basin, then the harsh, changing and wonderful landscape of Apulia, the cultural crossroads of the Mediterranean, in which there is an enormous amount of spontaneous architecture, is also dominated by stone. The architecture created with local materials, the architecture of stones transformed into big slabs or broken blocks that make up the prehistoric megaliths (menhir and dolmen), of the stones in the *"specchie"*, of the centuries-old artisanally-built dry stone walls of numerous *"jazzi"* (sheep pens), or of the supporting walls that terrace the *Murgia* slopes. Stones for the walls of the farms, for the arches of the enclosures, for the vaults that cover the rural constructions, *"chiancarelle"* (little flat blocks of stones) for the conical spired roof of *trulli* and of *pignon* constructions.
The *trullo* is the structure that characterises Apulian regional architecture, a timeless construction, which is the tangible sign of how aesthetics, functionality and organic unity are interlaced. As the expression of the *genius loci*, it represents a solution to the problem of co-existence between man, buildings and the land.
Apulian rural constructions, which tend to share the same functions and requirements, are characterized by a minimal outline consisting of a quadrangular cell to which subsequently single units are added: warehouses, stables, accommodation for paid labourers, a chapel, an olive press, a furnace, a granary.
The structure of the *masserie* (farms) – load-bearing walls of tufa stone and vaults of calcareous limestone with cylindrical elements in tile – interlaces with the closed and enclosed open spaces.
The residence of the owner is located on the first floor of the main section, while that of the farmer is on the ground floor alongside warehouses and rooms for storage. The stables are located in the rear or lateral zone and adjacent to the outer wall is the chapel, which sometimes has two entrances, one leading inwards into the courtyard, and the other opening outwards through the external wall of the complex. The type of vault varies according to the functions of the rooms: barrel vaults for the rooms on the ground floor, cross, pavilion, star

Fig.2 - Marchione Castle

or groined vaults for the residential rooms. The paving of the external courtyards is of *"chianche"*, tufaceous stone slabs set out in patterns of varying complexity depending on the ability of the master builder.

The aesthetic value of the buildings lies in the unusual working of the stone: decorative elements include corbels of the crowning and embrasures, coats of arms, bell towers with cornices and volutes, moulded balustrades on the stairways, variously-shaped chimneys on the roofs, cornices on the entrance arches, jambs, festoons and lobate openings on the facades of the chapels.

The Apulian rural constructions constitute a patrimony in which the morphologic aspects are connected to agrarian and financial aspects, and at the same time depend on microclimatic and geographic characteristics and on the social context of the various historical ages. Apulia's minor architecture, like all examples of spontaneous architecture, is born out of practical, concrete needs, and is neither an exercise in style, nor a simple whim, but a solution to real problems and a way of confronting reality, daily life and all that nature gives freely, or almost; it represents a genuine attempt to resolve existential problems. All of this gives pause for thought on the subject of construction and the principle of eco-sustainability expressed in the systemic vision of the manufactured article. Of Apulia's minor architecture, the farm with enclosed courtyard, which draws on Muslim architecture, stands out as a model of marriage between craftsmanship and functionality: examples are the Miani *masseria* in Polignano a Mare, the Calderoni *masseria* in Gravina di Puglia, and *masseria villaggio* (village farm) in

Fig.3 (top) - Masseria Montalbano; Fig.4 (below) - Masseria Concia

S. Vito in Polignano a Mare, which has a coastal tower; a tower-farm with a sheep-fold in front and a convent-farm with an abbey encircled by houses for fishermen constructed in the wall itself. Other examples are the Conchia farm in Monopoli and the Montalbano Vecchio farm in Ostuni, where the farm labourers' houses together with the stables and the shelters form a wing off the main residential building. This type of construction recalls the castles of Pettolecchia in Fasano and Marchione in Conversano. The use of exclusively local materials and techniques gives vernacular architecture an ecological character; it respects both the environment and pre-existing structures, so that man is always in constant balance with nature. The use of tufaceous stone from the local quarries means that the buildings are equipped, like the landscape, to deal with the problems of microclimate, insolation, and winds. The artisanal stylistic elements and the organic expressiveness of rural aggregation, consisting in "playing cleverly" with closed volumes and open spaces, especially on farms with *trulli*, demonstrate the importance of the protection and the recovery of such structures and the promotion of an architectonic language made up of a perfect harmony of natural, environmental, financial and functional elements.
As Lewis Mumford[7] asserts, the immense dictionary of constructive logic of the man who creates symbols appears obvious in rural architecture, which with its honesty, clarity and logic contrasts with stylistic architecture for its, before that instruments tied with territory, climate, economy and technique.
Practicalness and art are the characteristics of vernacular architecture, which expresses life in all its totality, and does not allow for a separation between thought and feeling. In order to be able to appropriate authentic environmental characteristics like those of spontaneous architecture, it is necessary to understand that technique and form are complementary.
The semantic value attributable to most minor building complexes derives from the ability of every organism to represent meanings tied to the memory of the past or from aesthetic qualities recognizable *a priori*.
Down the years the debate on stone architecture, rural architecture, has by no means been limited to provincial circles. In 1936, in the notebooks of VI triennial, G. Pagano and G. Daniel, seek to reaffirm the principles of the modern architecture through a comparison with the elements of local tradition and by underlining the value of minor architecture, the relationships between cause and effect which stylistic architecture had caused to be forgotten. Pagano and Daniel emphasize the importance of seeing architectonic tradition as a cathartic action which purifies from the cultural accretions and useless tinsel that confuse. In the photographic exhibition entitled "Rural architecture in Italy", conceived by Pagano, photos focused on the great courts, farms, suburban residences, labourers' cottages and villas scattered across the Italian landscape. Pagano replaces the myth of rationalist architecture with the deeply-rooted values of anonymous and spontaneous architecture and its simple and essential constructive systems[8]. Pagano asserts that the evolution of the rural house demonstrates, in the most expressive way the absolute dependency of the aesthetic on logical functionality. From an architectonic and spatial point of view, the shapes of the architecture have spontaneously constituted the basic building that represents a singular patrimony tied to the tradition of constructive systems with the use of local materials and formal aspects dictated by intentional rationality.

Pagano demonstrates the aesthetic and ethical value of functionality, tracing some of the native origins in the inheritance of rural architecture and restoring, in the patrimony of shapes of the modern movement, a series of typological outlines, constructive systems, and cellular aggregations.

The analysis of the rural house is an opportunity to confirm the principles of functional architecture, reassuming and exemplifying the evolution of the rural factory. In this historical overview, what is obvious is the importance of studying local architecture in the various scales of participation, at territorial level and at typological and distributive variety arriving to the constructive techniques. Such an attempt was first made in the Architect's Handbook[9] published in 1946.

Franco Albini takes part in the same debate, asserting: "All constructive methods are valid at all times as long as they are logical and still efficient". Albini's thinking is evident in the plan for the Pirovano hotel-shelter in Cervinia, which can be considered the manifesto of the renewed interest in rural architecture, and which would influence many tendencies in contemporary international architecture. The building is partly buried under the mountain and partly emerges from the profile of the land. The two highest floors have wooden walls with horizontal rafters embedded using a local technique called *"rascard"*. The walls rest on wooden beams which in turn rest on unusual mushroom-shaped joints of local stone.

In 1949-50 Luigi Epifanio[10] tried to convey through the forms of spontaneous architecture a sense of serenity, that sense of almost monastic peace that flows from the volumetric masses in which full surfaces have an absolute predominance and the empty spaces are distributed with instinctive thrifty wisdom. The same rationale is evident in the architecture of the Arenella district of Palermo: the external stone walls, the saddle roof of bent tiles, the use of wooden frames and fixtures, various details that re-evoke the rural world, are all ingredients of spontaneous architecture.

The search for a language that can resuscitate popular tradition continues in the Martella[11] rural district of Matera in all those buildings which hark back to the formal purity of rural architecture. The Martella district is an attempt to realize a "traditional" community on the margins of a town. Alongside the houses were cultivable plots to enable residents to create a self-sufficient community and rediscover their own rural traditions. This is why inspiration from rural architecture cannot be imitated: it loses meaning if removed from context, and the "civilization" of rural architecture ends up becoming an oxymoron.

Rural architecture can be re-proposed only in the original contexts, even if certain characteristics and its rationale may be adopted elsewhere. Thus, "the return to the age of stone" must be considered a willing attempt at reconciliation with nature and with its resources. We can rediscover the ancient fascination of stone, of tufa, of wood, if we submit codified language and advanced technology to the logic of construction. A re-reading of the technological aspects of construction can lead to the understanding of structural systems, such as roofing (types of vaults), water supply (with gutters, tanks, snow cisterns, wells), and ventilation (through a careful exposure and perfect exploitation of air currents).

An analysis of the time originally required for maintenance and the determination of the time now required for maintenance, and an analysis of feasibility in relation to the financial abili-


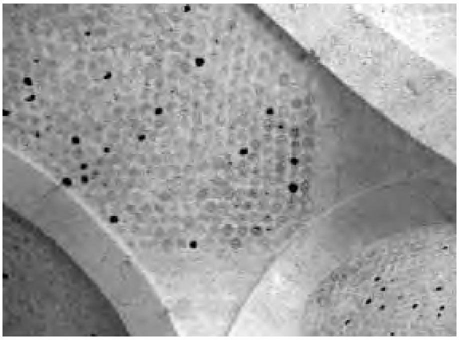

Fig.5 (top) - Stone stair; Fig.6 - Stone vault with "bubbole"
Fig.7 (below) - Masseria Monacelle; Fig.8 - Jazzo Crocetta

ties of the new functions must be the priorities for planners. To promote a re-evaluation of "poor" architecture, it is not enough to hark back in a general way to its roots and to history; what is needed is efficient pragmatism, tectonics which exorcises the use of structures identified with the landscape, absolute protection from every type of pollution searching a sustainable continuity of the building scene.

Notes

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2. Tiziana Susca, Construction Engineer - Ph.D. student at the Department of Architecture and Town Planning at Engineering Faculty, Polytechnic of Bari. tiziana.susca@libero.it
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9. Manfredo Tafuri *"Storia dell'architettura italiana. 1944-1985"* - Einaudi Editore - Torino, 1986
10. Luigi Epifanio *"La casa e l'ambiente"* in Casa nostra n. 1-2 1954
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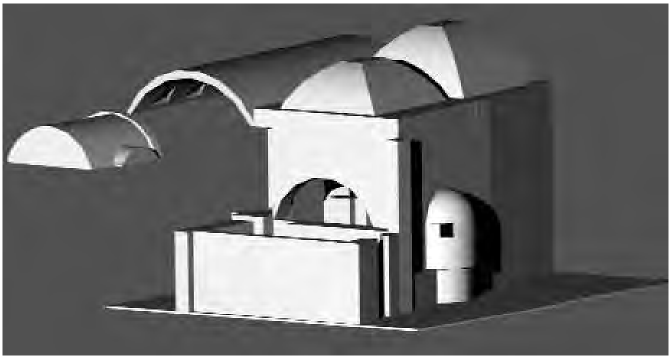
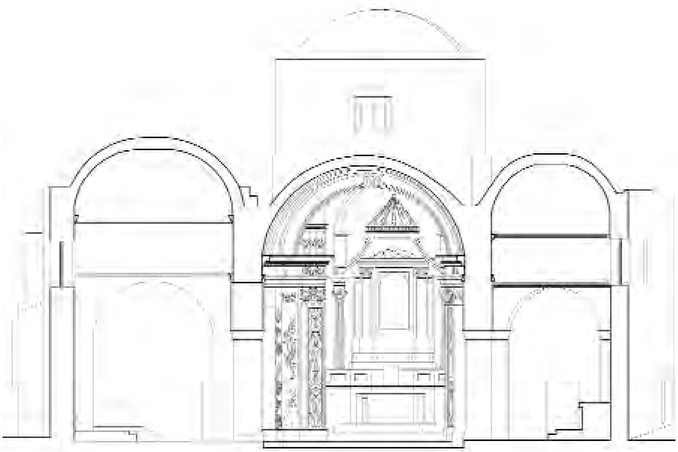
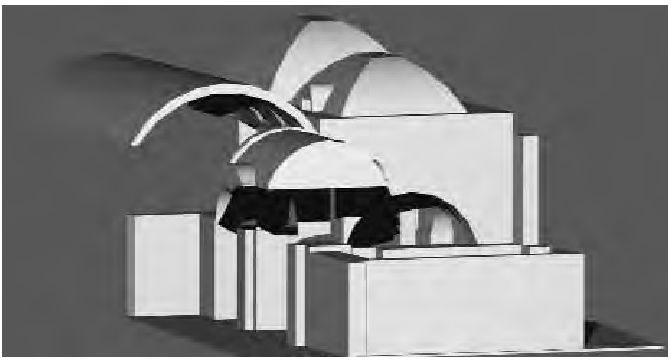






Figg. 1,2,3 Three-dimensional views and sectionw, Church of our Lady of Sorrows, in Castle of Lipari, (R. Fonti)

M. Candela, A. Bianco, R. Fonti, S. Tuzza, S. Guastella

THE COVERING IN EXTRADOS VAULT BUILT IN THE SOUTH OF ITALY

CASES STUDY: CAPRI AND LIPARI

The extrados vault is a typical kind of manufacture of many Mediterranean areas[1]. An accurate evaluation of the technical and structural features of this building allows to tare its real potentialities, with the purpose of carrying out on invasive and reversible repairs. The comparative examination of some vaults situated in Capri and in Lipari allows to acquire good elements of knowledge.

1.0 Historical and Typological aspects

The extrados vault: architectural elements, charming technological variant of a prototype proposed by Romans, Greeks, Arabs. It's the maximum expression of the Pope's greatness and power. The vault is spread and assimilated by the popular culture, becoming visible in each house, from the poorest to the most noble family, to the point of being of peculiar feature of one community. The plan of Capri is the symbol of the extrados vault's spread, being the architectural style of a particular civilization. In the island's reality, the cover is developed according to a native and special prototype building. In the same way, Lipari, much more isolated than Capri, land of pirates and hire, turned into a myth along the centuries, victim and executioner of itself; achieved an urban and technological development late in the *"Fino all'anno 1812 le case di Lipari erano limitate all'accerchiamento delle fortezze,[...] Solo da quel periodo si cominciò a costruire la città di oggi [..omissis..]"*[2]. Since that time, however, Lipari preserved its own architectural style, that, although changed in its technological soul, kept its unique formal features, according to the human needs and the land's difficulties. By comparing both the islands realities, Lipari and Capri appear similar and dissimilar at the same time, identical in their morphological essence. Today both show to our eyes their little and white houses with a differentiated development of their building block, according to the orography of the territory, and to the climatic conditions. These peculiar volumes can appear almost identical, except for some little differences in the external articulations. Instead, they hide remarkable technical differences, both in the choice of building materials, and in their setting. The different geological nature of the two places involves the use of different materials, whose size, resistance to stress and behaviour in case of seismic events, result inevitably different, and the same happens for the structural behaviour of the masonry. The island of Capri is of limestone origin, with its lowest section situated

in the central part, and the high lateral parts with steep precipices on the sea. The all complex is a logical continuity with the morphological features of the Sorrentinian peninsula, as already proposed by the Greek historian Strabone. Lipari, instead, is an island of volcanic origin that was generated along several ages. Indeed, its landscape is varied and different both in colours, and in the materials quarried across several part of the island and used in the realization of different buildings. Historically, the verified quarries are countless; for the great blocks of red tuff and for volcanic tuffs in general, found in corner, buttress and used like header elements. For example in the "Monte Rosa", the promontory turned towards south-east direction, on whose faces one can note red and back scoriae, yellow pyroclastic and hydromagmatic[3] deposits, black scoriae stratified, flow of lava inside the crater, neck[4] by exfoliation in "onion shape" and layers of red scoriae. The stone of *Bruca*'s quarry is used for mouldings of door and window posts. While the stone of *Fuardo*, quarried in the *Fuardo*'s pit, is used for door and window-steps, and for lintels. The pumice's quarried[5] are employed for producing plasters and screeds, while the obsidian[6], employed as element of stretcher in masonry, is dug out from the zones of *Monte Pelato* and *Forgia Vecchia*. Finally, the heap of stone, used in historical building industry, are quarried from the *rocche rosse* area. Nevertheless, as already indicated, both the islands present building modules very similar resemblances due to the same ruling people; infect, both were firstly colonized by the Greeks then by the Romans; while in Medieval time they lived different historical realities, but with a common lot. The populations, which were victims of such a bloody millennium retired in the high grounds. In Lipari, people retired in an acropolis situated on a rise

Fig.4 - Castle of Lipari, (R. Fonti)

stretched into the sae, defensible form the assaults of pillagers. While in Capri's island, historically divided in two communities with Anacapri, people gathered around the high grounds. Both Lipari and Capri became aspired places of pirates' incursions and pillages because of their respectively geographical position. Nevertheless, the exchanges with the Orient appear numerous and historically witnessed, both for the presence of numerous Byzantine and Islamic modules in the religious and local architecture, and for wreckages loaded with goods, found in respective sea floors. As a demonstration, we can quote countless examples of little churches from the Arab architecture, that show some extrados vaults. A long time ago, the latter resulted architectural elements of importation, while along the centuries they became peculiar of the Tyrrhenian island. Capri has so integrated this technique that, in last centuries, it flaunted little houses with vaulted covers, which then were inglobed in typical Mediterranean blocks. On the contrary, Lipari has always shown Mediterranean blocks, because of a greater necessity of water on the island and for prolonged, periods of total isolation. The territory of Lipari is therefore disseminated of little chapels with an extrados cover; and the whole acropolis present a complex of extrados vaults combined in many periods, as a tangible witness of the cultural assimilation of the extrados vaults. It explains the analogies with what happened in Spain and in Greece, where respectively people were inspirited, by Arabs and Byzantines, in the creation of extrados forms. A clear demonstration of the extreme mixture of last centuries between Spanish and Arab culture is Toledo. It's the capital of the Castille, a cosmopolitan city, where Muslims, Jews and Christians lived together in peace, by producing a cultural witness, whose traces are still evident nowadays. Today, both the Carthusian monastery of S. Giacomo in Capri, and the Acropolis of

Lipari are the result of a plain evolution through different architectural techniques. Indeed, by an examination of the two complexes, it emerges a lot of similarities, for example the origin of the monastic complex from which depends both the building of the Carthusian monastery of S.Giacomo, and the realization of many religious buildings situated in the Castle of Lipari. The first one is Carthusian, it was founded in 1363 on a territory donated by the queen Joanna I d'Angiò, and built by Count Giacomo Aricucci. The second one is Benedictine, it was founded by the will of the Count Ruggero, who settled in Lipari in 1083, gave the property of the island to a group of monks under the government of the abbot Ambrogio. The monastery was dedicated to Saint Bartholomew, probably for the precedent existence of a church devoted to the same saint n the place. In the Capitulary Archive of Patti(Me) is kept up the "Constitutum" [8], a document draw up by the abbot Ambrogio in 9th May 1095, which represents the oldest civic statute existent in Italy. Under Charles V, because of the huge dimensions achieved by the Spanish Reign, the peripheries detached from the central power suffered the uninterrupted assaults by Muslims, that in 1544 sacked and destroyed Lipari, deporting a vast number of citizens. The people of Capri will have the same lot in1553, because of the assaults of the pirates Dragut and Mustafà Pascià. After these bloody events, many churches and popular houses flourished, with the purpose of encouraging the repopulation of these island. In particular, in the acropolis of Lipari the whole destruction of the fortified city will provide the pretext for enlarging and unifying several churches; a very interesting case is the Lady of Sorrows's Church.

2.0 The Structural Engineering

The typology proposed is always the same: monocellular rooms of rectangular form, generally covered with barrel vaults; instead, in the architectures of higher manufacture are employed pavilion vault, barrel vault with lunettes, or dome. Both surveyed the structural thicknesses aren't over 15 cm. In the same time, the structural engineering result, similar and dissimilar, for their structural elements and techniques. Infect, in Capri, the vault is called *lamia* and it is built with heap of stone set out in arched form and between these gaps are filled with Pozzolana mortar, and all is beaten together. A layer of lapillus is set out on the *lamia*; in this way it will be possible to produce a waterproof surface (since the XVII century, this is the concept, that we can even deduce by the *libretti d'apprezzo* written in the *Regi Tavolari*. The lapillus's layer or *Lastrico* isn't composed of earthen materials, but it's composed of a well-proportioned quantity of lapillus white and black. These elements, mixed with mortar, raise a smooth and uniform dough. This paste at least, should be compounded two days before of its setting, and stirred more times, if will be necessary, with the addition of liquid lime. The impasto ready, is coated in one solution, in this way it's possible to avoid phenomenon of detachment or, as a consequence, splitting. Subsequently, the beating takes place, as much as possible the lapillus are packed by rammers; during this process, that lasts 4-5 days, the work proceeds with milk of lime's watering; in particular if the building is erected during the summer. The beaten of lapillus has a slope so that the flow of the rainwaters run down in apposite gutters in terracotta, until the cistern connected. Once the phase of beating is finished, all is coated by a layer of fens or straw and soil that, about 4 mouths after its manufacture, will be removed, exactly in spring. In the winter, in this way it's possible to avoid phenomenon of crystallization, and in the autumn, to avert phenomenon of splitting, generated from the summer temperature. Instead, in Lipari, vault is raised

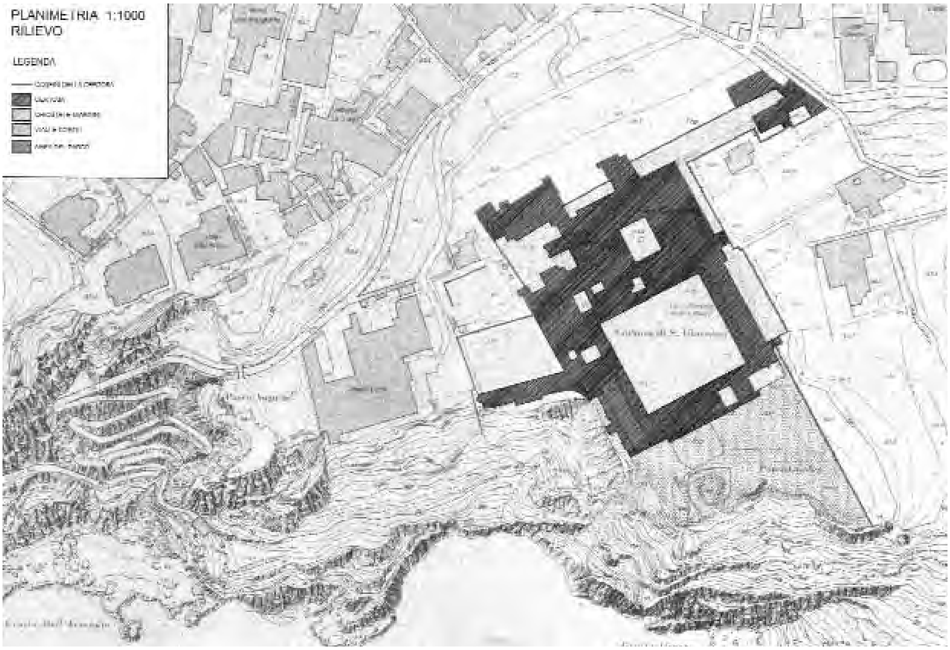
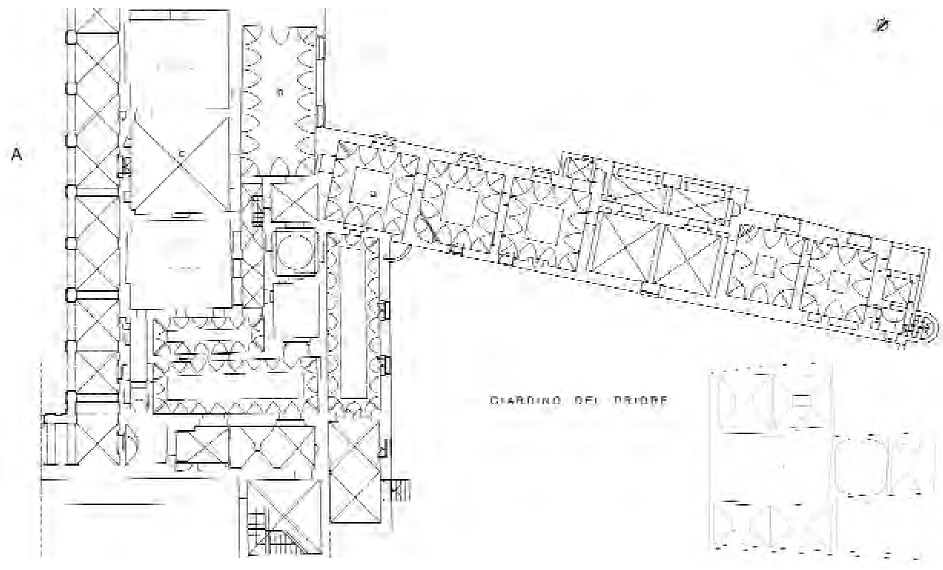


Fig.5 - Plan, Carthusian monastery of San Giacomo, Anacapri
Fig.6 - Overall view, Carthusian monastery of San Giacomo, Anacapri

Fig.7 - Section, Quarto Priore, Carthusian monastery of San Giacomo, Anacapri

Pavilion Vault (a)	l/l_1	Span(d)	Rise(h)	Thickness structural(s.)	Thickness geometric(s.)
Capri	1,01	5,50cm	1,70 cm	0,20 cm	0,47 cm
Lipari	0,94	5,10 cm	2,5 cm	0,12 cm	0,30 cm
Barrel Vault (b)	l/l_1	Span(d)	Rise(h)	Thickness structural(s.)	Thickness geometric(s.)
Capri	1,30	5,17 cm	1,80 cm	0,15 cm	0,30 cm
Lipari	1,75	6,69 cm	1,85 cm	0,15 cm	0,35 cm
Cross Vault (c)	l/l_1	Span(d)	Rise(h)	Thickness structural(s.)	Thickness geometric(s.)
Capri	1,08	6,13 cm	4,20 cm	0,15 cm	0,30 cm
Lipari	0,86	3,65 cm	1,50 cm	0,10 cm	0,25 cm



with local heap of volcanic stone, selected in small size, porous and light, called *rizzo*. It's concreted with lime mortar (its shortage on the island forced the Aeolian population to economize the lime), and covered by a beaten called: *rupiddu*. The *rupiddu* can be considered an incoherent material of pozzolanic nature; it's composed of lapillus [9] and pumice[10], they are ground in different granulometry: 3-7mm for joisted floor and vault; but the finishing coat show a dough mixed with thin pumice, and coated together with milk of lime. This kind of screed was packed by the *mataffo*, this is an heavy block of hard wood, made of long and wooden handle, engaged upright. Then, the layer is consolidated by wooden mallets for a long time, and at the end, it is coated by dried ferns; whose, like Capri's civilization, were sometimes damped until they became naturally dry and consolidated. So the two section can be distinguished in summed up briefly: about Lipari, from the extrados to the intrados, we can find 2,5cm of setting coat, 10 cm of *rupiddu*, 10 cm of *rizzu*, which compound the structural section and 2,5 cm of plaster and stucco. Instead, for Capri, where the structural thicknesses are greater, we always have 2-2,5 cm of setting coat and 15 cm of the *Lastrico*'s layer, 15 cm of *Lamia* the structural section of the vault, and at the end, as in Lipari, 2,5 cm of plaster and stucco.

3.0 Conclusions

After having provided this description, it's useful to go on with a comparison of the distinctive geometries of the vaulted system in analysis. For this purpose it has been filled in the following schedule, where are reported and cooperated the dimensional elements which allow the equilibrium. As you can easily deduce, it's the result of a centuries-old rolling, that has determined a craftsmanlike, based almost exclusively on the *lift* in the form. This implies the absolute importance of the geometric parameters respect of the resistant system, as a unique condition for its durability, considering the slenderness of structural thickness. It's easy to infer from the analysis of the quoted sheet, how the builders of the island, although with different materials, would respect the building codes created by similar origins. It represents a source of trust in these structures, that nowadays, even so thin, thanks to double dimensional equilibrium, are still able of facing worthing the dangers to which they are submitted.

Notes

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1. This work derives from a study realized for the degree examination of a three year degree thesis entitled "the covering in extrados vault built in the south of Italy, cases study: Capri e Lipari"; Final year student: Fonti Roberta; Relator: Ing.M.Candela; degree course in History and Conservation of the Architecture and the Environment; Faculty: Architecture; University: Mediterranean study's University of Reggio Calabria, Italy; Academic Year: 2005/2006.

2. "*Fino all'anno 1812 le case di Lipari erano limitate all'accerchiamento delle fortezze, al di fuori di poche case disperse della classe lavorativa. Solo da quel periodo si cominciò a costruire la città di oggi e le case della fortezza furono abitate soltanto dai condannati al domicilio coatto. [.....]Le case di Lipari una volta erano di fattura molto povera; fino al 1782 e sulle altre isole fino al 1804 si adoperava internamente quale calcina tra le pietre della terra pura e soltanto dal di fuori si arricchiva con un pò di calce e di terra.[..]Oggigiorno si costruisce dappertutto con calce e polvere di pomice, le aperture si fanno larghe ed alte e particolarmente dal 1854 vengono costruite numerose case a due piani, parecchie delle quale mostrano di già un certa architettura.*" LUIGI SALVATORE D'AUSTRIA, Le Isole Lipari, Parte generale, vol.VIII,

Capitolo III, Centro studi eoliani, a cura di Pino Paino, Edinixe, Lipari, 1979.
3. *"Il deposito idromagmatico è un deposito piroclastico prodotto dall'interazione di magma con acqua esterna. È caratterizzato dalla presenza di vetro poco vescicolato, di ceneri altamente frammentate e talvolta di lapilli accrezionari."* N.CALANCHI, P.L.ROSSI, F.SAN MARCHI, C. A.TRANNE,"Guida eolie", escursionistico vulcanologia delle isole, pag.206, centro studi e ricerche di storia e problemi eoliani, giugno 1996.
4. *"condotto di alimentazione messo a nudo dall'erosione, costituito generalmente da lava e più raramente da piroclasti o a materiale frammentato; essendo più resistente all'erosione rispetto al materiale che forma il resto del cono, può restare in evidenza come un pinnacolo solitario."* N.C., P.L.R., F.S.M., C.A.T.,"Guida eolie", pag.209, centro studi e ricerca di storia e problemi eoliani, giugno 1996.
5. Dèodat De Dolomieu*"Voyage aux Iles de Lipari"*,1781"[...] *A nord il Monte Sant'Angelo si erge una seconda montagna conica un po' meno elevata della prima, ad essa attaccata alla base, di un cecante biancore. Mi recai sulla sua cima, culminante in un pianoro leggermente concavo, traccia evidente di un antico cratere. Questa montagna è formata da pietre pomici e da ceneri molto bianche che le conferiscono l'aspetto di una montagna di gesso. Confesso inoltre che la finezza e la dolcezza al tatto di questa cenere, pulverulente debolmente aggrutinata, mi fece ricorre più volte alla prova dell'acido nitroso per assicurarmi che non fosse effervescente e calcarea;[.omissis..]è possibile suddividere le pomici in quattro tipi principali. Le prime sono grigie, hanno una grana compatta, pori e fibre non molto evidenti, sono pesanti, molto dure, e quando vengono spezzate appaiono d'aspetto un pò vetroso; esse vengono impiegate, visto che si possono tagliare facilmente, negli angoli degli edifici e nella costruzione dei muri, tant'è vero che la città di Lipari nè è quasi interamente costruita. Le pomici del secondo tipo sono anch'esse grigie ma più leggere, più porose, e hanno la fibra più marcata, però non galleggiano sull'acqua; sono utilizzate per la costruzione delle volte, e vengono esportate a questo scopo nelle città marittime del regno di Napoli e di Sicilia."*GIOVANNI LA GRECA, La storia della pomice di lipari, Dagli albori alle concessioni monopoliste, pag 35-37, Giovanni Iacolino editore, luglio 2003.
6. *"vetro vulcanico di colore nero, generalmente di composizione riolitica, caratterizzato da fratture concoidi e da piccole cavità disorientate, rotondeggianti od allungate."*N.C., P.L.R., F.S.M., C. A.T,"Guida eolie", pag.209, centro studi e ricerche di storia e problemi eoliani,6/1996.
7. *"il prospetto[...] curvo alla sommità, con al centro, il minuscolo campanile ad arco; gli stipiti di pietra contornavano l'entrata sopra al quale si apriva la consueta finestrella ad occhio di bue. La volta era a botte, in muratura massiccia, mentre il tetto della sacrestia era coperto a tegole."* GIUSEPPE IACOLINO, La chiesa di maria S.S. Assunta a serra di Lipari, cronaca e dimensione del sacro nel circuito di un villaggio, Aldo Natoli Editore Lipari, luglio 1998.
8. *"l'abate Ambrogio emanò la sua carta costituzionale, una sorta di statuto[..]che il Garufi definisce "la «protocarta» per fondazione di comuni rurali in Sicilia"[..]è già configurato nelle sue connotazioni costitutive.[...]si ha una regolazione contrattuale degli interessi fondiarii collettivi attraverso le concessioni in perpetuum delle proprietà private[..]qui gli homines hanno la facoltà di disporre dei propri beni e il riconoscimento della libetà personale di azione e di mobilità;"*GIUSEPPE IACOLINO, La Fondazione della *COMMUNITAS* Eoliana, agli albori dalla Rinascenza (1095-1995), pag.30-31, Aldo Natoli Editore Lipari, 1995.
9. *"frammenti rocciosi sia angolari che arrotondati di dimensioni comprese tra 2 e 64 mm di diametro che possono essere ejettati sia allo stato solido che liquido. I lapilli accrezionari sono corpi sferoidali stratificati concentricamente composti da ceneri fini indurite, talvolta attorno ad un nucleo frammento litico o di cristallo) più grossolano ("armored lapilli"). In un deposito piroclastico l'esistenza e l'abbondanza di lapilli accrezionari è indicativa di eruzioni idromagmatiche."* N.C., P.L.R., F.S.M., C.A.T.,"Guida eolie", pag.208, centro studi e ricerche di storia e problemi eoliani, giugno 1996.
10. *"roccia vetrosa, molto vescicolata, generalmente di colore bianco, caratterizzata da una bassa densità ed indicativa di un magma molto viscoso di composizione acida."N.C., P.L.R., F.S.M.,C. A.T."Guida eolie"*, pag.210, centro studi e ricerche di storia e problemi eoliani, 6/1996.

GIUSEPPE LO CASCIO, Dell'Architettura nelle Iosole Eolie, Aton Edizioni, Agosto 2005.
MINISTERO PER I BENI E LE ATTIVITA' CULTURALI, soprintendenza per i Beni Architettonici e per il paesaggio di Napoli e Provincia, Comune di Capri (NA), Certosa di San Giacomo, Progetto Preliminare di Restauro e Valorizzazione, Relazione Storica.
PROGETTO SCUOLA MUSEO, Le Isole Eolie nella preistoria, Fascicolo ASSUNTA SARDELLA E MARIA GRAZIA VANARIA, Il Castello di Lipari, Regione Siciliana Assessorato dei Beni Culturali, Ambientali e del P.I., Museo Archeologico Regionale Eoliano.OLIMPIA NIGLIO, Conservazione e valorizzazione dell'Architettura Vernacolare Mediterranea: la "casa a botte" in Costa di Amalfi, da www.tecnologos.it.

M. Cannaviello

ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE IN MEDITERRANEAN COUNTRIES: THE NEED TO CONTROL ENERGY CONSUMPTION FOR SUMMER AIR CONDITIONING

1.0 SUMMER COOLING OF BUILDINGS: ANALYSIS OF A GROWING PHENOMENON

The 2005 *Green Paper on Energy Efficiency or Doing More with Less* pointed out the possibility to achieve a 20% reduction in energy consumption (as compared to present figures) by 2020 in the sector of building heating and cooling – a saving of 41 MTOE (Millions Tons of Oil Equivalent).
It is worth of note that a reduction in energy requests has to consider summer cooling savings alongside winter heating: interestingly, this shows that European Union studies and documents are eventually stressing the need to take into account also summer air conditioning, which in recent years has become a major energy issue especially in Mediterranean countries.
In the European Union the share of electricity in the energy balance in the civil sector, including energy consumption for summer cooling, accounts for about 11.2%, a rather small figure which apparently does not deserve specific consideration. However, this percentage should not lead us to underestimate the cooling aspect and should be read in the light of the particular climate conditions within the EU which tilt the request balance in favour of heating.
Countries in the Mediterranean area have recorded a huge increase in summer cooling: if we analyse the trend of energy use in the last ten years, we can but observe that the beginning of the 21st century has recorded a remarkable increase in the demand of electrical energy in the period from June to September, and that the trend upward is definitely higher than that of other types of energy consumption.
If only a few years ago summer air conditioning was an 'exception' reserved for a selected few, cooling systems today are very widespread and, in certain cases, they have become the rule. One may even remark that the demand for summer cooling inside buildings is soon going to become a mass phenomenon which may be caused, among other things, by the growing need for comfort at home and on the workplace. A few decades ago we were more willing to adapt to extreme microclimatic conditions, but today, after having experienced the comfort offered by well conditioned spaces, we look for the same comfort (in terms of temperature and relative humidity) in all the indoor places in which we happen to be, be it for a long or a short time. On most of the cars currently on the market the air conditioning system comes as a standard.

Similarly, the spreading of air-conditioner external units on building facades is further evidence of the growth of the summer cooling phenomenon, also as a consequence of the recent climate change which has brought about rising temperatures especially in urban areas.
In addition to that, the lack of laws aimed at checking the energy performance of buildings in the summer season – which may be somehow expected in Northern and Central Europe but definitely not in the Mediterranean region – has led, on the one hand, to the construction of buildings unable to provide the required comfort standards in summer and, on the other, to an indiscriminate use of air conditioning systems whose energy efficiency is not certified.
This situation has many multifaceted consequences, concerning above all the notable increase in electrical consumption (and it is worth remarking that the primary conversion factor for electricity is about 2.6 times that of oil) and, as a consequence, growing polluting emissions during the summer, but also the increase of electrical peak loads and the following black-outs which may occur on the national electrical grid or during purchase from abroad. In addition to that, mention must be made of the mark left by thousands of pieces of awful equipment clinging to buildings which deteriorate the aspect of our cities more and more.

2.0 EU Directive EPBD 2002/91/CE for the improvement of energy performance of buildings

At the European level, Directive 2002/91/CE on Energy Performance of Buildings is the main tool introduced by the European Union to reduce energy use in the building sector, and should have been absorbed by all the Member States by January 2006.
The Directive lays down requirements as regards the construction of new buildings and the renovation of existing ones with a total useful floor area over 1000 m^2.
One of the main points of the Directive concerns the need to define a methodology, possibly one shared by all Member States, for the integrated calculation of the energy performance of buildings, in order to identify the actual or estimated amount of energy used to meet the many needs entailed by the standard use of a building. The Directive binds each Member State to set minimum energy performance requirements, mainly for new buildings, but also for existing ones if renovated. The Directive also introduces the obligation for an energy performance certificate for any building, which must include data related to:
thermal and air-tightness characteristics of the building;
position and orientation of buildings, including outdoor climate;
heating installation and hot water supply, including their insulation characteristics;
natural lighting and ventilation;
indoor environment quality;
heating and hot water supply systems;
air-conditioning systems;
ventilating systems;
lighting installations.
One of the most interesting provisions of the Directive 2002/91/CE concerns the attention placed on summer energy consumption in Mediterranean countries, as highlighted in the Introduction (Par. 18) "*Recent years have seen a rise in the number of air-conditioning systems*

in southern European countries. This creates considerable problems at peak load times, increasing the cost of electricity and disrupting the energy balance in those countries. Priority should be given to strategies which enhance the thermal performance of buildings during the summer period".

For this reason the Directive extends the evaluation of the energy performance of buildings also during the summer, and so the idea of "heating energy performance" is replaced by that of "overall energy use". The Member States must identify suitable strategies to improve the summer performance of building envelopes and the use of passive cooling techniques. This approach to energy saving in the building sector is definitely innovative as compared to those informing the national legislations of most European countries (including Italy) which, before the Directive was issued, only included provisions to contain building heating costs.

3.0 Summer cooling requests containment: a critical review of Italian law

An analysis, however superficial, of the Italian energy laws passed in the past few decades, from Law 373/76 to Law 10/91 and D.P.R. 412/93 (Decree of the President of the Republic) and following amendments and integrations, shows the total lack of specific requirements regarding the containment of energy consumption related to summer air conditioning.

It is likely that in 1976 (when Law 373 was passed) and probably in 1991 too (when Laws 9 and 10 were passed) summer was not yet considered a major and urgent issue; and, however, energy consumption for building cooling was still negligible as compared to that for winter heating.

The national energy legislation introduced was mainly aimed at setting specific rules to check the efficiency of heating systems (n) and to reduce thermal loss through the building envelope by introducing a specific parameter – the Cd (Italian acronym for volumic transmission loss coefficient) – that must be lower than an established limit value (Cd_{lim} = the maximum thermal power which, according to the law, can be lost by transmission from a volume of 1 m^3 for a 1°C temperature difference between the inside and outside of the building) for each new building.

Whereas Law 373/76 introduced fixed limit values for the insulation of the thermal envelope and the efficiency of heating systems, Law 10/91 and D.P.R. 412/93 and following amendments and integrations introduced a performance check of the building envelope done by calculating the Cd coefficient and controlling the overall heating system efficiency (ng). Together, these actions make it possible to qualify the energy performance of the building envelope / heating system through a new indicator of the normalised electricity and fuel demands, the FEN (Italian acronym for normalised energy requirement).

These binding parameters concerning the insulation of the building envelope can, on the one hand, guarantee good energy performances in winter since a smaller amount of heat is lost towards the outside and non-heated spaces. On the other hand, they are not as useful during the summer, when a simple evaluation of transmission loss coefficients is not enough and other aspects become more relevant, such as the thermal inertia of walls, roofs and the base, and above all the radiative loads through the windows and through the other surfaces of the envelope; as regards summer cooling, these thermal loads account for an important share (greater

than the transmission heat loads) that must be taken into account to define the total loads and design the HVAC system properly.
At the beginning of the new millennium, a new epoch started in Italy in the field of energy savings in buildings as a result of the new legislation enforcing Directive 2002/91/CE.
On 27 July 2005, after an incredibly long delay, the Italian Ministry of Transport and Infrastructures eventually issued the ministerial decree enforcing Article 4, paragraphs 1 and 2, of Law 10/91. This short-lived decree (it was cancelled by Law Decree 192/05, which was passed less than a month later and repealed paragraphs 1 and 2 of Article 4 of Law 10/91) has basically the same purpose and scope of action as the Directive and Law Decree 192/05). Interestingly, the text of the law includes some elements that indicate a route change as compared to previous legislation that only aimed at controlling energy consumption for heating, as highlighted in the introducing paragraphs, which refer to "*the climate on the Italian territory which gives rise to winter heating as well as summer cooling needs; and it is the latter ones that have caused the latest energy peak demands*". In this respect, Article 7 introduces specific provisions to contain summer energy consumption, with a view to encouraging a proper design of the building envelope, so that it may become "*a passive element guaranteeing summer indoor thermal comfort*". Designers are therefore invited to use ad hoc technological solutions to prevent summer overheating (Par. 2); in particular, they are required to determine and evaluate the attenuation and thermal phase displacement coefficients characterising the building envelope surfaces. As far as transparent surfaces (except those facing North) are concerned, Paragraph 3 requires the use of shading elements, either fixed or movable, which may absorb at least 70% of the maximum solar radiation during the summer and make it possible to use winter solar irradiance. Paragraph 5 binds designers to calculate the summer indoor temperature, in the absence of an air conditioning system, in the most exposed room. Paragraph 6, then, states that air conditioning systems should be introduced only when the indoor thermal and hygrometric conditions are particularly bad.
Actually, reference to summer cooling is already made in Article 4, which defines the performance indicators and related limits. Under this article, in order to take into account the effects of the thermal inertia of structures it is necessary to correct the Cd parameter (maximum admitted value of the volumic transmission loss coefficient) with reference to the parameter introduced in D.P.R. 412/93, considering the mass of vertical and horizontal specific surfaces (multiplying the thermal transmittance of the single elements by a coefficient defined in table 2 depending on the frontal mass of the element itself). In other words, the greater the mass of the structures, the easier it is for the Cd to comply with the limit value[1] established by law. Even without going into detail about the technical aspects of these innovations, we cannot but remark a new, significant interest of the legislator in considering summer performances in the general evaluation of the energy performance of a building.
As mentioned above, less than one month later, on 19 August 2005, Law Decree 192 was issued, absorbing Directive 2002/91/CE. The Decree concerns new buildings and those larger than 1000 m^2 which have undergone major renovation work. According to the Decree, within 120 days specific D.P.R.s should have been issued to define, among other things, general criteria, calculation methodologies and minimum energy performance requirements concerning

the design, use, maintenance and inspection of heating and cooling systems, hot water supply and lighting equipment. It is a fact, however, that no such Presidential Decree has been issued as yet.
Article 16, paragraph 3, repeals the methods for calculating the energy performances (Cd and FEN) previously used, and Attachment I - "Provisional measures for energy performances of buildings" while the enforcing decrees are not available – sets out clear limits, depending on the climatic zone and on the shape factor s/v, for certain indicators related to winter heating energy performances. These indicators are the winter energy requirement (expressed in kW/m^2 per year) or, alternatively, the thermal transmittance (expressed in W/m^2K) of individual elements and the system efficiency (n).
At present, and at least as long as the enforcing decrees are not available, the aspects concerning summer cooling requirements are only a marginal part of the Decree, which is in contrast with what EU Directive 2002/91/CE called for. On the contrary it appears that some steps backwards have been taken even as compared to the Ministerial Decree of 27 July 2005. This is shown by the fact that the only references to summer cooling are in Attachment 1, which binds to the use of shading elements, either fixed or movable, and for buildings located in climatic zones A, B, C, and D. The same Attachment introduces the minimum limit of $230kg/m^2$ for the superficial mass of vertical, horizontal and inclined opaque envelope surfaces.
Law Decree 311/2006, issued on 29 December 2006, integrates and amends some parts of Law Decree 192/2005 by introducing some innovations relating to summer cooling energy performances: it introduces the obligation to adopt external shading equipment, which is much more effective than internal ones since it stops solar radiation before it enters a room and increases the room temperature. The same decree sets certain limits to the glass / opaque elements ratio.
Although carrying out an in-depth analysis of the technical aspects of these provisions may be quite difficult, some of the limits set out in the text of the decree are immediately evident.
The obligation to use fixed shading elements is no doubt too vague a provision to solve such a major problem as the solar radiation incident on the transparent surfaces. In addition, while designers are required to verify and prove the effectiveness of the screening, there are no minimum limits about the percentage of solar radiation that has to be intercepted.
Similarly, imposing a superficial mass greater than 230 kg/m^2 may entail a gradual dropping of lightweight envelope components in favour of an indiscriminate use of heavy stone masonry.
The containment of summer cooling costs is very complex to do and the existing laws are definitely inadequate, even though they show a willingness to start tackling the summer 'issue' and should be viewed by designers as a spur to search for the technological solutions which can best reduce recourse to air conditioning to the minimum, consistently with the requirements of the Ministerial Decree of 27 July 2005.

4.0 Building envelope requalifications to reduce the summer cooling costs

The development of legislation originated by EU Directive 2002/91/CE is evidence of a growing awareness in Europe and in some countries in the Mediterranean area (including Italy) of the need to control energy consumption for summer cooling. Actually, this awareness arrived

much after the huge increase in energy consumption, and probably law makers have not identified the best way to control it, also because of the complexity of the problem.
This complex, sometimes contradictory and in many respects incomplete legal framework points out that designers cannot keep ignoring the problem and constructing building envelopes which are unable to contain summer indoor overheating and therefore rely on air-conditioning systems for indoor thermal comfort.
Although a confined space may be somehow considered as a system that is 'isolated' from the surrounding environment; it actually is closely connected to it. The building envelope (and the overall quality of its making) influences the possibility of mitigating, more or less effectively, the effects of external weather conditions and determines indoor comfort conditions.
For thousands of years, in the traditional building practice all over the Mediterranean area the building envelope has acted both as boundary between the inside and outside of a building and as bearing structure: this way, its duration and mechanical strength also determined the conditions to meet any other needs, and in particular to provide indoor thermal comfort.
The remarkable masonry mass (characterised by a minor glass ratio) guaranteed optimal environmental comfort conditions in both the climatic seasons (in winter through heat loss containment; in summer through the thermal inertia of structures, which reduced indoor overheating and slowed down overheating). A building was designed and constructed in such a way as to optimize interactions with the sun and the wind, using different shapes, materials, openings, protrusions, depending on the orientation and, in particular, on the climatic and environmental sources on the various facades.
By simply observing the building tradition of southern Italy one may easily identify – even among many different characteristics – "the presence of some constants which make it possible to recognise the close links existing between the need for protection against extreme weather conditions and a proper use of the resources and of the physical properties of the materials used"[2].
Unfortunately, over the years a deep change came about in the relationship between architecture and energy, in the form of a shift from a passive energy use, where the envelope itself guarantees indoor thermal comfort, to an active energy use making use of specific energy systems. Today, thanks to the spreading of more and more efficient conditioning systems, it is possible to construct any type of building in any climatic condition: this, however, requires high energy consumption to reach suitable comfort conditions in the indoor spaces.
This approach has had negative, more and more evident consequences that lead us to question a relevant part of the latest architectural production, which has rejected the local architectural tradition that, over the years, had developed, "construction and architectural methods that were sensitive, reactive to and consistent with the surrounding environment in which they were born, and oriented to define a natural conditioning of indoor spaces"[3]. Apart from the provisions of relevant legislation, that are to be seen only as guidelines, a fresh start is necessary both in the design of new buildings and in the renovation of existing ones, recovering the Architecture-Climate relationship. This does not mean going back to the conceptual and formal stereotypes of the past, which would be a serious mistake considering that both materials available and building techniques have changed greatly. Conversely, it becomes necessary to recover a spe-

cific knowledge of the microclimate, materials and shapes, which was the strength of much of Mediterranean architecture. Today, as in the past, it is necessary to start from this knowledge to configure, size and quantify the design solutions which can make the best use of new materials and technologies with a view to producing an envelope that may reduce the total cooling requirement of a building as much as possible.

In 1998, Germany gave rise to the new concept of Passivhaus 4 (passive building), a building characterised by very limited energy requirements that was later adopted also in other central European countries. To obtain this certification, the thermal energy requirement of a building must be lower than 15 kWh/m^2 per year (the mean value in Italy, with reference to residential building, is 7 times greater). The Passivhaus standard is beginning to spread in Northern Italy, and requires the construction of buildings with particular characteristics, namely major thermal isolation, passive use of solar energy, mechanical controlled ventilation with heat recovery, etc. While these characteristics can guarantee optimal performances during the winter, it is true that in the summer they are not sufficient to fully control the cooling load, especially in the Mediterranean region where summer temperatures are quite high. For example, an adequately isolated building, such as to prevent winter thermal losses, is not automatically able to contrast summer overheating in the same way.

It could be interesting to define a new concept of Passivhaus that may be used in the Mediterranean region, that is a building designed to feature an overall energy efficiency in all climatic seasons: its specific characteristics should be determined on the basis of the climate, architectural, landscape, cultural and social characteristics of this geographic area. This way, any such building will appear to be deeply rooted in the context in which it rises.

What has been said so far clearly shows that a summer 'issue' does exist, and that EU Directive 2002/91/CE has been a major step in bringing it to the fore. It is now up to the Legislators and Committees for Standardization on the one hand to develop the debate by identifying minimum requirements and suitable calculation methodologies to check energy performances, and, on the other hand, to designers to evaluate new shapes, materials and technological solutions.

NOTES

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2. Amirante, Caterina, Leone: Costruzione della casa e risparmio energetico nel Mezzogiorno. Edizioni Scientifiche Italiane, 1979
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V. Capone [1]

THE DOMOTICA AND THE NEW UNITIES TECHNOLOGICAL IMPIANTISTICHES IN THE BUILDING SYSTEM

1.0 Abstract

The electronics it develops, in the residences, a fundamental role for the usual in the use of electronic apparatuses what: appliances, televisions, systems of alarm, thermal regulators, systems of telefonia etc…; nevertheless these apparatuses, although perfect and reliable, they have the limit not to have woven among them e/o with the outside. The actual technological progress and the reduced price of the electronic components make possible and convenient, one use of theirs in way from to overcome this limit; that is it allows of to have, in the typologies of residences (individual or collective, new or old) of the superior performances to those obtainable with the employment of traditional apparatuses. To the moment, the ability of dialogue employee has limited to an only "pole of activity"; for instance within the heating, the probes of temperature placed in every room and to the outside of the residence send some information to the central unity that handles their elaboration and the following management of the thermal apparatuses, that belong to the same subsystem. The products that allow the qualitative and quantitative increase of these demands are commercialized in the circle of one of the most substantial markets of the beginning of the third millennium generally constituted from the owners and from the consumers of the small tertiary real estate (dealers, free professionals), therefore constituted by a crowd of persons.

Nevertheless the commercial failures, in this sector, they are remarkable, since, despite a building is conceived for lasting different decades, the electronic components, employees, result currently quickly old. Besides, the components proposed have been penalized often by the themselves manufacturing that, few careful to the rules of the market, have neglected generally totally the reactions of a sensitive common use from a too inclined technological progress.

The domotica (electronics applied for performance houseservants) it will reach his/her objectives when it will improve the quality of the life of the men contributing to correct drawbacks what, the insecurity, the lack of time, the stress, etc... In a future far, the domotica will not modify radically the conditions of comfort, safety, and of the way to communicate or to work; in the meantime, it is necessary that it is demitizzata so that you

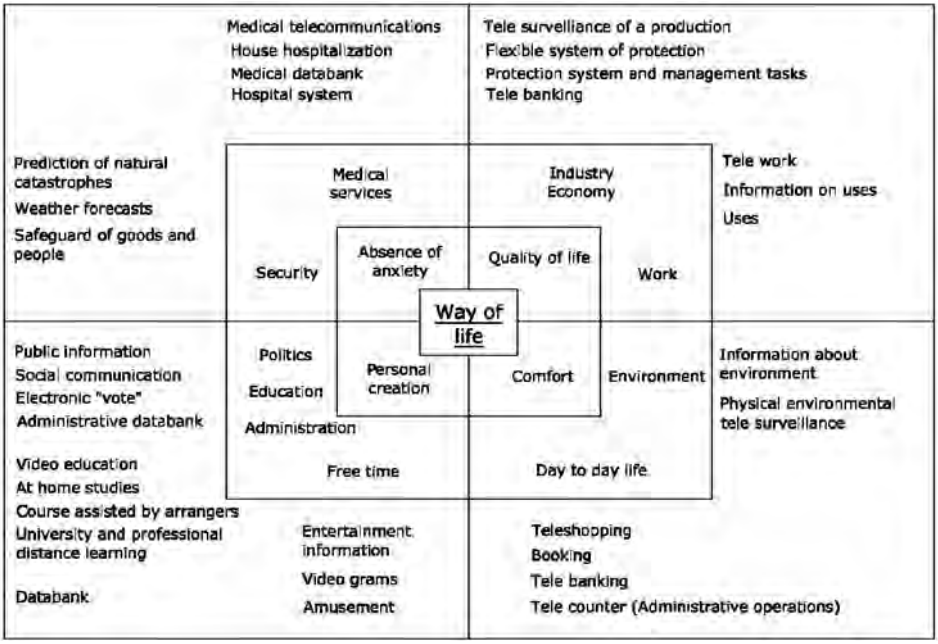

Fig. 1 - scenery of services and techniques finalized to the optimization of the quality of the life

become believable and you overcome the distrust that every innovation, kind if rare and fantastic, he/she normally meets. To bring to solution in serious manner and it embodies the problem of affirmation of the domotica, is necessary mainly to operate with a lot of prudence avoiding the applications innovative pushes, holding account that where it finds position it is had the conjunction of two compartments of activity, the housebuilding and the high electronic technology, characterized by philosophy of approach to times of evolution very different.

2.0 Domotics and its objectives

With a synthetic, but effective definition; domotics is a new technological wiring building unit which particularly presides over a dwellings by systems that carry out different functions and that can be connected both among them as well as to outside and inside communication networks. In particular, the functions regard economy and optimization, technical management, information and communication, management of comfort, safety and assistance."

With its advent the residence, that for centuries served only to protect from the bad weather, becomes so a space of multimedia information, thanks to the possibilities offered by television, minitel, the telephone, the electronic newspaper, etc... And surely it will be to the origin of a lot of future mutations, in a field both technical and social, in the way of living of men. Moderate domotics, simple to use, economic, will constitute a real need

for the users, while the complex and "Hollywood style" systems will serve only for expressing in an excessive way one's "status symbol."
The whole of the sectors in which domotics can have a determinant influence is presented schematically in the fig. 1; underlining the correlation between automatic systems of management, of control and of communication in different circles of daily life on one side and the corresponding factors of global improvement of the quality of the life on the other side. It is to be clear that domotics is simply a facilitation, good or bad, employable for the carrying out of the indicated activities.
A possible classification of the fundamental functions which domotics can contribute to

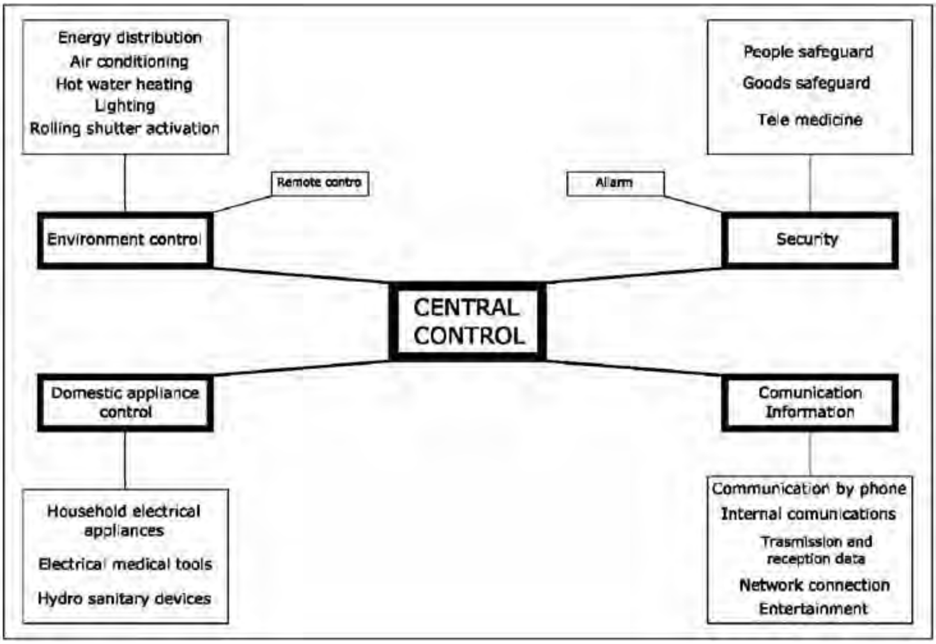

Fig. 2 - possible classification of the various functions domotics

is the following (fig. 2):

Management of the environment (on the site, or by distance by telephone), concerning:

- the energy's distribution;
- the air conditioning;
- the water heating;
- the illumination;
- the remote running of doors, windows, gates, etc...

Safety (with the possibility of sendind an alarm signal to an outside telephone), concerning:

- the people's protection against gas leaks, fires;
- the protection against burglary, flooding, etc...;
- the telemedicina or the assistance to people who are sick.

Communications and information, including:

- communications with the outside by telephone (with possibility of management and control of the residence) for social activity and of work, purchases, payments, bookings, banking operations, various information, answering machine, etc...;
- data transmission for sanitary controls (telemedicina);
- transmission and reception of data for didactics and for working activities (with possible network connection) by video terminal means;
- information or entertainment through televisions.

Management of the domestic appliances, with particular reference to:
refrigerators, freezers, elettrical medical tools, hydro sanitary devices.
Central management, for the supervision of the aforesaid functions and for energetic control, including possible solar panels, heat pumps, etc...
The new functions introduced by domotics, consist in:

- making devices communicate among them, through the employment of a bus of communication of the computer type to connect instruments endowed with an own intelligence or connected to a central control unit in which the intelligence of the whole system is located;
- in communicating with the outside: the domestic network accesses the telephone network directly commuted through a modem connected to the central control unit; in this way it is possible to remote control the domestic network through the telephone or, at least to be able to consult its state;
- in improving the reciprocal "dialogue" man-machine, through different types of commands: besides the classic switch, infrared command buses are employable, radio frequency commands, vocal synthesis commands or computer terminal, and the signals to the event of reception of a command can be the lighting of a LED, the diffusion of sonorous messages by vocal synthesis or the appearance of messages on a monitor;
- in improving the automatisms: the ideal would be not to command the devices, but that they would self adjust. The automatisms can be improved both by an integrated intelligence within every pole of activity, and thanks to the performances offered by the domestic network and particularly by the enormous power of a domotics program installed on a personal computer;
- in protecting the systems domotics, by the pointing out of the function anomalies and the dispatch of messages of alarm, or through the automatic re-configuration of the damaged system. The modular architecture of the domestic network allows one pole

of activity to be independent from the other and to not be globally affected from breakdowns. Therefore, the failure of a central control unit does not have to put in crisis the basic functions realized in the different poles.

Singularly, such services can be obtained without recurring to domotics, as a videotel, a personal computer, modem, etc., alone already allow today access to a multitude of databanks and services. But the possibility to make interact through a domestic network the different systems, to reciprocally self-adjust, to automatically intervene in case of damage, or more simply to use a computer terminal as system of running and control of the whole residence, as well as the connection with external networks, is an exclusive characteristic of the domotic systems that offers great possibilities in comparison to some products in commerce that improperly use such appellative, even if limiting themselves to much narrower fields and, above all, isolated. Domotics doesn't bring any contribution to the people's safety as regards the banal, but recurrent domestic accidents due to falls, elettrical shock, burns, poisonings and other causes on which the electronics will hardly result influential.
Remarkable is the utility within surveys (gas leaks, fire), with sending out a an alarm signal to warn the user or the emergency aid immediately, thanks to a message automatically transmitted on the telephone network.
Similarly it is for the burglar alarm, with many possibilities of control as the total surveillance of the building in which the single apartment is located or that of surveillance limited to some external zones of the building.
Other types of alarm can be conceived for the home surveillance of ill people, of children, etc...; and it's predictable that further services of the same kind or of other kind can be realized thanks to the new possibilities of communication (automatic call, number search , clear message with vocal synthesis, etc...).
Besides, another field of domotic extension demotica is the control and the regulation of the other technological wiring unities: for instance, the possibility of automatic intervention on the level of illumination and heating of the rooms, keeping in mind of the presence or less of other peculiar factors.
Finally, with a broader vision, the potentiality to guarantee in the future provident services such as those of remote tele-surveillance of the houses to distance and of the medical tele-assistance is not to be underestimated.
As regards the environmental integration of domotics, its main feature is that it must be perceived by user only for the quality of the service made.
Therefore , the ugly components must be put in opportune technical lodgings and those visible in the different rooms must not be more evident than the classic electric (sensors, probes, switches, acoustic diffusers, bright diodes screens or liquid crystals) components.
Attention must be set to the devices in the rooms that serve for "dialogue" of men with the system; their choice and the ergonomics that are involved are decisive elements for the consent to domotics. They must allow to communicate with a language as much more natural as possible, so not to disorientate the customer and as not to force him to an onerous learning.

The good quality of domotics installation is appraisable from the behavior of an elderly person, that invited in a domotic house didn't have any hesitation to use its basic functions. Under the ergonomic profile, the simplest means of dialogue between the system and men is the phonetic one; a rather diffused system thanks to vocal synthesis, a well tested and economic technique, that allows to the system to send out in clear language the different information.
The technicians and the industrialists that have confronted themselves with the market have verified how the reactions of the customers are slow to evolve, reason for which it is important not to upset them by radically changing their habits or imposing an intrusive modernism that they don't desire. From inquiry of comparison made on the reactions of the customers the necessity that domotics is discreet and moderate has emerged: it must tend essentially to improve the conditions of life, avoiding any sporadic effect so to adapt to social-cultural environment, and not vice versa.
In a first moment it must limit itself to offer some basic functions, subsequently other diversified functions so that the customer, in the same way he applies to the services of an interior decorator will apply to those of an organiser to formulate calibrated plans for the control of the different modulars connected in conformity to the expressed demands. An "intelligent house" can facilitate the life of its occupants rather than on the aspect according to which the electronic systems interact among them; the technique can do no less than to interest the experts, for the common mortals it doesn't represent more than an esoteric world whose complexity is certainly not reassuring. Therefore it is convenient to skip the modernistic aspect of domotics, and to insist on the quality of the life that it produces.
Comfort, silence, safety, economy, simplicity of use, well being, education, are concepts that agree with a kind of domotics that doesn't disorientate, as it is fundamentally conceived for the user.

Notes

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RURAL ARCHITECURE IN PUGLIA: ANALYSIS AND EVALUATION OF SUSTAINABILITY OF TRADITIONAL TECHNOLOGIES

1.0 Abstract

Rural buildings of Puglia, the so-called *masseria*, represent a considerable part of the architectural heritage of this area. The variety of climatic, environmental and geomorphological characteristics, together with the availability of raw materials and energetic resources, have determined the evolution of different building systems and technologies, which the *masseria* consists of. These systems, fruits of cultural heritage passed down over generations, have gone through an evolution, according to the progress of materials supplying and laying processes.

This study, starting from the direct mapping of a significant sample of *masseria* in country of Bari, has identified a "path of analysis and learning" of traditional building technologies, which would describe the relationships between various parameters: hystoric-cultural context, environment, building typologies, materials, building technologies and local traditions.

Therefore it can make an evaluation of technological units, their life cycles related to environment, with the aim to estimate their sustainability in the region of Puglia.

2.0 An evaluation model for building technologies

The study begins with the identification of technological systems of rural buildings.

It picks out all different solutions of each technological system and classifies technological units according to their function. It defines their major characteristics, performance demands in regard to the environment, building technologies and processes, which technological units were made through.

The study goes on to value technological units, with a multicriteria analysis, estimating their performance response, life cycle assessment and final sustainability evaluation.

Each technological system has to meet with strict performance requirements (load-bearing capacity, comfort, maintainability, etc.), with regard to environmental carachteristics and building functions. Performance analysis examines that respondence.

Life cycle assessment, which analizes the well-known four phases of product life (supplying materials, assembling parts, product life and discarding), has been made in order to value materials compatibility and environmental impacts, like "abuse" of energy and non-renewable resources, and waste production.

Specific ecocompatibility analysis estimates the possibilities to build technologies and preserve them in the course of time, without causing irreversible damages to ecosystems. Therefore it's important to analize maintenance processes required to conserve technological units, and environtmental impacts releted to that.
For what concerns traditional technologies, raw materials usually comes from "integrated" cycles of transformation, which don't involve production of pollution, but often generate dust emission during manufacturing stage (shaping of the stones). However they often involve an excessive exploitation of non renewable resources (stone quarryng, for example). These environmental impacts, which once were considered irrelevant, are nowadays crucial to determine a "global" evaluation of the technology.
After that we are able to value the technology on the whole, with the aim to estimate the expediency to recover traditional technologies, not only through the conservative refurbishment of existing buildings, but also by reproposing traditional building technologies in nowadays construction, in order to recover their high value of ecocompatibility, whereas it has been verified.
We will present in this paper a particular case study regarding the typical technolgy used to cover rural buildings in Puglia: the vault.

3.0 Case study: the vault

3.1 Definition of the technological system

Vaults act, firstly, as horizontal structures, being the traditional load bearing floors of *masseria*. Furthermore, they accomplish the function of "horizontal closing" for intermediate floors, ensuring soundproofing performances as well as the level extrados; they act also as covering "horizontal closing" for the last floor, with roofing systems, ensuring global indoor quality performances (soundproofing and heat insulation, protection from atmospheric phenomena) and defence from burglars. In the end, vaults accomplish the aesthetic function, especially for residential and state rooms.

3.2 Materials and technological features

Vaults of rural buildings in land of Bari are mostly made of tufa ashlars, a light and workable material, typical of this region; when tufa is not available (as in Alta Murgia region), vaults are made in limestone, with little elements slightly carved, usually of flat shape, called *chiancarelle*, or more rarely with squared ashlars. Sometimes vaults are made of earthenware hollowed cylindrical elements, called *bubbole* (fig. 1).
In tufa vaults, squared ashlars are carefully worked to get the right geometry and dimensions, related to the vault sweep and the position along the vault arch (key-ashlars, springer-ashlars, etc.). Vaults ashlars are placed by lines with staggered joints, and are connected by thin mortar layers. To ensure the correct static behaviour of the structure in the course of time, ashlars are compressed each others through the insertion of stone splinters, so that loads are transmitted to the wall through the mutual pushing actions of adjacent ashlars.
The material used to fill the upper part of the vault and to ensures a level extrados, called *rinfianco*, is usually made of unworked stones, sometimes coming from building construction or demolition; whereas in well made vaults, it can consist of little tufa walls regularly placed, or it

can be made up of light filling in earthenware hollowed cylindrical elements.
In tufa vaults the mortar has the only function of connecting ashlars and it has no real static function, so it is generally used in thin layers. On the contrary, in stone vaults with slightly carved elements, the mortar, made of lime and stone grit, ensures also the vault sweep and the continuity of stone elements, which are usually characterized by irregular surfaces, so that it also contributes to the load transmission. In this type of vaults, mortar is used in big quantity, has generally good static capacities and good cohesion with stone.
In vaults made of *bubbole,* the earthenware hollowed cylindrical elements have different dimensions (usually, height of 14-19cm, diameter of 9,5-12cm, average thickness of 6 mm), and are characterized by little hols on the upper and lower convexo faces of the cylinder (diameter of 1-2cm), to let the exit of the heat produced during the working. These elements, not very resistant, are generally used for the parts of vaults in which stresses are lower, that is in the upper parts, while the lower parts are made in stronger materials as tufa or stone. B*ubbole* are lied as shown in figure 1.b-c, connected by special mortar made of earth, slaked lime and gypsum.
Vaults types and configurations vary depending on building typology and on rooms dimensions and functions. Usually in rural buildings simple vaults (barrel vaults, barrel vaults with arches, called *nervature*) are used for ground floor rooms (residential rooms, cattlesheds, storerooms), while composite vaults (barrel vaults with lunettes, cloister vaults, cross vaults, cap vaults) are used both for ground floor and for the floors above (residential rooms). Because of the different static bahavior, simple vaults, which transfer loads only to the crosswise walls, need thick wall sections, while "composite" vaults, which transfer loads either to all the walls or only to the corner pillars, allow thinner walls or even no wall, so that wide openings and spaces are possible (fig. 2).
Vaults in slightly carved stone are thicker than vaults in tufa stone, either to obviate to the less accuracy in the execution or to bear the bigger weight of the stone structure itself. Stone vaults are generally built with little elements so that they can easily adapt to different forms and irregular geometries. Both in tufa and stone vaults, ashlars are lied by staggered lines, in order to avoid cracks and breakings along mortar joints, which are the weakest sections, caused by natural structure settling and material deterioration.
Bubbole are generally used for simple vaults, as barrel vaults, but also for composite vaults. As they don't have a great compression strenght, *bubbole* are used only in the upper parts of the vault, as sais, depending their dimensions on different types of vaults (for example in barrel vaults, stone or tufa ashlars are used in the vault sections from springer to an angle of 30-45 degrees, while *bubbole* are used from here to the vault key, as shown in figure 1.c). In composite vaults, also the lines of intersection are made in tufa or stone ashlars, as in these sections higher compression stresses are present.
As intermediate horyzontal closing, the vault has to ensure mainly a level extrados, as said, so that, above the *rinfianco,* a mortar bed is lied, the *massetto*, that constitutes the base for the stone flooring. For what concerns covering vaults of *masseria,* they are usually characterized either by a level extrados or a curved one. The most common roofing systems mapped are:
- continuous waterproof mortar surface, made of hydraulic lime (curved or level surface, unwalkable);
- limestone flooring put on a mortar bed above the masonry structure (slightly inclined, walka-

Fig. 1 - Masseria Spada, Corato (Bari). Typical vault in stone and "bubbole"

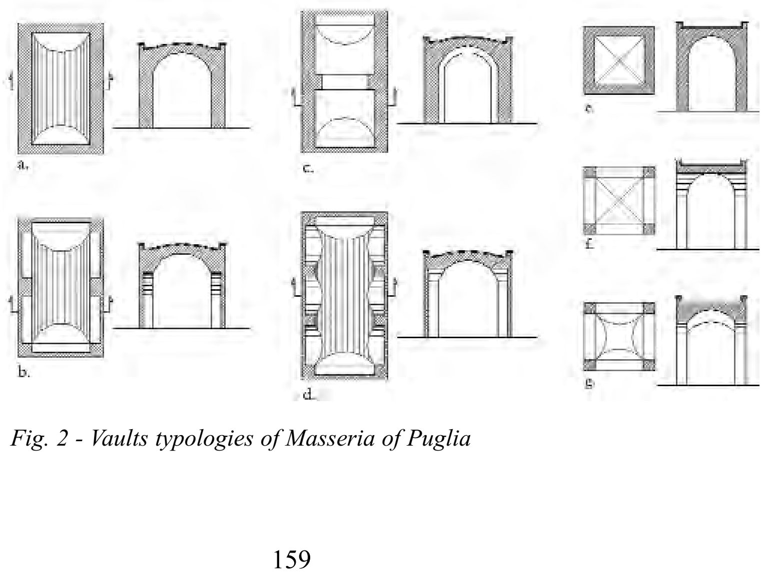

Fig. 2 - Vaults typologies of Masseria of Puglia

ble);
- tile roof in *chiancarelle*, without mortar, called *a secco*, or with mortar (inclined surface);
- earthenware tile roof.

In the end, vault intrados is usually finished with lime plaster or light layers of lime white washing, while in cattlesheds and storerooms ashlars have generally no protective layers (in this case the vault is defined *faccia a vista*).

3.3 Evolution of the technological system and relationship with the building traditions

First vaults in land of Bari were made of slightly rough-hewn stone ashlars, with mortar joints of lime and clay, as already described. With the beginning of stone-working, the introduction of technics of rough-cast, squaring and moulding, stone vaults are replaced by tufa ones, where tufa stone is available, because of the greater lightness and workability, as well as good features of heat insulation, overall necessary in covering closings. This takes a complication of the production and working process of the material really, as well as a harder activity of planning and organizzation of yard; on the other side however, this sort of stardardisation makes the process easier, faster and globally with better results.

3.4 Performance efficiency of the technological system

As horyzontal load bearing structure, the static resistance of the vault is guaranteed by the mechanical features of materials compounding the ashlars (tufa ans stone), and from the whole characteristics of the structure: dimension and shape of every element, mechanical properties of mortar and dimensions of joints, lately the laying. Static troubles of most vaults analized are usually due to the degrading of materials, errors in building methods and bad quality of the vault and/or pillars. In the end, the vault globally meets with the static requirements for the horizontal load bearing structures, if well planned and built *a regola d'arte*, and in absence of material degrading.

Furthermore, vaults guarantee good indoor quality performances for the great thickness of covering system (vault and roofing) and the inner insulation features of materials, especially tufa; protection from atmospheric phenomena is demanded to roofing system only. In the case of limestone flooring , for example, the fast hardening and the growth of lichens on the stone surface in the years, contribute to increase heat insulation of the covering.

For what concerns water steam in indoor rooms not well aired, which is an important cause of degradation of structures, tufa vaults better perform than stone vaults in draining outside humidity, as tufa is a very perspiring porous material.

Besides, vaults accomplish aesthetic function as well, where this feature is required. The vault satisfies this feature through uncoverd ashlars, *faccia a vista*, perfectly fit through a particular accuracy in ashlars moulding and mounting, or through the finishing of intradoses with an easy plastering, exalting the whole geometry, or with fresco decorations.

3.5 Lyfe Cycle Assessment of Technology

After analysing most important characteristics of vault and related roofing systems, we can study

their life cycle. First, the production of building materials includes two processes, quarrying and stone-cutting, which technologies depend on stone quality. These processes cause serious damages to the environment: consuming of not renewvable materials, creating quarries (great envorontmental upheavals which are very hard to reclaim), producing of discarding materials and emission of stone-dust in the atmosphere. Stone waste and slime, called *marmettola,* represent the 30%-40% of quarried material. Therefore we can consider this step of "vault life cycle" very harmful to the environment.
Second step includes producing of mortar and assembling stone ashlars. Mortar is an ancient building product, very famous for its air-wicking quality, which makes it a good ecological product. Mortar production, which involves stone-waste recycling processes, can also be considered a perfect sustainable process. Assembling ashlars is a simple laying process, without any particular environmental impact.
Technology life doesn't involve any relevant problem, but it requires a good maintenance of roofing elements. The final step, the technology discarding can be considered a sustainable process, on condition that it is made through disassembling and preserving stone ashlars, for a following reuse in another building.
For what concerns roofing systems we have the same LCA for stone parts. However the *chiancarelle* were often made with recycled or collected materials, so they present a greater sustainable value.
Other materials used in roofing system, like wood or earthenware, represent a negligible quantity, so their use for buildings doesn't create an impact on the environment.

3.6 Global evaluation of efficiency and sustainability of the technological system

Final evaluation of the technological unit sums up specific analysis of relationships between technologies and environmental context.
The vault can be considered a "good technology" on the whole, with the exception of first step in lyfe cycle. That technology meets with performance requirements, structural and comfort ones and has a good maintainability in time, in addition to a great aesthetic value. The only negative point is the environmental impact during providing/supplying building materials.
Therefore the preservation of that technology is to be hoped. The vault represents an important element of architectural heritage of Puglia as well as a "good technology" according to geographic location, but its reproposing is subordinate to supplying recylced materials instead of new ones, to preserve the environment.

Notes

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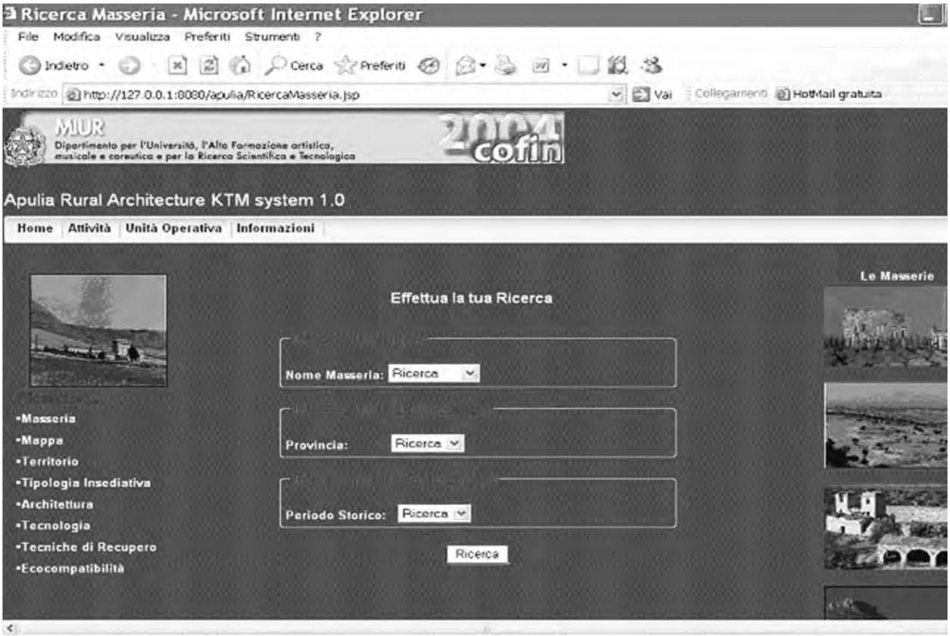

Fig. 1 - Search page

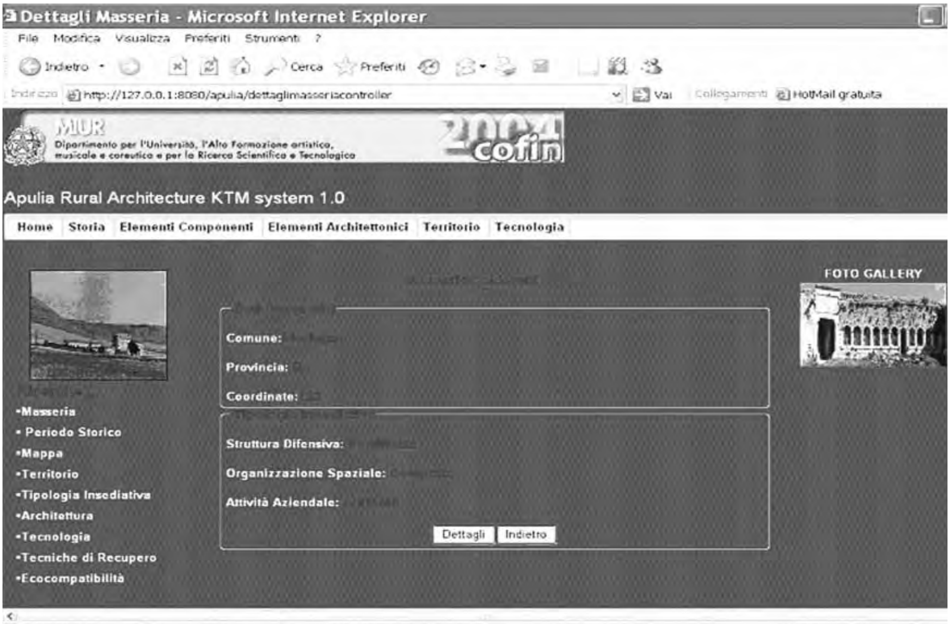

Fig. 2 -Farm page

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A DATABASE COMPUTER SCIENCE FOR A SUSTAINABLE PRESERVATION OF TRADITIONAL TECHNOLOGIES IN RURAL ARCHITECTURE

1.0 Abstract

The study of rural architecture and traditional constructive technologies, conserved whitin historical buildings, represents an important moment of deepening, acquaintance and cataloguing of the enormous architectonic heritage. The phase of cataloguing constitutes an important occasion in order to see again the collected data, characterising the existing relations between the various specific parameters, with the aim to create one "interpretative net" of the same data, which fundamental support to the assessment phase of rural building technologies.

The priority objective of the study is therefore the definition of one methodology of surveying, analysis and catalogues, thanks to the ITC supports, and the creation of a database, as an indispensable instrument to the cross-sectional reading of the data. The cataloguing comprises data systematization, by means of a complex system, which gives back a simple information under shape of relation between various information and therefore under shape of "knowledge". In the specific field of traditional constructive technologies, the explicitness of the existing relations between different parameters, which condition the characteristics of the same technology, concurs to comprise the evolution of the constructive techniques, and to deepen one's knowledge of material characteristics in relation to the territorial context. Therefore performance qualities and sustainable characters of the technology are examined by means of the life cycle analysis, with the aim to winnow possibilities of a "sustainable recovery" of the same technology and the opportunity to propose the employment in new constructions. It's been constructed a tool model for cataloguing traditional constructive technologies, called "Apulia Rural Architecture KTM System". The realised tool answers to the necessity of obtaining different levels showing information, textual and multimedial, diversified to you, on the base of predefined profiles of users. The tool, opportunely activated from "input of search", is able to operate a cross-sectional analysis of the contained information, in the within of the carried out search, supplying for result an analysis of the parameter, completes of information of descriptive type and data of relational type, that constitute the fundamental base for a critical analysis of the rural architecture and the traditional constructive technologies.

2.0 Web-based ITC for rural architecture evaluation and cataloguing

The phase of catalogues constitutes, moreover, an occasion in order to read again the collected data, characterising the existing relations between the various specific parameters, to the aim to create an "interpretative net" of the same data, as a fundamental support to the phase of appraisal of constituent elements in rural architectures, in relation to the historical cultural within, the environmental context, typological and architectonic models, materials, constructive techniques and traditions.
The priority objective of the search becomes, then, the definition of one methodology of surveying, analysis and catalogues, by means of the employment of information technology supports, and the creation of a database, as a fundamental support to the cross-sectional reading of the data, up to now described. The choice to realize a tool, employing the information technology, derives from the consideration that the information and its accessibility are determining elements in order to activate the acquisition of knowledge.
The cataloguing is not more realised with a simple "system to directory", but it comprises the systematisation of the data, to the aim to guarantee, therefore, a correct management of the information and the relative access. We focus to the employment of the computer science technologies, which favours an integrated knowledge approach, by means of new organisational systems able to manage data coming from different fields and to correlate structurally different data types, arranging different accesses to the data. Therefore it's been created a tool for cataloguing traditional constructive technologies, which access of by final customers is managed through a standard interface, by methods of "information retrieval".
The tool has moreover to provide different levels for accessing to structured hypertextual documents, also including informations of cartographic type. At last the model must guarantee a character of extreme flexibility and adaptability, in order to concur of the knowledge transfer through different fields. With the aim to create a "systematic catalogue of resources" they have been therefore defined the principles for the constitution of the systematic system of the data bank. In particular they have been defined:
- the type of information that the system must be in a position to manage;
- search systems and the parameters;
- the system capacity to recognize systematic relations between different parameters.

For what concerns the type of informations contained in the system, they have been characterized different thematic areas, all afferent ones to the analysis of the rural architecture:
- Historical analysis of the territory context;
- Geomorphologic characteristics and climatic analyses of the territory;
- Typological analysis of rural constructions;
- Outlines of distribution scheme;
- Analysis of architectural units and technologies, materials and laying processes;
- Analysis of degradation phenomena of building technologies, and the techniques of recovery.

In order to define search parameters, it has been necessary to establish the type of access from part of the various possible customers. The IT tool must be, in fact, accessible to different customers, including:
- the search team, inside of which a responsible coordinator for every thematic area distinguish-

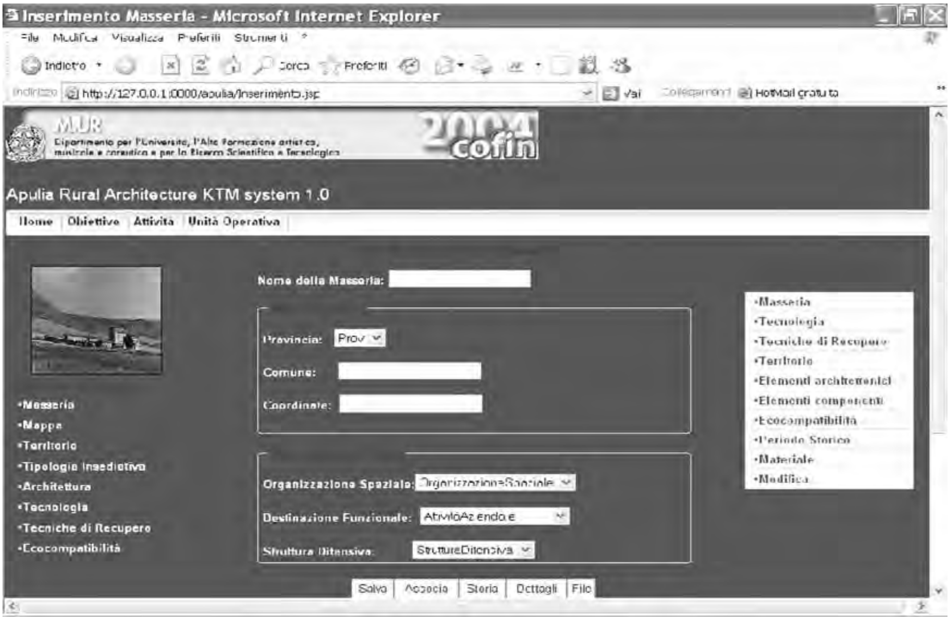

Fig. 3 - Data Recording page for a new mapped farm

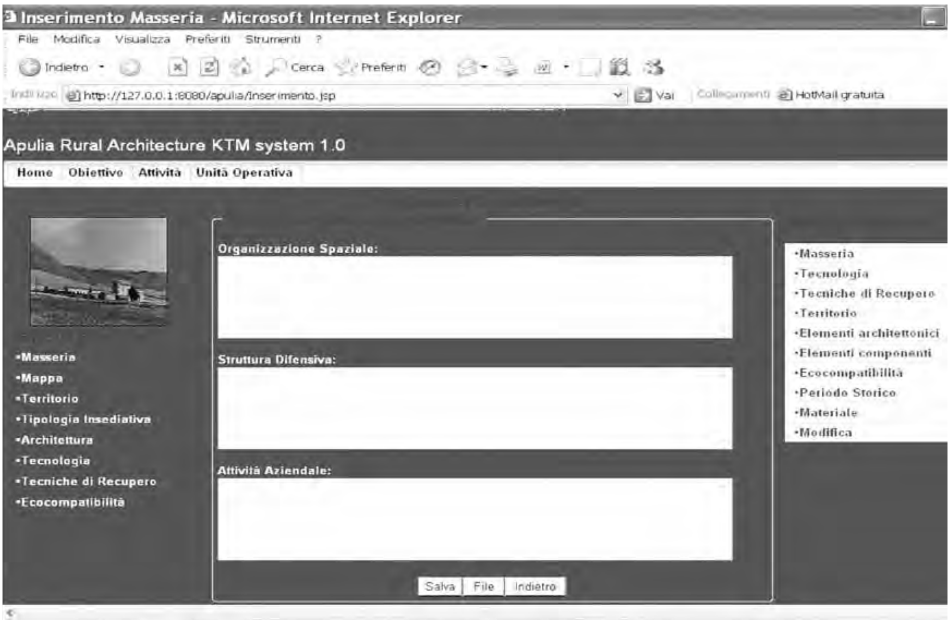

Fig. 4 - Data Recording page for a new building typology

es itself, that it should approach the data bank with the possibility to insert new informations and to modify ones already contained;
- the expert customer should be able to approach the informations, by means of making searches aimed at the explicitness of the different parameters, inside of one or more thematic areas, without modifying the data,
- the not expert customer, that should have a simplified access to data.
To such scope the cataloguing system should be predisposed to carry out simple and/or advanced searches:
- within single data bank,
- among similar data banks;
- among different data.

In order to construct the complex system of accesses and therefore to define the different "possible searches", they have been defined also the so-called "answers", which are the systems of structured informations constituting the result of searches. At last the definition of such outlines, inside the cataloguing system for rural buildings, establishes the same ability to the system to recognize the relations between different parameters.

A.tool like that, therefore, opportunely activated with "input of search", operates a cross-sectional analysis of contained informations, supplying for result a complete parameter analysis of descriptive and relational type of data.

That analysis constitutes the fundamental base of a critical evaluation of rural architectural technologies, for what concerns the technological characteristics, their relationship with the territory, the availability and the employment of natural materials and energetic resources, the answer to performance requirements, connected, once again, to the specificities of the environment (temperatures, rainfall, solar exposure etc), with the aim to be able to estimate the possibility of a "sustainable recovery" of the same technology and the opportunity to use again traditional technologies in new constructions.

3.0 L'Apulia Rural Architecture KTM System

In the light of what pointed out, the knowledge and transfer management system of regional architecture characters in the area of Puglia, has tried to optimise the functions with the aim to guarantee the necessary effectiveness for its access.

In short the information system "Apulia" offers to customers the following "macro-functions": Search, Registration, Data Recording, Data Editing.

Function "Search". Through first interface of model it's possibille to start searching by typing on left lateral bar. The system concurs to carry out the following searches:
- *Masseria*;
- Environtmental context;
- Typologies;
- Architecture;
- Technology;
- Refurbishment Tecnics;
- Eco sustainability;
- Geographic references (maps).

Typing in, by way exemplifying "*Masseria*", model will show to user the interfacing page pointed in Figure 1. This interface is composed of three areas: searches for name, which allows to choose the name of a farm, searches for province and ones for historical period.
Chosen the farm it will show the page in Figure 2. The superior navigation bar will allow all users to look at further information of the farm identified by technological units, architectural elements and history characteristics.
Function "Registration". This function allows members od research gruop to join the system and be admitted to the interface "Insertion". In such a way the researcher gets a username and a password to access to the restricted area from the Home Page. Therefore he has the possibility to modify or cancel data, only in his own specific researchingc area, which he had to specify among the following ones: - Eco sustainability; - Architecture; - Typologies; - Territory; - History.
The researcher typing his thematic area, User ID and Password approaches (only if identified) to the area of data recording of own competence.
Function "Data Recording". This function allows the "special" users, who have been admitted to the restricted area, to icludes new data in the sysstem, among following ones: -new mapped *Masseria*; Building Technologies; Recovering Technologies; Architectural elements; Technological Units, -Materials, -Ecocompatibility Analysis, - Historical Analysis. For example the interfacing page for "Data recording" of a new *Masseria* is shown in Figure 3 .
This page allows the user to record data. Typing in the key "Details" of tightens inferior, he will be able to record informations about different aspects (shown in Figure 4) and enclose documents (pdf files and images).
Function "Editing Data". At last it's possible to edit data with Typing in the key "Edit", in every recording pages. It will appear an interfacing page which allow user to delete and edit informations previously recorded.
Further functios of the system are omitted for the sake of brevity.

4.0 Conclusions

In this paper we described the information system developed under the framework of a work project for management and transfer of knowledge about a sustainable recovery of traditional technologies of the rural architecture. Unlike most current information system that are designed for a specific learning-domain, our system can be applied to any learning domain, since it is applicable to a wide range of organizations and individuals with different levels of architectural knowledge. The developed information system is immediately accessible by the users considered in the work program, but it also constitute the starting point for both theoretical and applicative future scientific investigation.

Notes

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7. MySQL: The World's Most Popular Open Source Database (http://www.mysql.com)

M. C. Catani [1] , R. Valente [2]

NEW MODELS FOR THE RECOVERY OF URBAN MAIN ROAD SYSTEM IN MEDITERRANEAN ENVIRONMENT

1.0 Foreword

Roads have always been structuring matrices in European towns: wider ways were integrated to urban public spaces in the shape of boulevards, tree-lined avenues, ramblas and the planning of these places consisted in a complex symbiosis between infrastructural aims, purposes of morphologic structuring of the city and the creation of public places for meeting and social exchange.

Still today in Mediterranean area the urban public open space is identified with the roads and the squares that, thanks to the favourable climate, are preferential places for socialisation, market, free time. In this way they are used from the citizens along many months during the year. With the advent of car and the speed, roads have been designed following the idea of the separation between the pedestrian distances, slow, from vehicular ones, fast. The functionalist logic, applied to the city design has caused the expansion of spaces of infrastructures and the consequent loss of meaning for the open spaces all around them. Currently, the great urban fast relief roads, the highways, are completely separated from the city reality and life. The originally targets for design of public open space have lost the character of integration and it has been answered to everyone of them in an independent and not homogeneous way, with a general lack of interest for the quality of the city form. It is necessary, then, to look for a new model of asset for great urban street infrastructures, to try to answer the original requests (functional, social and morphologic), revised towards city development.

This new asset must consider also the transformation of social, economic and political models, the new modalities of mobility, the new technological competences and the environmental priorities, tied to the features of the Mediterranean contexts.

The actions to undertake concern both new infrastructures and the recovery of the existing roads; regarding this last, rearrangement is more complex, but also more interesting, since in many cases urban highway rings, formerly constructed outside of the consolidated city, currently have been absorbed into the city structure. Inconveniences caused from great street infrastructures crossing the city are multiple and they can be ordered in three great thematic areas: functional, environmental, social and economic problems, closely

connected between themselves.
The first concerns the street, working as a connection between different city parts and between urban road system and metropolitan and regional ones. A good functionality of the street layout favors the fluidity of the vehicular traffic and low levels of congestion; still it is connected both with management aspects, and with the geometrical features of the tracing. Actually, organic management of the whole road urban system by a unique agency allows to obtain homogenous levels of performances and, not secondary aspect, makes possible systems of street toll, good for self-financing of the agencies managers, for works of ordinary and extraordinary maintenance.
Geometrical characteristics, instead, define the high and planimetrical variations of the street axis, the dimensions and the characteristics of the cross section of the infrastructure, the functionality of the interchanges. Management aspects and geometrical features of the tracing, therefore, may cause the rise of the levels of congestion of the traffic. Also the environmental impacts are multiple and they concern both the local and the global scale: air pollution and greenhouse gas production, noise pollution, effects on the local microclimate, barrier effect. In particular, the barrier effect, that is the cut made from a mayor urban road, has negative ecological effects, as it interrupts the link between the green areas of the city, interferes on the hydro-geological asset and therefore it can cause erosive phenomena. Moreover, the physical and perceptive permeability between the two sides of the road is blocked.
Residual spaces, proper of the edge of the street and of its pertinence, confined areas between interchanges and those under the roads are subject to the abandonment and to the physical, environmental and social degradation. At last, best accessibility of some urban estates, due to the presence of the street infrastructure, on one side increases the value of grounds in the areas nearby, producing a positive economic effect, but, on the other hand, it favours the speculations and the development of new settlements, with a consequent consumption of the city ground. At last, there are the social and economic costs due to accidents, that are very high on these roads, for various reasons (bad functionality and maintenance, phenomena of congestion, promiscuity with local and urban slow hauls, etc).
These are, in great synthesis, the main nodes to solve, the points from which leaving in order to rethink urban main road system, to redesign its integration with the city structure and to give back to this mobility type new environmental and social quality. The challenge has been faced in different ways in Europe; starting from the experiences, still in existence, of three great cities of Mediterranean area, Barcelona, Madrid and Naples, it is possible to make some reflections and to draw method conclusions.

2.0 The Barcelona model

From the Eighties, Barcelona has begun the redesign of the city, supported and stimulated by the democratic administration, that has seen figures like Oriol Bohigas and Bernardo de Sola leading the transformations of the town. Olympic Games of the 1992 have constituted an extra push and a remarkable economic support for the transformation

already begun, that it is continued with the further stage of the recovery of the area destined to the Forum of Cultures 2004 and that currently must be completed with the great plans on the areas of the Llobregat river (expansion of the airport area, realisation of the Agrarian Park and recovery of the delta of the river) and the Besós river (recovery of the fluvial areas) and with the plan for the multimodal station Segrera for the high speed.
Since the beginning, the carrying element of these transformations has been the design of urban infrastructures, in particular of the roads. The system of the Rondas, planned and constructed for the Olympic Games, constitutes a model recognized for the street infrastructuring at the urban scale. The strategy that guided the interventions has been to plan the works for the improvement of the functionality of the main roads in order to generate, through these, new urban spaces, integrating as much as possible roads with the life of the city.
The two objectives are apparently antithetic, because generally the strategy followed to limit the disturbance caused from the fast relief roads in urban environment is rather to clearly separate the fast ways from the context. The approach used for the performance of this program has been based on some fundamental concepts [3] . The idea has been to not only consider the road like carrier for the traffic, but also for its important social, cultural and economic meaning. Therefore it has been decided to assign 50% of the street profile to the vehicular traffic and left 50% to a slow, pedestrian use.
This relation, already introduced from Cerdá in the plan of the Eixample, apparently limiting for vehicular traffic, recognizes it like an integrating part of the daily city life. From the design point of view and the constructive process management one, great importance is given to the need to include all the projects in a unique program, coordinated by an architect. For this purpose, exchange and collaboration between the architectonic engineering competences is fundamental, in order "to construct works of engineering with the language of the architect" [4] . Therefore the road, that usually has an anonymous aspect, result of the sum of the rules of the norm, assumes an architectonic shape and an unitary image. The mastery of all the relations between the project and its context is the fundamental key to assign meaning of public spaces to the spaces of the road. The materialization of the described key concepts is the realization of the cross section of the system of the Rondas, in particular of the Ronda de Dalt, that constitutes the reference model for the other projects. The complex spaces organization and the compactness of the section realize an economy of the space that generates new urban dynamics around the infrastructure. In fact the path of the Ronda de Dalt is punctuated of areas for sport and free time equipments, parking, collective residences equipments and other services to local and city scale.
These results are due to the fact that urban problems and compensating measures for the realization of the infrastructure have been faced from the beginning of the plan, considering at the same time the three dimensions of scale: planning, integration with local level and the detail of the shape of the infrastructure. The model of the Ronda de Dalt has been applied also to more recent plans, like for example to redesign of the Gran Via de les Cortes Catalanes, by Andreu Arriola & Carmen Fiol, or in the interventions of reshaping of the Ronda Litoral in the area of Forum 2004.

3.0 Madrid. The recovery of the M-30

The M-30 is a street ring that encircles the city of Madrid and works as a typical urban main road system. Constructed during approximately thirty years, it shows lack of homogeneity of design, due to successive modifications, realized following not integrated design criteria.

Meantime the town is deeply changed, estates next to the road have consolidated, new accessibility has facilitated new settlements, to local and urban scale. These dynamics contributed to reduce the efficiency of the layout, that often turns out congested, because it must stand traffic weights higher to the previewed ability. In 2004 the Municipality of Madrid adopts the plan for redesigning all the ring-road. The aims of the plan are fundamentally two: to improve the quality of mobility in Madrid and to reduce actual environmental negative impacts, or even to invert their sign.

The variability of the layout and of its long context along the path asks for integrated approaches, but different for every part of the street axis. The main problems to which it is necessary to find solution are the high number of accidents, the deficiencies of the tracing, that provoke the chronic congestion of the traffic and the excessive environmental pressure in the adjacent areas to the course of the Río Manzanares. The requalification program has been therefore subdivided in four great groups of projects.

The East part of the street axis has a homogenous design today, with characteristics of fast road and a cross section constituted from a central way and lateral roads. Yet this part of the tracing is characterized from a high number of crossings with the radial roads that exit from the city and therefore from a continuous movement of the vehicles that move between the central lanes and the lateral ones. The East Project, therefore, solves these problems by planning five interventions, that consist in the redesign of five exchanges with the radial road system and in the improvement of the passages between central and lateral lanes.

The South Project redistributes the traffic of the South Node, that actually has high levels of accidents and design faults of layout, through the creation of direct link road of connection that distribute part of the traffic weight on other streets.

The North Plan interests a part of the M-30 that introduces different features from the rest of the road. In fact the layout has been conceived here like an urban road, with a strong promiscuity between the local traffic and the one of the ring-road. The recovery projects foresees to inter a part of the Northern layout and takes care of the urban space therefore available.

The West part of the M-30 follows the course of the Río Manzanares in its south-west area. The serious barrier effect constituted from the street axis, which crossing the river interrupts the continuity between the north zone and the south one, and the concentration of the impacts on the natural and anthropic environment carry to dealing this section of the M-30 in a different way.

This program, in fact, foresees a series of interventions on the road, that is interred for a long part, clearing a space on surface; but, beyond to the interventions on the infrastructure, in the 2005 the Municipality of Madrid announces a competition of ideas for the plan of Urbanization of the Linear Park of the Río Manzanares, with the aim to develop the original targets of the plan of reshaping of the M-30. The surface become available by interring of the infrastructure will be used to obtain a better environmental quality of the areas nearby the river, to help the connection between the districts before separated from the road, to realize new green areas, for the sport and the free time, making available the areas close to the river once denied to the citizens. Main objectives are the recovery of the river environment, the new design of the urban structure and the new plan for the system of mobility in the area. Therefore the return to the city of an immense high value zone is realised through a series of interventions on a great street infrastructure, extraordinary chance to realise an ambitious plan of recovery at the urban scale, also in sight of the candidature of Madrid to the Olympic Games of 2012.

4.0 Naples. Main roads network and ecological network

The city of Naples stakes on the collective rail transport as carrying element of the city network of multimodal transport, like evidenced in the Communal Plan of the Transports of 1997. The multimodal system needs that the railway network is integrated to main road system and to the junctions of modal exchange.

Therefore in the 2000 the Municipality of Naples adopts the Plan of Main Road Network that answers to some main criticality: the quantitative imbalance between the demand and the supply of road mobility, the incompatibility between the actual street system and the urban functions previewed by the planning tools, the serious impact that currently the road urban system determines on the quality of the noise and air environment, the alteration problems caused them from the presence of great street infrastructures.

The fundamental criteria of the Plan is the integrated character of the interventions on the landscape, planning and transport aspects. One of the more innovative topics is the idea to increase the nature in actually degraded areas, by using the interventions on the road system, to make accessible the system of the existing and forecast green areas.

The main tool to realise this program is a net of ecological corridors, placed in the open spaces around streets, different for morphologic and vegetal features, in relation to the crossed zones. The plan proposes an environmental organisation, under the agronomic and vegetal profile, of the main territorial units in the urban extension, indicating four important: the eastern area, the hills area, the phlegraean basin and the external versants of the phlegraean archicaldera.

By mapping the territorial natural resources it is defined the frame of actual environmental values, that allows to estimate the interactions between the street and the green system. It comes out as often the main road system constitutes the interface between urban and rural space, more obvious function for the urban freeways, just for their functional characterization of link of the urban with territorial main road system.

The design intervention proposals delineate a general strategy articulated for the creation of a new environmental quality through the reconstruction of the city ecological network and of the respect of existing the natural and agronomic values. Placing side by side street infrastructures with the ecological corridors and the constitution of the city ecological net will allow to mitigate the environmental impacts, taking advantage also of the vegetation of street margin.

The improvement of air quality and microclimatic conditions, the control of noise pollution, gas emissions and particulate, the mitigation of the aesthetic-perceptive impacts, the increment of the permeability of the urban soil, of accessibility and of the connections with green areas to the west, north and east of the city, through pedestrian and cycle paths, and at last the reconstitution of the ecological connectivity will follow.

5.0 Conclusions

As it can be observed from the described examples, the recovery plan (but the same can be said for the new infrastructure plans) always starts from indicating more significant and characterizing aspects of the infrastructural work and its context. The followed strategy, in the different cases, is to define a selective criterion, on which to carry out aware choices to develop a shape of the infrastructure that solves the problems of the context in the more efficient way.
Therefore the interventions of Barcelona have as priority the combined solution of the functional problems and of those social and economic, connected with the urban crossing of main roads. The priorities of the program of modernization of the M-30 in Madrid, beside the topic of the improvement of the functionality of the street, face the aspects connected with redesign of the city shape and with the environmental recovery in areas of value like the banks of the Río Manzanares. The Plan of Main Road Network of Naples proposes a method for reading the infrastructural net as an instrument to the plan intentions, particularly for what concerns the idea to join road and ecological corridors, using the interventions on the main road network like a chance to create a town ecological network, to gain general environmental quality.
This strategy, that works with the social, economic and environmental available materials, to integrate the project in the place, controls also that the interventions that today are carried out will not be an obstacle for future developments, both for the infrastructure itself, and for the city. Therefore the complex, hybrid infrastructure model is validated, containing in itself multiple uses and functions, constituted from distinguished and independent elements, but coherent between themselves and together answering to the requirements of local and global scale.
The new hybrid infrastructure satisfies at the same time the needs, apparently antithetic, of integration of the road system with its context and of versatility of the structure in answering, during time, to different solicitations.

Notes

1. Architect, PHD student in Technologies of Architecture and Environment, Department of "Restauro e Costruzione dell'Architettura e dell'Ambiente, Facoltà di Architettura "L. Vanvitelli", Seconda Università di Napoli". She has edited paragraphs 2, 3 and 4.
2. Architect, aggregate professor of Environmental Design, researcher in Technology of Architecture, Department of " Restauro e Costruzione dell'Architettura e dell'Ambiente, Facoltà di Architettura "L. Vanvitelli", Seconda Università di Napoli". She has edited paragraphs 1 and 5.
3. Cfr. Thierry Goossens, Philip Moyersoen, *Infrastructure // Barcelone. Interview Bernardo de Sola*, in *Infrastructure*, A+. Architecture + Urbaniste + Design + Art n.190 october – november 2004
4. *Ibidem.*

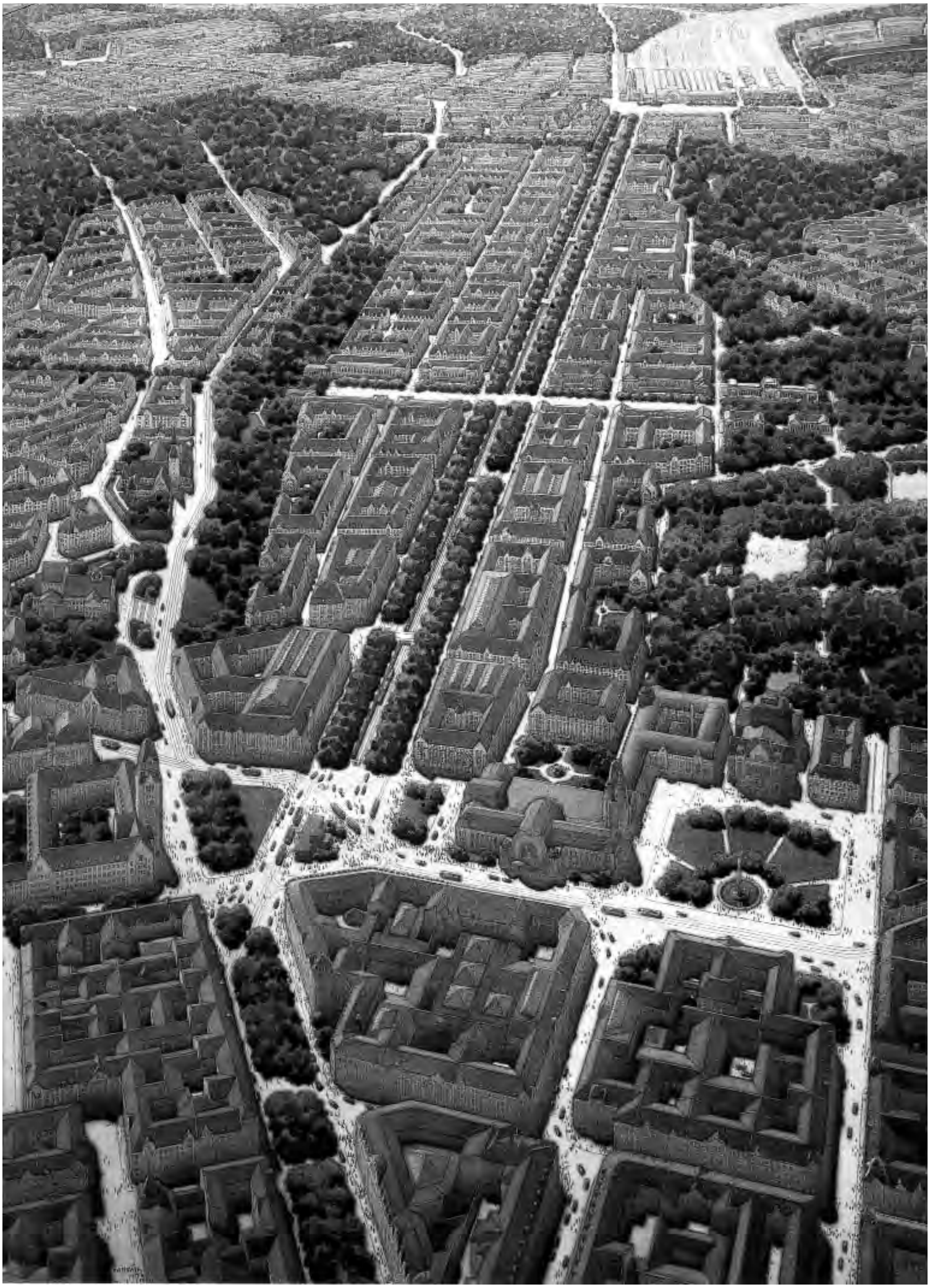


Fig.1 - Plan for Helsinki. Eliel Saarinen. 1917

J. Cenicacelaya

A STRATEGY FOR IMPLEMENTING HOMOGENEOUS DISTRICTS

1.0 Introduction

Much has been written about the need for using the Master Plan as the base to pre-visualise the final form of a city.
With the Master Plan, together with the codes or ordinances that can control the aspect of the buildings (their section, façades, materials, etc.) and with the help of the Design Guides, we have a complete range of steps in order to create something consistent.
A consistency that has to do not only with the physical aspect of that city for which the Master Plan is proposed, but that includes other important issues such as where the different public services will be, how big they will be, etc.
This methodology, quite known for anybody familiar with New Urbanism, can guarantee a good level of homogeneity, of formal unity within the variety that the design allows.
And still, it is today really difficult, not to say impossible, to sell this approach to many local authorities. And the reason for the reluctance in accepting such a methodology for a city, or town, is the resistance by many critical sectors to what they consider "control" over the creative capacity of the designer.
One has to understand that not everybody in our society is concerned with values such as formal homogeneity, or formal unity within a given district or city.
I consider of extreme importance this factor of formal homogeneity, in order to provide the character, or rather, to maintain the character of a given place; in our case of the Mediterranean towns.
In order to find a way out to this situation of reluctance, there is a need for the search of strategies that can help to convince the local authorities of the advantages of using this methodology.
Nowadays the municipalities have understood that a town with a strong architectural and urban character is a precious asset for a sustainable tourism. It is one of the main factors to keep the attraction of people towards that town. What these municipalities do no sufficiently understand is the value of searching formal homogeneity.
As one of the strategies in such a search, I consider the one of the division of the cities, or towns in sectors; it will help to discover, by comparison, what type of urbanism and

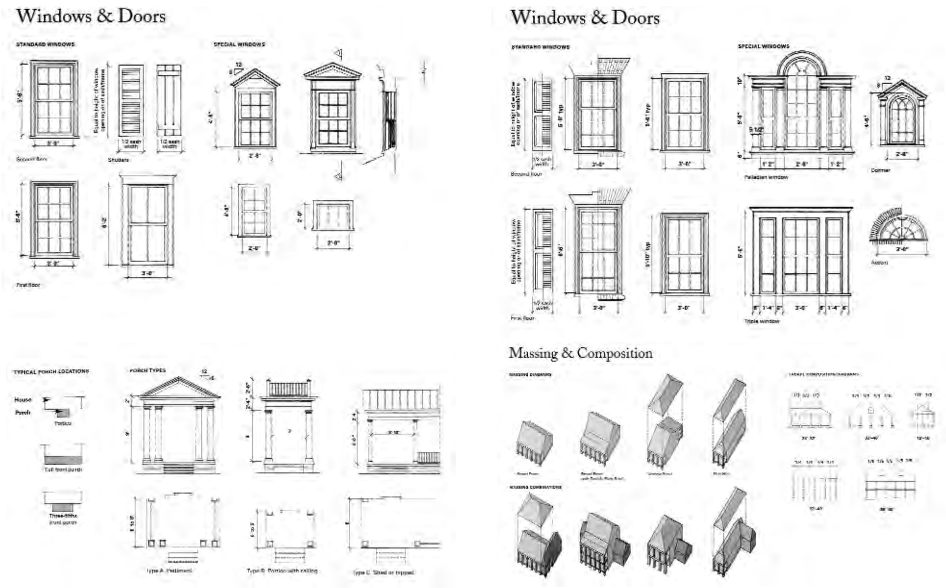


Fig.2 a,b,c,d - Examples of Design Codes

architecture works better for the city.
Instead of allowing a mix of architectural styles in a given district, in the name of “creative freedom”, the city or town should dedicate complete districts for specific architectural styles.
Some districts could be left for experimentation by that creative freedom; but others should impose specific architectural languages aiming at achieving a formal homogeneity.
I consider that with this approach people can compare; and through comparison, as a tool to select the best options, the city will avoid mistakes; sometimes serious mistakes made for good.
This paper deals with the search of those strategies to implement the above mentioned methodology.

2.0 Homogeneity and tradition

An homogeneous district does not mean a traditional district, not even a district with a type of architecture that expresses some type of continuity with historical precedents, or regional precedents.
If I specify this point is because once the Master Plan is produced, and the codes or ordinances established, the moment comes for the possible guidance in design by specific Design Guides. In this way we could perfectly pre-visualise practically any form, any kind of scenography.

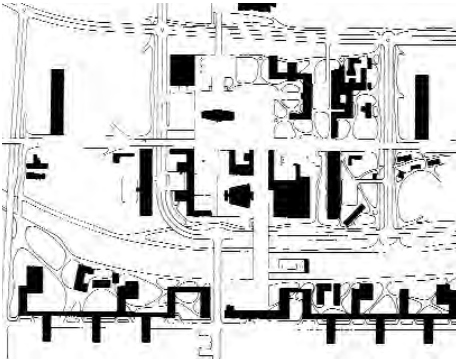


Fig. 3.a - Figure-Ground Plan of Saint-Dié

Fig. 3.b - Figure-Ground Plan of Parma

It could perfectly be proposed, for example, some kind of futuristic science fiction townscape; or the recreation of a Disney world. The tools at our hands (Master Plan, plus codes, plus design guides) do allow for very precise pre-vision of any future urban environment, in formal terms, indeed.
Having said this, my point in the present text deals on how to convince local authorities about the convenience of creating districts that keep continuity with the regional type of architecture and urban forms. Homogeneous character, therefore, within a continuity of precedent manners of doing.
And when arriving at this point we need to face few important issues in order to clarify the discourse, in other words, in order to make our purposes more clearly understandable. Can we speak of specific regional types of architecture? Can we say that certain urban forms are more commonly found in certain regions than others? Can we take into account the precedent? Does the fact of giving value to the precedent reduce or liquidate the creative capacity of man? Does it have any sense looking for formal homogeneity? Do not the new materials induce new forms in architecture? Do not contemporary conditions, such as the general use of the car, alter the continuity with the precedent ways of designing?
These and other similar questions can be raised in order to reduce or eliminate the interest for the search of a formal homogeneity of new districts, within a given region.
Let me try to produce a brief comment on each one of these questions.

3.0 Can we speak of specific regional types of architecture?

The type of architecture that we most commonly find in a given region, and that has been produced aver a long period of time (sometimes over few centuries) is what is usually known as vernacular architecture.
It is the result of centuries of empiricism. A real precinct of rationality, The perfect, precise, and most adequate solution to the given circumstances of the place: the weather, the available building materials and building technologies, the type of economy, the social

Fig. 4a (top left)- Aerial view of open blocks, Fig. 4b (right) - Aerial view of closed blocks
Fig. 4c - Aerial view of a compact city

organisation, etc.
We can indeed speak of regional architecture. And nowadays with the facility of transportation, and of communications in general, in other words in an increasing global economy we can of course use "foreign" types for a given area. The question that remains is if there is any sense in building a glass house in Norway or in Egypt, to say just two locations.
We do have the technology to control the internal comfort of the house; there is heating and also air conditioning. But, being possible, is it really reasonable?
Is there any sense to have flat roofs in areas where the snow and the rain are very frequent? We can have that type of roof, against what has been traditionally built in that particular place, but again, is it reasonable?

4.0 Are certain urban forms more commonly found in certain regions than others?

We just have to travel the world to realise to what an extend the ways communities are socially, culturally, and economically organised, do determine the type of environment in which they develop their daily life.
In the Mediterranean area the intensity of the life in the Greek agora was transplanted to the Roman Forum, and later on to the Spanish Plaza Mayor. The intricate network of narrow streets of Roman towns have prevailed in the Mediterranean region, whether southern Europe, North Africa or the Middle East.
When the Spaniards colonised the Americas and founded hundreds of new cities in the New World, they followed certain patterns, among them the establishment of a Plaza Mayor, and the precise definition of the streets by the alignment of buildings or by the

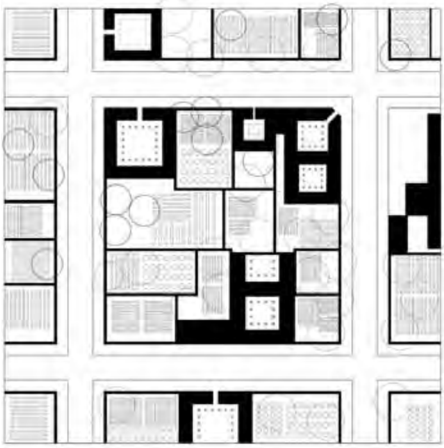


Fig. 5a
Colonising the block in Latin America

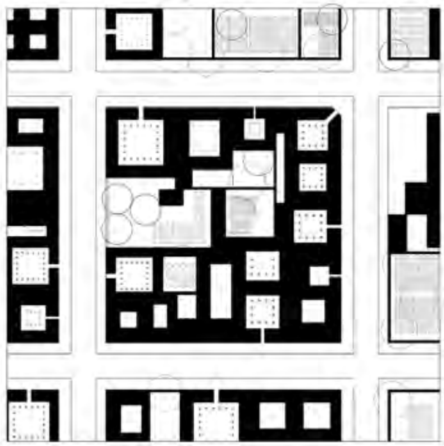


Fig. 5b
Consolidating the block in Latin America

walls enclosing private open spaces.
That approach is the one they had in their homeland. It was the one that the Romans brought to Spain, and the one that the Arabs in their expansion from Saudi Arabia in the VII and VIII Centuries found in North Africa, and kept as part of their way of inhabiting a city.

5.0 Can we take into account the value of the precedent?

I want to refer to a short text by Colin Rowe, in which he claims the inevitable need of the precedent. The text is the answer to an exercise proposed by Walter Gropius to his students, in which he asked them to be creative, and inventive but without copying.
Colin Rowe says to this:
"Let me first stipulate that I don't really perceive how your topic, *the use of precedent and the role of invention in architecture today*, can very well lead to profitable dispute.
I can never begin to understand how it is possible to attack or to question the use of precedent. Indeed, I am not able to comprehend how anyone can begin to *act* (let alone to *think*) without resorting to precedent.
For, at the most banal level, a kiss may be instinctual, and a handshake remains the product of convention, of habit, or of tradition; and in my reading, all of these words and whatever they may signify are related—loosely no doubt—to the notions of paradigm, of model, and hence, of precedent.
So much is my initiatory bias, which I will now expand upon via the ancient strategy of a series of rhetorical questions:
Just how is it possible to conceive of any society, any civilization, or any culture without

the provision of precedent?
Are not language and mathematical signs the evidence of convenient fables and hence the advertisement of prevailing precedent?
Further, in the romantic predicament of interminable novelty, surely one must be at a loss to discover how any discourse (other than a grunt) is to be conducted?
Is not precedent, and are not its connotations, the primary cement of society? Is not their recognition the ultimate guarantee of legitimate government, legal freedom, decent prosperity, and polite intercourse?
As painfully obvious and horribly banal as these implicit propositions are, I assume that they belong to the platitudes that any one operating in a *reasonably* structured society (neither savage nor subjected to overheated revolutionary excitement) will be compelled to observe. I do not assume - I *cannot* - that these platitudes are available to the average architecture student. For he or she has been educated in a much more expansive milieu, with boundaries and limitations fragile to say the least.
In the days when it was understood that all art is a matter of imitation, whether of external reality or of some more metaphysical abstraction, the role of precedent was scarcely to be disputed; and, needless to say, Aristotle produces the argument very succinctly.

"The instinct of imitation is implanted in man from childhood, one difference between him and other animals being that he is the most imitative of living creatures and through imitation learns his earliest lessons; and no less universal is the pleasure felt in things imitated."

6.0 Does the fact of giving value to the precedent reduce or liquidate the creative capacity of man?

Let me continue with the text by Colin Rowe
In these last paragraphs he will refer to how in order to invent something new, or in other words in order to genuinely assess that one is making a real contribution, a real invention, there is the need to know what there was before such a contribution is proposed.
Colin Rowe says:
"Now, what about the second part of your topic: *the role of invention in architecture today?* Well, one thinks about the lawyer with a whole library bound in blue morocco behind him. This is the inventory of cases bearing upon the specific case that he is required to judge. So simply to pronounce a legal innovation, to discriminate the new, our jurist is obliged to consult the old and the existing; and it is only by reference to these that genuine innovation can be proclaimed. For are not precedent and invention the opposite sides of the same coin? *I think a better topic might have been: How does the new invade the old and how does the old invade the new?* "

7.0 Does it have any sense looking for formal homogeneity?

When we observe an urban landscape, a street for example, in which the buildings that line the edge of the road present important variations in height, we logically perceive the idea of visual and even formal disorder. In a given neighbourhood, contemplating contiguous buil-

Fig. 6 a,b - Cacomorphic townscape

dings or very close to each other, but with different heights produces that sensation of disorder; a bad formal characteristic that creates an evident urban cacophony. It is like a choir that sings without order or control, thus producing an audible cacophony.
That visual disorder can be the prelude to an augmenting disorder. It is not pleasing to the eye, nor does it produce an effect of calm and tranquillity. It does not invite harmony or aesthetic order.
This type of landscape is habitual in the cities of the United States, where urban centres have suffered so grave alterations since World War II. They are landscapes composed of small pre-war buildings, alongside skyscrapers, and vacant lots (products of the demolition of entire urban blocks) destined for parking. Everything is formally and functionally disordered, an authentic pathological situation that one arrives to by car, and abandons at five in the afternoon to return to one's home because this place is no place to live.
Desolate landscapes of a city, the American city, that has unfortunately lost the impactful beauty it once had, and that it has to recuperate.
That visual disorder that I would called cacomorphic aspect is the result of a lack of a minimum level of homogeneity. Formal homogeneity indeed, including not only the architectural expression, but also the volumetric one.
One could argue that certain cities do appear without a strong level of that type of homogeneity, and nevertheless do perform very well. Quite frankly this is very arguable, and specific examples has to be proposed on the table in order to support that point of view.
The homogeneous character of any settlement is first of all, the consequence of a search for harmony, of the determination of the inhabitants for a balanced environment without significant inequalities among the citizens. And secondly, but not less relevant is the result of applying the same codes, ordinances, and regulations to everybody, from building regulations to fire preventing ones.
According to the previous considerations, the search for a formal homogeneity will mean avoiding a visual cacomorphism, as a previous step for a more chaotic environment than just a formal disorder. It means a sense of egalitarianism for all the actors in that milieu, and it also means giving relevance to the public realm instead that giving prevalence to the con-

structions, or more precisely paying a disproportionate attention to the diversity of buildings on display.

8.0 Do not the new materials induce new forms in architecture? Do not contemporary conditions, such as the general use of the car, alter the continuity with the precedent ways of designing?

One could claim that new materials or new functions do force the architecture or the city to change; and it is true, but just to a certain extend. I previously referred to the glass house, an epitome of the contribution of modern architecture; but that this means that the glass house fits anywhere?

There is no doubt that new materials, such as glass, have provided a higher degree of comfort in specific situations; but it does not mean that the buildings that find their expression in glass, represent a transparent or democratic society, as one can read in many texts today. The physical transparency of that material belongs to an entirely different category to the transparency required by democratic institutions.

A similar comment can be said about new functions in a city such as the extensive recurrence to the car. It is indeed a very relevant factor, that nevertheless does not justify some extremely radical propositions that have been made all along the XX century. For example the idea of separating the pedestrian circulation from the vehicular one, in the proposal by Ludwig Hilberseimer in Berlin, to mention just one.

The traditional city, the historical city has proved to have an incredible capacity to accommodate changes, and to adapt to technological novelties. And such a capacity may be due to the fact that the traditional city is a really complex creation; far away in its structural configuration from the simplistic propositions of some contemporary proponents.

9.0 The comparative method

I can presume that at this point of the present text, it is reasonably clear that pursue of certain levels of homogeneity is a rather convenient approach for newly created districts; an homogeneous district within the regional ways of doing architecture and the city.

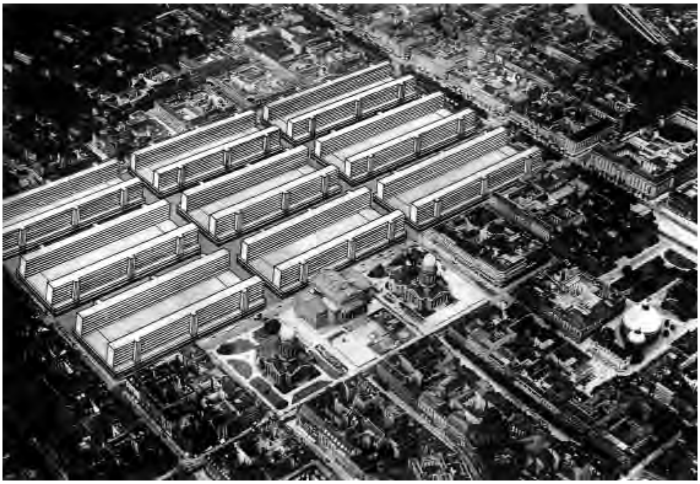
We know that all our decisions are based on the choice of specific options from a variety of given options; those decisions are the result of having compared the option that we choose with other possible ones. The comparative method is the engine of knowledge. We compare our way of speaking with the one we take as reference, or in other words with the one we imitate. Imitation is a way of comparing. And therefore the method of comparison allows the establishment of a discourse, the establishment of a civilised existence. I think that this precise method should be chosen for the creation of the new districts in a given city.

One has to be extremely sure and convinced to just take one option on any specific issue when betting for the future.

With the levels of uncertainty of our contemporary world it sounds wiser as the Spanish proverb says: “to put the eggs in different baskets”. In a sense as it happens with the Stock Exchange, betting on more than one option.

In this respect, the local authorities should in my view try different options than just the one

Fig. 7 - Proposal for the High City, Berlin. Ludwig Hilberseimer 1925



currently used and labelled as "modern".
Even more so, considering the negative and sometimes devastating result of modern urbanism; why then continuing repeating the same model of urbanism that has so widely proved to be a complete failure.
Modern urbanism does not contemplate the rich complexity and huge diversity of the traditional city and of traditional urbanism. Modern urbanism does not propose a compact city, with mixed uses, homogeneous character, and the recourse to the architecture of that specific region. It is more concerned with the systematic repetition of the same clichés no matter if the proposal is for a cold or for a hot weather, no matter if it is for a given topography or a different one, for a specific culture and tradition, or for a general and abstract place.
Local authorities could try to introduce partially traditional urbanism and architecture in just one part of the city, in just one district. Having done so, it will be possible to establish the comparison between the modern and the traditional district.
We are assisting in the last decades to an increasing demand of a local character for an specific place. In the world of tourism this phenomena is more clearly visible. After having devastated hundreds of miles of the Mediterranean seaside with developments having no character at all, people look for places with a minimum sense of identity, with clear character, with a human scale.
In the coming years those cities that have kept a local character will be able to sustain tourism in a steady way. The search for a sustainable tourism, or a sustainable development is behind (or should be behind) the option for traditional urbanism.
And having said this, the issue of identity remains behind this mentioned option of sustainability.
Identity in the positive sense of the word, I mean as the real and genuine antidote against alienation, against being a foreigner in our own milieu. Identity therefore as a source of harmony, beauty and balance.

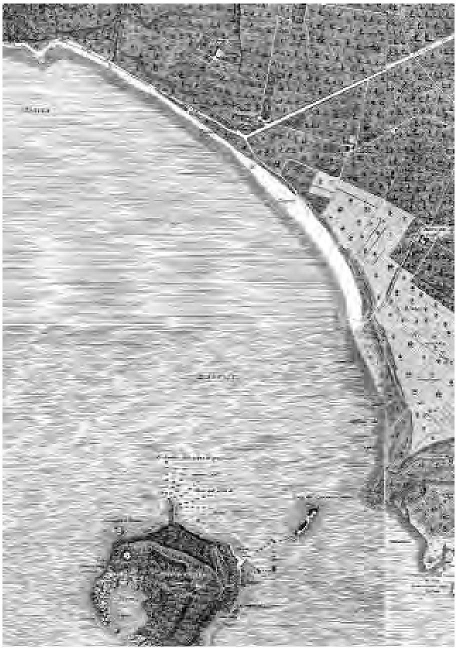


Fig. 1 - Map of the Duca di Noja (1775)

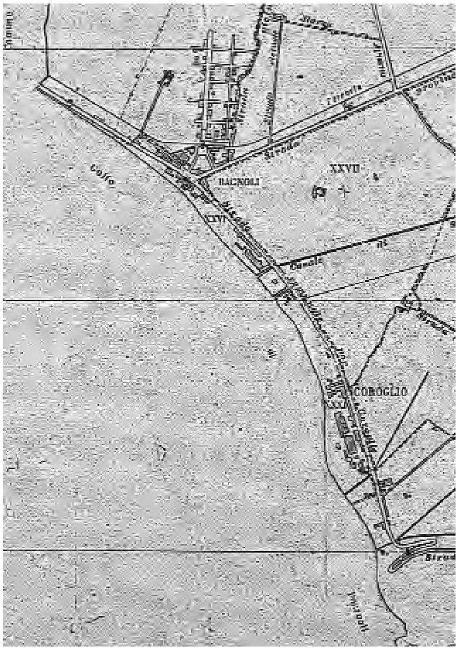


Fig. 2 - Map of Cadastral plant

P. Cerotto [1]

TO REGARD THE COASTS THE "MARINA DE' BAGNOLI" BETWEEN INDUSTRIAL INSTALLATIONS AND BUILDING ABUSIVENESS

1.0 Coastal landscapes

The line of coast constitutes the limit between the dry land and the sea, among what it is known and what is unknown, dangerous; that sea that is had to face for drawing its his own maintenance, to develop trade with whom finds beyond the sea, or simply because pushed by the desire to know.

It deals with a limit, of a very strong threshold and difficult to overcome; mutable in the time and for the meteorological time. On the coasts she was not lived: the band behind the sea, as he finds today still in so many coastal installations, the service was destined to building of the activities of the community which hospitalize for the boats and the materials for the fishing, deposit of the commodities destined to the embarkation, etc.

Along the coasts dynamics of opposite sign are assembled: from the earth toward the sea the pressure of the man practices him, that change and it organizes the in operation territory of her own activities and the housing necessities and it finds the insurmountable limit constituted by the sea; from the sea pour the earth the dynamics of the natural strengths he mainly develops but also that of the man, that develops a lot of activities on the sea and therefore it intervenes to modify the coast to realize suitable structures, as hands or also simple berths. "Il limite naturale delle terre argina l'avanzamento dell'antropizzazione del suolo, lasciando che sul bordo dell'acqua i processi di trasformazione si interrompano e si spengano, come fa l'onda sulla riva, talora serenamente, talora con fragore distruttivo. Su quel bordo si addensano e si accalcano nel tempo assalti successivi di esigenze umane risolte e irrisolte che accumulano sul litorale i resti di conquiste compiute, ma anche di sconfitte patite, di trionfi ma anche di fallimenti, di glorie e di vergogne."[2]

The interaction among the different strengths that act on the coast has produced and it produces some 'mark'. Mark material, allowed by to act some natural strengths in the time and to act some man; non material mark that determine what we define 'the idea of landscape and if "per paesaggio intendiamo, come comunemente si fa, il luogo che contiene in sé il senso di segno ambientale estetico per le sue caratteristiche fisiche e geografiche, per il suo apparire allo sguardo, per il suo essere soggetto e oggetto di opere d'arte, allora solo attraverso la unitaria percezione di tutti i segni delle e sulle coste si potrà rappresentare globalmente una idea che contiene la cosa e la sua immagine, il suo artefice e il suo riguardante."[3]

Therefore even if here we will deal there with the 'mark' material, the approach to the problem list that interest the coast is necessarily, and I would positively add, influenced by the idea of landscape that comes to build him in the community, rather from the ideas of landscape, because they can coexist differences, sometimes remarkable, in the way of intending the landscape and therefore in the proposals directed to intervene on the material data.

The coastal landscape is not as many consolidated as other types of landscape, both ours to act that the to perceive is 'limited' from the sea while it is appearing evident "come i luoghi la cui immagine è maggiormente consolidata siano quelli nei quali i cambiamenti sono stati indotti da un'azione diretta dell'uomo sul territorio in continuità o discontinuità di intenti, ma pur sempre compiuta ora nel ruolo dell'attore che agisce ed ora dello spettatore che guarda (…). Se consideriamo invece il mare vediamo come l'uomo non possa agire su questo elemento nel senso del mutamento. Il mare è, come il cielo, il luogo della totalità; il luogo del movimento; il luogo privilegiato per guardare, per cogliere il limite di quella terra che permette all'uomo di agire."[4]

The analysis of the natural[5] modifications and the critical evaluation of the positive and negative aspects of the transformations determined by the intervention of the man, allow to build an articulated picture to be able to formulate aware proposals of intervention.

2.0 Frame

The development of the coast flegrea, inhabited since the antiquity, she has determined a rich and articulated patrimony of 'traces' and of 'traced'[6] that is compared with the urban problem list and consequent urbanisms to the disused of the industrial area of the Italsider and to grows her demografic pressure.

The line of coast interested by this study, from 'Nisida ' to 'La Pietra' to horse between the communes in Naples and Pozzuoli, is brief but dense of urban and natural elements. It constitutes the initial part of the limit of the Regional Park of the 'Campi Flegrei', founded in 2003, that it comes up to Cuma from the promontory of Posillipo; it has a particular landscape importance and a bathing and tourist vocation for a long time denied by the presence of a great industrial installation, today obsolete; the vast area of ground behind the coast on which she insisted offers manifold opportunities of use, not first however of a suitable environmental reclamation.

The simple cessation of the industrial activities has given life to a spontaneous trial however and not checked of resumption of the tied up activities to the bathing, so much that the mirror of before water Coroglio becomes for the only summer period a great I bring tourist, deprived however of all the elementary infrastructures.

The coast is also marked by the presence of an urban installation of recent plant, the district of Bagnoli, clearly defined in its road structure within precise natural and artificial limits, of which it will be said more before; from punctual presences of antecedent buildings the industrial installation, particularly in the place Coroglio, but not immune from phenomena of unauthorized growth; from some building out 'measures realized in the sixties of the by now departed century.
The comparison among the Map of the Duca di Noja of 1775 (Fig. 1), the 1892-96 Cadastral plant Map (Fig. 2), a Map of 1920 (Fig. 3), the 1943 aerial photography raised by the IGM (Fig. 4), a Map of the eighties where however she is not brought fills her to sea (Fig. 5) and a recent image from satellite (Fig. 6), it allows to follow the evolution of the relationship among the limit of the coast, the urban installations and those industrial and the to form him of the 'frame' that characterize the territory in examination.
The first industrial installation places along the coast of the plain one of Bagnoli in 1853 and is the establishment of chemical products of Ernesto Lefevre, but it is alone in 1907 that the jobs of construction of the establishment of the Ilva start, that will mark the destiny of the area as great iron pole; the first establishment will come more times widened and restructured and the Ilva will become Italsider. In the same area they will install him in the second post war period the establishments of the Cementir (1951) and then those of the Montecatini and of the Eternit.
The first nucleus of the district of Bagnoli is built beginning from 1888 to work of the marquis Candido Giusso that made to approve the construction of a new building installation, the quarter Giusso, on site of her ownership[7]. The plant, according to the canons of the epoch, it is to chessboard and he has hinged on a central axle, the actual avenue Campi Flegrei; the prevailing building typology is constituted by small villas in how much the intervention didn't want to be an urban expansion, and for many verses it is not today still it, but a 'pleasant place' for the middle class of the epoch. In the first halves the Nine hundred the development of the district determines an alteration of the native typology with the realization of buildings for residences that they sometimes occupy two insulae; but it is in the second post war period, like it happens in the rest of the city, that been free the areas they are saturated both from the public installations and from the private speculation.
Also the line of coast suffers remarkable changes, in fact when in 1934 the islet of Nisida is connected to the dry land, the alteration of the sea tides determines the formation of an ample beach in correspondence of Coroglio, today very used for the bathing despite the pollution of the sea and the same beach; a phenomena similar but more limited course has been determined by the wharf of the Italsider in correspondence of Bagnoli plaza.

3.0 To give places

The analysis of the territory and the carrying elements that they define the specific identity of it is fervent of you sprout of reflection both on the theoretical plan that on

Fig. 3 - Map of the 1920

Fig. 4 - Aerial photography raised by the I.G.M. in 1943

that operational.

A possible approach for a careful and finished retraining of the area has to move from the understanding of the phenomena that they have determined in the time the transformations of the territory; beginning from these transformations it is necessary to intervene for inserting her in a new ordered system and harmonized of interventions able to give back quality to the territory and to throw the bases for a less distracted attitude towards the delicate relationship between environmental emergencies and human places.

The presence of the industries if from a side she has certainly determined the pollution of the coastal band, for other verse, paradoxically it has sheltered the area behind the limit of coast preserving it from that chaotic and uncontrolled building development that has devastated a lot of other areas, coastlines and not, of the city.

Also the building installation of Bagnoli, although strongly notched by the interventions of public house building and by the private speculation, she has not suffered the same dramatic destiny of the other suburbs of the city, so much to make 'anomalous suburbs'[8] to define it, thanks also to the presence, to south, of the industrial installation, and to the symmetrical north presence of the NATO, that they have not only prevented the expansion of the inhabited area but they have notably influenced the housing and social dynamics of the district. The further physical ties constituted by

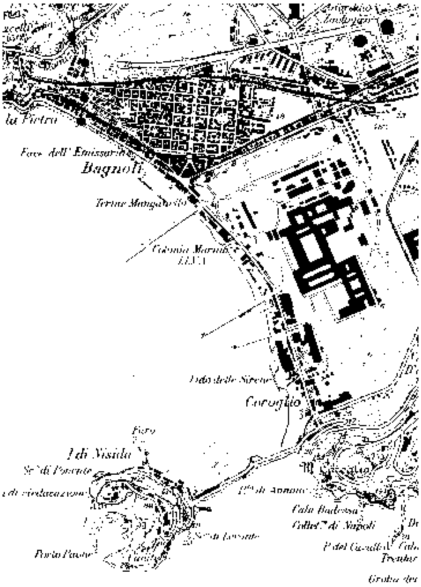


Fig. 5 - Map of the eighties

Fig. 6 - image from satellite

the railway line Cumana and from the railway line ‘Direct’ Naples-Rome, has closed the inhabited area in a ‘enclosed’ in to whose outside has remained a hold band among the railroad Cumana and the sea, that an autonomous development has followed characterized by building episodes not homogeneous.

After to live off the industrial systems they have been formulated numerous proposals turned to the recovery and the exploitation of the environmental patrimony to promote the development of the territory and to use the natural resources without to the state has had raced. To such intention it is opportune to underline as an intervention of urban retraining has to move from the analysis of the morphological characteristics and typological, from the dimensional and formal relationships, to make to emerge new relationships among the built parts and not build.

In the specific place it seems me that she owe us to first of all propose to return the sea to the city with the fruition of the coast both from earth that from the sea; in such sense she must be gives particular attention to an use of the territory consistent with her vocations, ancient and recent, so that to reconstruct the urban frame, to modify with an intervention ‘weak’ the territory aiming to also return urban quality to that interventions that, singly taken, they result incoherent. They can be individualized at least two specific uses to which ‘to give place: the bathing use, a great deal ancient and from which derives according to the most accredited sources[9] the name Bagnoli,

Fig. 7 - The line of coast seen by sea

use besides extended him up to halves the Nine hundred and recently taken back in spontaneous way; the use such as port, a great deal more recent but very felt in a city as Naples, that she sees in the mirror of before sea Nisida, well protected from the winds, an ideal centre.

The 'use' can easily enter in conflict among them, therefore only a careful setup of the places can allow a profitable coexistence of it able to adequately emphasize the vocations of the area.

Notes

1. Researcher of the university in Naples "Federico II", Dipartimento di Progettazione Urbana e Urbanistica
2. R. de Rubertis, *Gli obiettivi della ricerca*, in *La riva perduta* (a cura di R. de Rubertis), Officina Edizioni, Roma 2005, p. 13.
3. C. Carbone, *L'analisi della costa come esperienza estetica*, in Ivi, p. 42.
4. Ivi, p. 44.
5. The coast in examination has been subject in the time to the phenomena of 'bradisismo' typical of the area Flegrea and the quota of the ground she has had, in the last thousand years, a total excursion of over 12 meters; today few is found below the middle value.
6. For a further close examination of the tied up matters to the layouts of the city of Naples it is postponed P. Cerotto, *Per le antiche strade. Percorsi e tracciati della città di Napoli*, Grafie, Potenza 2006.
7. Before the new installation in that area there were only some farm and some houses, of which he finds again today still memory in the pre-existent road layouts, preserved him inside builds him.
8. "Il termine 'periferia anomala' non è allora una semplice trovata, più o meno suggestiva, per dare un titolo a questo libro: è invece quello che meglio riassume e delinea la realtà di Bagnoli, come viene vissuta peraltro dai suoi stessi abitanti". V. Cardone, *Bagnoli nei Campi Flegrei. La periferia anomala di Napoli*, CUEN, Napoli 1989, p. 245.
9. "Alla erudizione e alla cortesia di Raimondo Annecchino devo anche la presente voce "Questo toponimo (…) deriva dal nome della terma Balneolum (vulgo lo Bagnuolo) (…). E' probabile che il nome rimonti all'antichità, come la terma; però le più antiche testimonianze non risalgono oltre il Medio Evo"". G. Doria, *Le strade di Napoli. Saggio di toponomastica storica*, Riccardo Ricciardi Editore, Milano-Napoli 1974, pp. 56-57.

Fig.1 - Venezia, panorama (images from AVOE archives www.avoe.org)

P. Choynowski

THE EDUCATIVE VALUE OF TRAVEL

1.0 THE EDUCATIVE VALUE OF TRAVEL

In his story of Italian Renaissance painting James H. Beck of Columbia University divides the painters between two general categories or tendencies: monumental and lyric. “As we shall see, these two stylistic labels are only relatively meaningful, like the analogous terms classic and romantic. Just as no single artist represents the absolute monumental current in every respect, although Masaccio, Piero della Francesca, Raphael and Titian come the closest, no single painter fits completely within the lyric category, although Pisanello, Botticelli and Pantormo are candidates. The monumental and lyric currents …should be thought of as parts of continuum,…” And further: “While it is not desirable to ..exaggerate the characteristics that make up lyric and monumental…, certain qualities recur with enough frequency to sketch distinction between two currents. Within the larger context of a Renaissance style, in lyric painting we find an emphasis on gracefulness, elegance, and refinement of forms; complex, often curvilinear, design patterns related closely to, or on, the surface; and an excitement of contours. Frequently there is a strong commitment to naturalistic detail, to landscape elements, as well as concentration on decorative features. The proportions of the figures may be attenuated, with long, lithe bodies and smallish heads; the limbs, especially the hands and feet, are tapered.

In the monumental current, there is a gravity of forms, a volumetric three-dimensional insistence in which the figures take up space in convincing stage-like environment. Usually there is an organization that emphasizes horizontal and vertical stresses; a full front view or a sharp profile for figures is preferred. Colour is used less for its own sake than as a vehicle to produce readability. In its extreme, monumental pictures become cold, mechanical, and rigid; lyric pictures become precariously decorative, capricious, and overrefined.”

This, perhaps a somewhat extensive quotation, refers to and describes very well the phenomenon of a characterological nature which is more general than just belonging to the history of art of any period or even a nation.

The quoted author makes of it the dialectical couple, of monumental v. lyric, hints at clas-

sical v. romantic, but it also may be called classical v. gothic or calm v. restless, tense or nervous. To be sure it is all about beauty, but of two different types of nature, of character, of temperament.
It so happened that during two last years I have been moving, travelling by car, along the backbone of the Old Europe from Italian peninsula, through the Alps, along the Rhine and towards the Low Countries and back. All this time with Paris as a focal point of reference where I stayed for a longer periods of time. During these travels I have noticed this difference in temperament clearly enough, as imprinted in the artistic environment along the North-South axis of the continent. It may be introduced still another dialectical couple to describe it geographically as Latin v. Teutonic.
The vocabulary introduced by prof. Beck in the above quotation, I believe, might be helpful to get a grasp of a phenomenon which nature is liquid and imprecise since it operates within the same cultural and geographic continuum. Exactly as in case described by prof. Beck where it is about the stylistic one.
The divide comes to a focus in the two masterpieces, which when juxtaposed clearly reveal the stylistic differences mentioned above, proving that the sometimes alleged banality of a problem is illusory. Two paintings, both Renaissance, both of the same subject, the Resurrection, but what a difference in expression!
The one by Italian painter Piero della Francesca, an Italian, the other Mathias Gruenwald, a German. The one shows all the features of a monumental: strength, calm, the message understood as a clear, univocal statement, the reality of which is not to be misunderstood. By Gruenwald the Resurrection seems more joyful but also more unreal, quasi fairytale like. Contrasts and colours are more dramatic, and generally the scene is animated in a contrast to Piero's static harmony.
During my travels I realized that the same may be related to architecture, to a built environment. The rapid trip from Paris to Rome, has woke a similar reflection as contemplation of the two described pictures. Two cities of equal beauty but at the same time how different.
Again the robust monumentality of Rome as against nervous, electric delicacy of Paris. Self-fulfilment of one versus the constant search of the other. Stone versus iron. Accomplished classicism of Rome, and gothic or eclectic experiments of Paris. This slightly impatient, restless atmosphere of this city, with its unfinished gothic towers or strange stylistic hybrids like St. Eustache, combined with a great classical monuments, undouptedly contributes to the strange, electric fascination evoked by this metropolis.
This sensibility must also have intervened at Fontainebleau built not long after the Isenheim Altar was painted, where the main artistic personages has been representatives of Italian Mannerism Rosso and Primaticcio. These masters become instrumental at so called School of Fontainbeau, which inaugurated the French Renaissance. Jean Goujon, one of the first French fully Renaissance artists, as his fountain of the Innocents in Paris certify, was its representative.
Interestingly, but characteristically it was the Mannerism, which by the way of "Maestri Comacini" has penetrated the Alps northwards, spreading its version of the Italian Renaissance over most of the Northern and Central Europe.

Fig.2 - Universidad Laboral, Gijon, Spain - arch. Luis Moya Blanco (www.avoe.org)

It seems that to peoples used to employ the wooden filled frame for the walls of the town houses, resulting in a fine liner pattern of black and white, were naturally attracted to aesthetic of “grotesque” ornamentation, which likewise the framework did not leave the wall bare. This same aesthetic allowed for creation of elaborated “atticas” which fit well with a high gables of the northern climes.
Most of the towns of Rheinland,, of Alsace, of Low Countries, of Northern France and Bourgogne. Or Bohemia and Poland for that matter, become from the XVI th century onwards filled with the elaborate decorated facades as the successful merchants begun to compete for visible signs of their prestige. The Grand Place in Brussels illustrates this well enough.
These features were alien to the classical purity of the Mediterranean. Why then to go to these lengths to describe them?
Because it seems that the experience I made while travelling, demonstrates the educative force of contrast, of seeing things in their diversity which destroys their banality. Simply seeing that nothing can or should be taken for granted, that every phenomenon is in itself unique and as such precious. Nothing makes this feeling stronger then when one visits the cities of Germany destroyed as a result of the furror of their own making.
In the same way when after crossing the Alps one encounters the Mediterranean it tastes differently, one also feels more clearly the special character of the region, nonetheless its urban environment.
The towns and hamlets of the Pianura Padana rather densly set along the old Roman throughfares make a stocky, and rather matter of factly impression. Narrow streets, brick or stuccoed, piazzas with the Duomo, usually at once Mediaeval and Baroque, in stone, sometimes like Parma or Cremona with Battistero which have curiously lace like walls. Sometimes, among the fields one can see agricultural buildings in brick, which look almost as survivors of the Roman era. One can also see clearly, as in Poland, the outlines of the parcs once belonging to the grander country estates. These are specially visible in the Emilia Romagna, along Via Emilia and around Ravenna.
The newcomer from the North will also be surprised to find the old feudal agricultural facilities inside the townships, with a palazzo and all, including the garden.
Except for the palazzi, often quite grandiose, the town houses organized along the streets on the deep elongated plots, not unlike in the north, but these houses belonging to merchants and artisans are much more modest then their northern counterparts. Usually a two window, two story and the roof façade, porticated or not one meets all along the Pianura, practically the same in the big cities like Bologna or small towns like Bagnacavallo.
The structure of the towns is clear enough. Around the main piazza with a Duomo or a parish church, usually consecrated to the patron of the city, the seat of the earthly power, the network of streets more or less regular, depending of the topography, can be described as follows: rather narrow, often porticated streets, typical houses of brick, stuccoed brick or stone, depending of locality of the place, among them scattered the feudal establishments of nobility, much grander in form and decoration, on the peripheries the monasteries and usually the fortress “rocca” belonging to the defence system of a given territory.

In contrast to the northern Europe decoration is scarce, even churches and pallazzi are most often decorated in a rather classical manner, even Italian Baroque is restrained and classical in comparison with that of the north, and the houses of the common burgers are modest indeed. It makes for the typological clarity. Not only in plan but also in three dimensions. Entering the city everything seems clearly defined.
All this could make for a monotony if not for a great variety of Italian landscape and topography which provides for diverse building materials, stone, brick, stucco, as for the city layouts, hill towns, or cities of the plain, more hippodameic. But basically all are variations of the same type.
All what has been said above is of course a great simplification, the reality is certainly less black and white, more complex. We have to remember that all happens to belong to the same cultural continuum, Alps notwithstanding, the same stylistic development only submitted to somewhat different sensibilities, be they genetic or cultural. The temperamental undercurrents, resulting indifferent emotional sentiments, result only in a still greater cultural wealth of our continent.
This wealth can only be properly appreciated when perceived within a bigger context and through comparison, juxtaposition or contrast.
Travelling makes it much easier.

Notes

1. Architect, Visiting Professor at many EU and USA Universities, 1992 European Prize for Architecture

F. Converti [1]

THE DESIGN FOR THE PORT-CITY

1.0 Introduction

This study was conducted on cities containing a high percentage of works of art.
Any research into large ports and the surrounding areas have to start with an evaluation of the requirements of the city through a research of the materials. The interpretation of concrete analysis together with elaborate data provided by the project material, attempts to provide a report covering all aspects of the project.
As spaces become available within the city, two major/fundamental things become apparent: the realisation that the empty space reflects the transformation of the city and that the relationship with the sea goes beyond the project.
The big projects elaborated for port areas involve the city as a whole, designing areas in both built up and unbuilt spaces that will have an effect on the whole city, thus creating an alternative city center.
In the study, is important to research the city's ''individual character'', in depth with ''the methodology that tend to calibrate every change in relation with all the pre-existing contexts''.
Therefore, the port areas become new expansion areas that permit the redesign of the city but at the same time taking into account the existing architecture. But it is undeniable that frequently, the big projects for port areas have been wrong interpreted and the needs of the city have not been taken into account. The rhythm at today's urban change has not been linked to the residence, but to the constantly changing service and transportation sectors. This is creating the risk of removing again these spaces from the city, probably in a less imperious way but certainly just as dangerous.
Due to the new role that the Mediterranean area is assuming in the intercontinental flows scenario, the Italian port system can have the role of the European ´South door´ for flow of tourists from Middle East, Asia and America.
On the base of these considerations it is evident that a radical physique and organizational transformation of the surrounding portal areas is required in order to use the territory efficiently.
The principal purpose of this research is the interaction between the port and it's city,

in particular to detect city-port interactions, oriented to link the city to the more porous and compatible port areas with urban flows and activities, the structural interconnections to link the hinterland to the port and the possible repercussions on the territory. The infrastructural spaces that link the port with all the other transportation nodes, after all, have not only connection infrastructures; around them arise a number of interactions with housing, productive, environmental and cultural systems.

2.0 The arrangement of the scientific problem

In this first phase it is fundamental to conduct a detailed research of project materials in order to obtain a proper understanding of the different contexts. It is an essential cognitive phase to detect problems, analyze planning solutions, and examine architectural topics concerning the cities' needs.
For the research to be comprehensive, it is necessary to go in "situ" to gather essential inedited details as well as, where possible, designers' testimonies. This should provide increased sources of information and news concerning the project. From a systemic-managerial perspective, two things emerge as major criticalities; one being the scarce integration between ports and the related territory. The other issue which emerges is the deficiency of the computerized systems that manage the administration and coordination of port installations.
The primary purpose at the base of the research is to develop different opportunities for better collaboration between cities and port, thus generating added value. This creates a synergetic environment which encourages a reality wherein there exists a rich multitude of options for the customer base. This can only be obtained through an integrated port system with the urban context, therefore improving the port/city relationship ultimately promoting the waterfront development for a city's tourism.

3.0 Cutting-edge trends

Cutting-edge trends essentially consist in the capacity to fulfil the needs required for the evolving city functions, improving supplies, structures and city services. This should be made with attention to the sustainability and the compatibility of the existing cruise line infrastructures within historical cities´ ports.

Definition of an operational plan in line with the pre-defined strategic idea:

- Relief of the actual status for the territory´s large system infrastructures.
- benchmarking techniques: comparison of the southern ports' inter-modality situation and relative impact on the territory with success cases at the national and European levels
- Swot analysis: the points of strengths and weaknesses for the infrastructures´ port/territory exchange in the southern legs;
- Location of alternative strategies for territorial planning;
- Evaluation of the environmental impact: location of a provisional model for a cost-benefit analysis;
- Urban redevelopment processes in the waterfront areas;

- Port-city relations, in conjunction with the passenger terminal functionality: the problems of the accessibility and of the infrastructures, the liveability and the environmental quality.

4.0 Methodology

The research can assume a strategic character not only for one city but for all port cities. With this consciousness, the research methodology should be absolutely rigorous and characterized by a correct and suitable technical scientific approach.
A flexible structure and multifunctional that combines the efficiency of the services with occasions of fun, entertainment, and cultural activities, is the hopeful solution to answer to the passengers´ requests. Simultaneously, an excessive concentration of activities creates the risk to convoy the tourism in closed-circuits, depriving the city of its basic functions.
The interdisciplinary approach also requires a united vision and a general coordination; in more incisive terms, the collaboration between the economic aspects of the city and the operating companies in the sector, have to represent a target objective.
Obtaining the results of the single phases will be the goal of periodic technical-scientific relationship with a strategic plan.
Important quality, safety, comfort and service standards will be adopted.

Notes

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M. G. Corsini

THE REGIONAL NEIGHBOURHOOD "COSTA DEGLI OMETTI" DESIGNED BY GIANFRANCO CANIGGIA QUINTO, GENOVA, ITALY

In the book "Interpreting basic building"[1], in 1974, Gianfranco Caniggia systematically codified the scalar structural components of the environmental organism: building, tissue, urban organism, territory; defining at same time the design's operative method of "interpretation and design".
Later, in 1982, with his design for the "Costa degli Ometti" quarter in Genoa Quinto, Caniggia proved that the method worked in an intervention that is fully integrated with the environment and in relation with the local historical building process .
The quarter is laid out on the hills of Genova and it is exemplary of a design in continuity with the language of the cultural area.

1.0 The design at the territorial and urban scales

"Costa degli Ometti" is a quarter in a typical position of promontory as the majority of the small historic towns of the Liguria region. At its northern edge, toward the mountains, is the Genova-Livorno Motorway; its southern border, toward the seacoast, is Corso Europa, the road connecting Genoa with the towns along the eastern Riviera.
The quarter's layout follows the logic of the spontaneous formation of traditional promontory settlements[2]. The line of the hill crest becomes the town's main through route, connected by means of stairways with the streets along which the buildings are laid out in relation to the natural curves of the promontory (fig.1). The overall design establishes the crest as the quarter's central axis, which is specified at the intersection with the town's streets, placed at varying elevations, with specialized spaces and buildings: the main square and covered parking area, the gym, the playground, and so on.
The square constitutes the quarter's main hub and is placed in relation to the median route that cuts across the slope of the hill. Facing onto the square are the quarter's principal service-related buildings: supermarket, outpatient clinic and library; placed at a level lower than the square are the parking area and, on a contiguous underlying ledge, the gymnasium. Located on a level above the square is a terraced area outfitted as a children's playground.
The quarter's organic layout is owing to a close derivative relationship with structures on the territorial scale. The crest is the main axis crossing the entire quarter and is specified

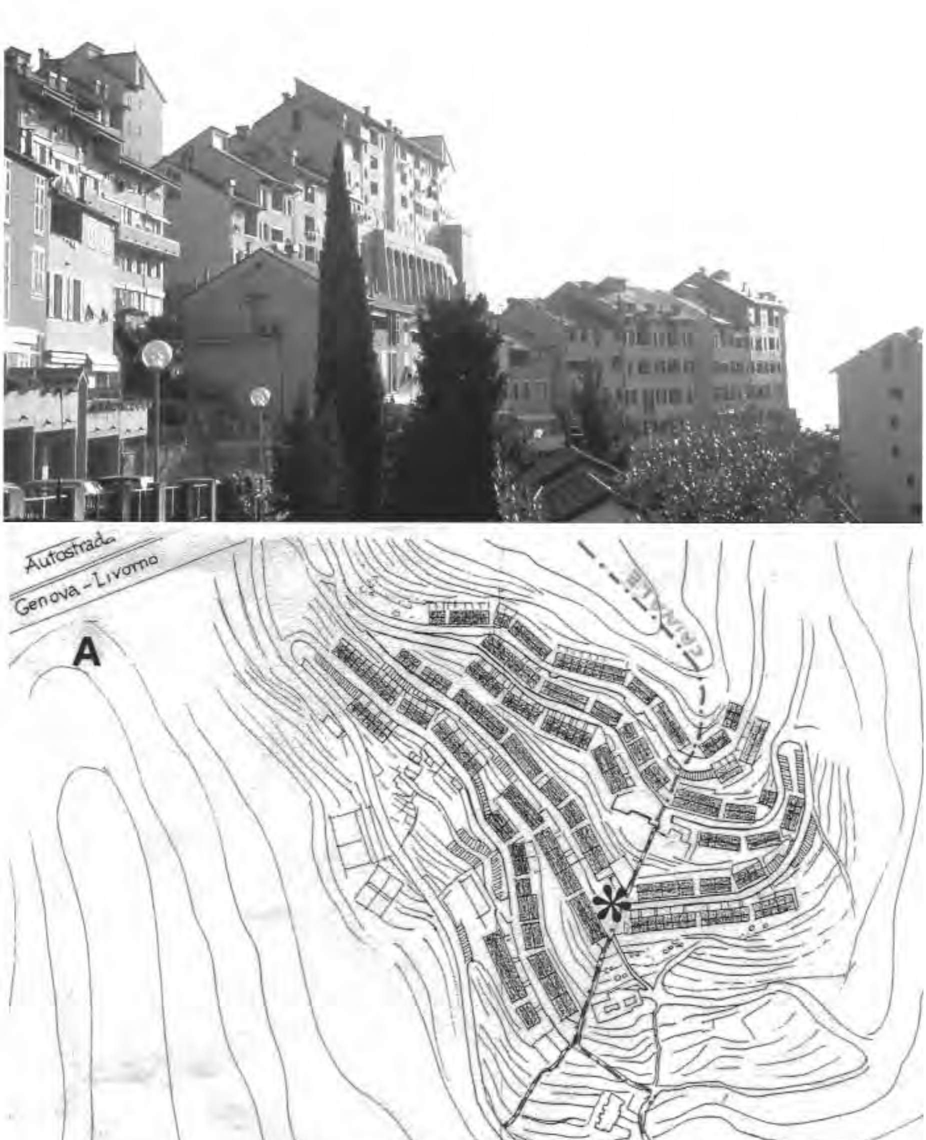

Fig.1 - The fabric of the "Costa degli Ometti" quarter

and hierarchicised at its intersection with the main counter-crest route, surpassing it with the raised square. The streets follow the curves of the promontory and define a serial, repetitive built settlement.

2.0 The design at the fabric and building scales

The relationship between street and lot, building and lot and buildings and street network is highly specified in the design. As in the historic centre each building is related to the street and responds to the shape and size of its lot and to the lot's placement within the built fabric[3]. Along the square, and in proximity to the special "nodal" places and central axis, the design calls for apartment houses whose ground floors offer the possibility of adaptation as non-residential spaces. In areas earmarked as residential, the design calls for row houses.

The row house type, which has by now given way in the urban suburbs to a predominance of apartment houses, offers the best yield in a orographic area such as Liguria. Indeed the compact scale of the row house allows for a closer correlation between the building and environment. The row house type proves the most suitable thanks to the contained dimensions of its façade and its adaptability to the varying depth of the lot in correspondence with changing elevations in the terrain, leading to formation of aggregations that fully participate and collaborate with the structure of the natural environment.

The built fabric is placed in relation to the orography. The slope is used to the best advantage for the maximum yield in building distribution. Indeed, the design utilises the terrain's various elevations to provide autonomous access to the separate homes. It happens thus that a two-storey row house can be distributed along one street, while the parallel street a at level two storeys higher permits the sort of autonomous entrances of the apartment houses (fig.2).

In this way the building organism participated and collaborated with the orographic structure and gave rise to numerous variations on its distributional layout in relation to the lot . Moreover, in its relationship to the lot and the slope, the design utilises every opportunity to place the open green areas – these too at varying elevations – at the disposition of the residences.

So it may happen, as in the villages in Liguria, that a number of areas divided into terraces according to their utilization as gardens, vegetable gardens or olive groves belong to the same property.

As in the historic city centre, every free or green space is linked to basic or specialised building. For this reason, there are no waste or abandoned lands in the quarter, all the greenery belonging to a private home is treated by the owner as something precious.

Another essential component of the quarter plan is the solving of the problem of "parking" in a way that is integrated with building and the fabric of the area. There are no extensive areas in the district totally dedicated to parking, and therefore with a high environmental impact. The only car park is that underneath the square and "invisible" from above the ground. Parking places are "widespread" and located along the roads, in the squares and viewpoints. They are, in any cases, of a size and a planning scale that fits in with the buildings and respects the environment and the landscape. As occurs in the consolidated historic villages, there are no specific parking places but side or combined areas are used, integrated with the road network.

3.0 The design at the building scale

Highly cultivated architect that he was, Caniggia systematised and codified the process of spontaneous transformation taking place in the evolution from single-family to multi-family housing.

The buildings adhere to the anthropical layout of the land following the ledges and relative stone supporting walls, witnessing man's work of a thousand years.

In adhering to the orographical structure of the promontory, the choice of the building types, row houses and in-line houses, in low density, is consequential and consistent.

A comparison of the structure of the planned housing with that of the spontaneous building in the city centre of Genoa and villages on the Liguria coast makes the continuity of the plan with the cultural traditions of the area obvious. The architect works on the basis of his skill in computerising, codifying and transformation phenomena, up-dating them and specialising them for use in a modern day context[4].

The building modules recapture the size of the historical Genovese building cell, from 4.50m to 6.00m face on, with a depth which varies from single to double cell, depending on the slope and orographical location. The distribution of the housing shows the living room facing the front whilst the kitchen and bathrooms face the rear.

The framework relates to the distribution structure and, as in the historic city[5], the houses have main walls warped in the depth of the lot and warped floors parallel to the front, with the flexibility of cellular structural modules adaptable to the depth of the lot or the site .

The building design thus re-proposes all the variants of the row houses redesigned in a contemporary development: row houses with external stairs, and with internal stairs, with a simple flight orthogonal or parallel to the front; the row house with access from the upper or lower path; row houses with front or rear gardens.

Exploiting the orographical position the house is frequently supplied with a terrace on the first floor and a garden on the second. The design further codifies the building transformation phenomena present in the process and up-dates them, further specialising them. So the housing is equipped with lifts, terraces and loggias, garages, all the components present in the Genovese building process in its development to date.

In some row houses types, the terrace on the first floor, in the day area, is covering the porch and the parking place on the ground floor, recovering and specialising the traditional boat shelter.

The buildings communicate through the layout, structure, elements and materials that constitute the language of the site (fig.3). The materials are those recurrent in Ligurian tradition, and particularly diffuse is the use of slate both as a roofing material as well as in stairways and finishing details.

The main doors are wooden, with simple frames. In many cases there is over the door a window which illuminate the entrance and the staircase, like local buildings.

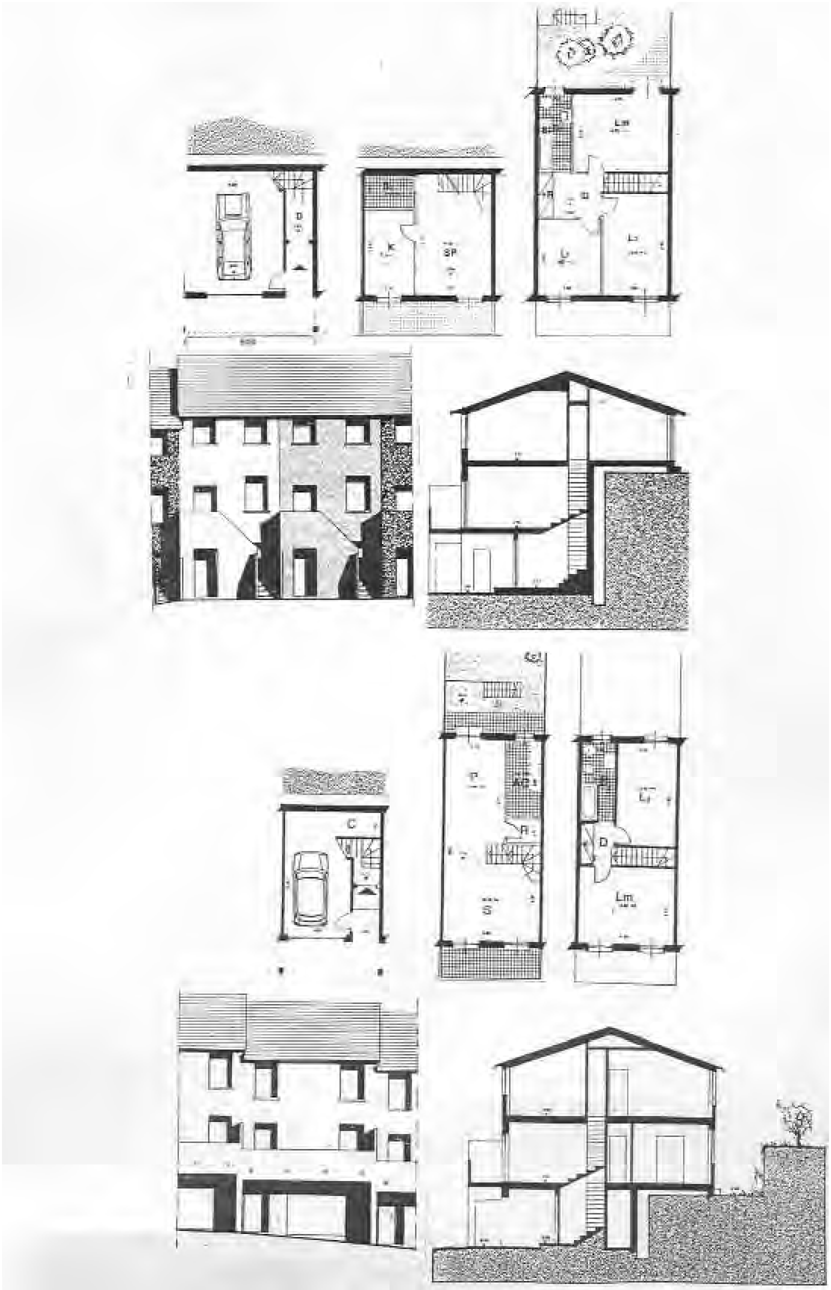

Fig. 2 - The "Costa degli Ometti" quarter: the variants of the row house in relation to the orography. (By the project in Caniggia G.,Maffei G.L.,Moderno non moderno, Marsilio, Venezia 1984)

*Fig. 3 - The "Costa degli Ometti" quarter
and the design at the building scale: materials and elements*

On the subject of fixtures, a very important role is given to the re-proposing of the shutters called "alla genovese" typical of most Ligurian buildings and architecture, which were widespread until the 1950s-1960s and were then replaced by sliding shutters.
Due to its particular workmanship, the "alla genovese" shutter assumes a decorative and functional importance in defining the shape of the buildings.
A further important role for the "language" of the quarter is the supply of a Colour Plan from which each owner can choose the colour for his home.
The colour plan and abacus of elements (types of cornices, doorframes, etc.) offered to each property owner to choose from, demonstrate the importance the design gave to the relationship between the house and its inhabitant .
The colour chosen early on by the owner led to the formal definition, so frequent in small historic towns, of a multicoloured building face that maintains legible the individual residences within the serial aggregation.
It is necessary to point out that each house was designed as an individual building organism in relation to the shape, size and position of its lot. For this reason the uniformity of the colour of the buildings belonging to the final construction phase was not able to erase the individuality of each building unit.
The quarter is highly differentiated from its contemporaries, Caniggia met often in the design phase with future owners who expressed their preference for one-family buildings. The plan's basic motivation therefore was the reaction of the co-operators to a PEEP that envisaged up to eleven floors located on a hill ledge planned with olive trees.
He therefore planned a fabric made up predominantly of one-family homes in an area where a large fabric scale building had been envisaged, similar to the contemporary projects in Genoa – for example "Le lavatrici" (washing machines) or Rome's "Corviale"[6].
This is the first design that truly encompasses the entire process of fabric and building of a place and, as used to happen in the past, that constantly referred all components to the human, individual scale.
In this sense it is proposed as a modern but completely "regional" quarter, an example of a suburb planned in full continuity with the language, as the building and architectural identity, of the city centre.

Notes

1. Caniggia G., Maffei, G.L. (translated by Susan Jane Fraser*), Interpreting basic building*, Alinea, Firenze 2001
2. For the villages of promontory see: Figoli M.G.,*Luogo, linguaggio, architettura*, E.R.S.U., Genova 1995.
3. For the building tipology of the historic centre of Genova see: Corsini M.G., *La casa in linea a Genova.Tipo e progetto nell'edilizia residenziale*, Kappa, Roma 1996
4. See the project of "Costa degli Ometti" quarter in: Caniggia G., Maffei G.L., *Moderno non moderno. Il luogo e la continuità*, Marsilio, Venezia 1984.
5..See Corsini M.G., *La casa in linea a Genova. Tipo e progetto nell'edilizia residenziale*, Kappa, Roma 1996
6. See Corsini M.G., *Building types and urban fabric of Rome's outer suburbs*, charter 7 in Scheer B, Stalinov K, (edited by*), Suburban Form. An international perspective*, Routledge, New York, London 2004

Fig.1 - Islands and surrounding Mediterranean region

D. Costantino [1]

THE LANDSCAPE OF THE SICILIAN ISLANDS: DEVELOPMENT PERSPECTIVE

1.0 Landscape and morphology

Numerous Islands are scattered throughout the northern, western and southern coasts of the Sicily. These islands are contact points between the west and east, north and south and contain traces and signs of the various civilizations that inhabit the coasts of the Mediterranean sea (fig.1).
Islands were formed from the slow sedimentation of stagnant seas, raised from the bottom of the sea following volcanic eruptions, or the accumulation of submarine lava flow or ash explosions.
These volcanic islands rise in the Tyrrhenian sea, like the solitary Ustica and the Aeolian archipelago, forming the centre of the arch that developed along the edge of abysmal plateau. Linosa and Pantelleria are located in the Channel of Sicily to the extremity North-oriental of the Rift [2].
These islands, single volcanic build ups or aggregation of several volcanic build-ups, emerge from the sea (from 2000 meters of depth up to the present altitude of 600-900 meters) and form complex structures of many different shapes and forms. Volcanic cones, small cupolas, *cuddie*, domes, calderas, craters of small or large dimensions have all originated from the lave flow (fig.4 -5). The volcanic origin of these islands sometimes times is easy recognizable by the typical shape of the volcano even by an untrained person However in other circumstances the structures formed are not easily recognizable by their complexity or because the transformations brought about by morphological events (fig.2, 3 e 4).
The sea has contributed to the shape of the coasts of these imposing volcanic build-ups: high cliffs on the sea, steep slopes, lowlands reefs, straight or indented form promontories, inlets, capes and small beachs. The multitude of colours of volcanic rocks and the green of the rupestrian vegetation contribute to make more fascinating these coasts.
The volcanic materials, the sea, the sun and the wind have constructed these natural landscapes that the man moulded transforming steep slopes in terraces and planting cultivations of olive, vineyards and caper.

The limestone islands characterize the coast between Trapani and Marsala. The Egadi archipelago, the Stagnone lagoon with the Isola Grande and Mothia, are fragments of a remote Sicily that extended very much beyond existing boundaries, while the pelagic islands (Lampedusa and Lampione), in located in the Sicilian Canal, and are the first emerged offshoots of the African continental platform (fig.5, 6 e 7).
These islands are formed from a mostly flat tubular limestone plate (Lampedusa fig.6), or formed from two wide platforms of marine abrasion separated by a ridge derived from the Triassic period of the Mesozoic era (Favignana fig.7), or from a limestone relief containing a central depression, (Levanzo), or from an imposing limestone relief , rough, jagged and indented with very steep vertical high cliffs (Marettimo fig.8).
The coasts, carved from the marine erosion, alternate imposing cliffs to low reefs and small beachs, designing points and capes, small inlets and many caves, some known for their natural characteristics or for their history.
The rock gives to the landscape the white color of the limestone of Miocene origin or the yellow ochre of the sandstone of the inferior Pleistocene period or the rose and the golden colour of dolomitic limestone: tender and friable, material for carving and creating architectonic ornament.

2.0 Habitat

All the islands are microcosms, unique ecosystems, with a wild habitat characterized by rare species of animals and plants that the sea protected from new incoming species. In some islands the flora acquires a special characteristics: biotic community and endemism document an extended isolation from the mother land.
The sea and islands are clearly different ecosystems nevertheless they have very strong interdependence. Fragility and vulnerability are constant features of these environments. Geological and climatic factors have had an important influence on all types of life in the islands and in particular the deforestation of XIX century has deprived the land of the protection offered by the original Mediterranean woodlands and shrub.

3.0 Myth and landscape

The travelers and writers of the Mediterranean sea, wrote of heroes and mythical places and described happy islands that the geographers have not never well represented in their maps.
The sea routes are interlaced with legends that cannot be easily ascertained. These routes identify places with common identity and differences but they also lead to a diversity of landscape, which follow one another and superimposing elements, places and names.
There is a border between history and narration, between likely and unlikely. Sea travels permits one to overcome these limits and permits one to search for new adventures that might lead to new emotions that were unknown, enigmatic, undefined and unlimited.
The cartographers have criticized legends and today they gives one precise and real-

istic description of the places. Unknown islands do not exist more; they are all on the map. They exist only in fantasy and they only exist in the mind of those men, as the King says in the story of Josè Saramago, who need a boat to go in search of an unknown island [3].

All the islands are unknow until someone lands on them. Images on the horizon, rocky formation whether uninhabited or inhabited, suddenly emerge from the sea; but only by getting closer, sailing around and landing will transform them in a worthwhile experience.

The landing is desire of knowledge, stopping the journey without a particular aim is the desire to discover, to explore and to have new experiences with places and mankind.

The discovery of the islands is the desire to explore territories and landscapes often never seen, to improve the aesthetic feeling, to enjoy the beauty of the places and of the own feelings.

On islands everything comes from the sea, the slavery and the wealth, the culture and the impoverishment. The sea is immense, at times a barrier not easy to overcome, but at other times a element that unites.

Relationships and isolation mark to alternate phases of decay and development of the islands off Sicily. The isolation can mean absence of connections with other places, difficulty in getting supplies, lack of opportunity, limitation of cultural, political and socio-economic relationships. But when a network of relationships exists, the isolation becomes value, a privileged destination of tourist flow.

Social organizations, ways of life and cosmogonic conceptions during the different centuries have found in the

Mediterranean and its routes a unifying moment. The reasons of these similarities are trading possibilities and cultural exchanges between various civilizations presents along the Mediterranean routes, evidenced by the great mobility of people and of willingness to accept mutual influences.

Similar climatic and environmental conditions have also influenced the development of agricultural, sheep-rearing and production techniques giving rise to solutions and methods that could be easily integrated. The houses, the architecture, the construction techniques, clearly show many features common to various people that lived in the Mediterranean region.

4.0 Read the landscape

The civilization of the islands have brought together the sea and the earth; and these two elements have adapted and moulded to live of the same destinies (fig.8). It has provided to these places a way of living, overriding difficult environmental climate conditions: lack of water, dry, rocky and steep slope lands. This culture generated the landscape of the islands, their history creating a unique, recognizable and unrepeatable identity.

The rapid, intense and massive human intervention is clearly documented in the land-

scapes. They are an exquisite and complex stratification of signs, plots changes, destruction and construction by human and nature; they are the durable outcome of processes and interrelations between environment and community. They have a dynamic structure that maintains its stationary equilibrium until strong impacts do not alter it.
The landscapes of the Sicialian islands are the result of the various life styles that has taken place: those occurring of the past, whose signs are in part still visible; those of the present culture; testimony of the intense human activity or the abandonment.
The land has been organized based functional hierarchy and ways of living, creating a landscape regulated to meet the needs for a productive and social life. In this design the traditional settlements and architectures are interacting elements between the needs and the natural environment.
The traditional architecture is characterized by common typical elements to all of the islands characteristic of the fundamentals of the place: the flat roof, (the *dammuso* of Pantelleria fig.9), used to collect the rainwater, the geometric shapes, arches and the terraces, the furnaces and the fireplaces; strong integration between open and closed spaces; the extension for addition of new building not communicating from the inside; the spaces for the transformation of the agricultural products (*trappeti*, *stenditoi*, *aie* and sheds) and several manufacturing places (mills, mandre and warehouses), the fishing facilities (tonnare) and the ports (fig.11, 12).
Currently the dogmatic the use of typical buildings unrelated to the local context, often masked on the outside and appearing similar to the traditional models (for instance see Pantelleria) contribute to the loss of the cultural identity of the islands (fig.10).
The sober activity of the native land workers has produced new landscapes and complex environmental equilibriums; terracings and stone walls are an example. They are a technical and cultural patrimony, that helps increasing productivity and the fertility of the land, that conserves water, that stimulates particular croups and techniques of cultivation; which without any care they undergo degradation. When the agricultural community abandons their work, nature finds new equilibriums. The erosion, the landslides, water loss and the appearance of foreign vegetation are expressions of these dynamics. Nevertheless the higher or steeper slopes, great and secluded, or small and straggling places abandons from the man, fragments of landscape, colonized from the wild vegetations are basal for the conservation of the biological diversity; they are the “Third Landscape” explained by Gilles Clément [4].
The landscape in the islands shows different significance, dimensions and temporal difference. This variety, heterogeneity and complexity appear like turning points of the superimposition and differentiation of three matrices that define it: the physical matrix, consequence of the history and geologic times, the biological matrix and the anthropic matrix, more intensely correlated, derived from the biological and cultural evolution and historical times.
In the complex history of the landscape, however, no visible rules and meanings of its

Fig.2 - Linosa

Fig.3 - Pantelleria, M.Grande and M. Gibele

Fig.4 - Pantelleria, Cuddia Khamma

Fig.5 - Favignana, M.Santa Caterina

Fig.6 - Marettimo cliffs

Fig.7 - Lampedusa, Isola dei Conigli

Fig.8 - Formica, Tonnara

Fig.9 - Pantelleria, traditional architecture and stone walls

Fig.10 - Pantelleria, new buildings with swimming-pool

Fig.11 - Lampedusa, Porto vecchio

Fig.12 - Marettimo, Scalo vecchio

Fig.13 - Ustica, Hotel to Spalmatore

constitution are always scientifically and objectively comprehensible but that can be perceived by emotions and sensations.
To read the landscape is to make a journey in the various meanings of culture both from the naturalistic and historical point of view. It means to characterize it in its singular specificity. It also means that we see "only that we have learned to see, and we see therefore what dictates the style of the time [...]. We put on nature a net whose meshes and whose webbing determine what to choose from its infinite variety and make a decision on which landscaped important" [5].
The contemporary society, basing its model of development on the limitless economic growth and the homologation of the cultures in the globalization process, has systematically separated the subject from the object, the physical and the visible from the symbolic, the nature from the culture, and has privileged the amount over the quality, the functionality over the shape, the globality over the local.

5.0 Planning the landscape

Also in the islands the technical knowledge, not more local and not more coming from the experience of the tradition, tend to ignore the relationship between human settlements and environment; it becomes expression of power of nature and of emancipation and overcoming spaces and temporal boundaries that the landscape creates. Everything can be done everywhere and always.

The tourism, finds leisure places and new investment opportunities, subjects the islands to remarkable pressure. Mass tourism contributes in considerable way to the destruction of the landscape and the environment, to disintegration of the island societies, modifying the social behaviours, provoking the destruction of traditional economic systems. Moreover it can generate conflicts of use and create "territorial poverty" with no guarantee that promised benefits will be achieved, that in principle, justify the commercialization of something that should never be considered merchandisable: the sea, the sun, the environment and the scenery (fig.13).

The examples are not few, in Italy and abroad operations where the economic dynamics of the tourism has used up the resources that were at the basis of development, has marginalized the local collectivities, left decisions to the external operator.
The use of the same technologies and materials for the construction of new tourist houses in the city or in the rural areas, along the coast or on the hilly slopes, contributes to produce buildings that are in conflict with the quality of the places and the specificities of every island. The mass production, the homologation of the materials and the tipologies of the buildings make new settlements that do not take into consideration the local way of living.
Agricultural workers abandon marginal lands, difficult to cultivate, and specializes in productive activity, like monocultivation, use of herbicides and pesticides. Generally for the local consumption the import of products from the outside is preferred. The traditional landscape vanish swept by the push of the modernization, that changes the

agriculture land into a building zone and the territory into an abstract space, to support the economic processes, to take advantage of resources until exhaustion.
Degraded landscape is therefore constructed, as expression of new restrictions determined by the fragmentation of the space, often by invisible walls and boundaries, the social divisions, the economic conditioning, the procedures, the zoning, infrastructures and so on.
The cultural identities are lost; the memory and the roots are forgotten; the change in the life style do not match anymore to the development model. The prevalence of just one culture, that of modernity, may cancel all the other identities. There is a need for diversity and complexity: imposing a single culture means to cancel the history; to stop time and to make the landscapes as museums, all this is just impossible.
In order to solve these problems we must " take care " of the landscape, adopting a behavior that considers the landscape in its globality and not more as an exception, that has a way of operating taking in account the integration, the physical, biological, social-economic, historic-cultural and aesthetic aspects. Therefore the transformation becomes away for construction of the landscape and constitute a process of innovation where the landscape is the protagonist, offering opportunity and limiting which are not ties but rules within acting and working in order to conserve and to increase the values and in order to guarantee its durability and its autoreproduction.
A radical change is necessary regarding the present model that produces wealth through the degradation and the consumption of not renewable resources. The laws, placed on limited areas, give the illusion that is possible to reduce or to balanced the negative effects due to the destroying processes with the introduction of interventions technically correct to achieve a tolerable and compatible thresholds.
It is necessary, instead, to consider the landscape as a " resource " for the development. That means estimate and select the transformation regarding the values to protect; value of use and value of existence. The landscape as resource is a system of high complexity, is a patrimony of long duration; it is a place dense of history, values to transmit to future generations, values enriched by the work of the contemporary man.
This requires new thoughts and the need to find the right measure of the intervention that allows to protect the complexity and the diversity of the landscapes of the islands.
This culture, wanted by the European Convention of the landscape and by many documents of the European Union, is taking place, at least in the intentions of the programme, but, also in the local planning. These experiences show a way of planning different from that traditional. These plans are increasing the value of the resources and are promoting concretely reutilization and restoration; they are reducing the new expansions, qualifying and complete (in the sense of limiting) the existing ones. That means that existing administrators, planners, citizens and also from some business areas begin to operate taking into account new economic horizons, no more based on the customary models of consumption of land and destruction of territorial resources.
The islands must find the right future for local development (that it comprises also

endurable tourism) reconciling the economic necessities with the conservation and valorization of the historic-cultural and ecological heritage. The local development is founded on the description and basic characters of the landscape identity, and on rules that concur to use the heritage without to destroying it, rules of growth and reproduction, transformation and building of the landscape by subjects, bearers of durable plans [6].
The local development must be based on new ways of strategic planning and based on the diversity of the landscapes, the products, the initiatives. It is a method of regulations and negotiations that allows to realize an harmonious development, in which the horizons of the plan are defined through the participation and the contribution of those involved in making decisions.
It is possible to construct local auto generating development plans when innovative social energies are safeguard the historical, environmentals, landscaped and aesthetic values of the territory. When all those involved consider as fundamental the care of the landscape and the building of durable wealth, the choices of the planning become multiple since various are the places, many the interpretative cultures and many the potential subjects involved in building the landscape.

Notes

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2. Volcanic activity is still present to Stromboli, Volcano and in the sea of Pantelleria.
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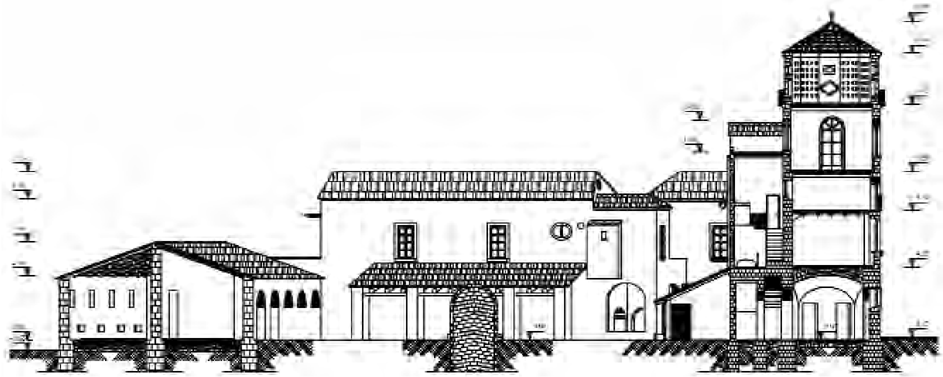

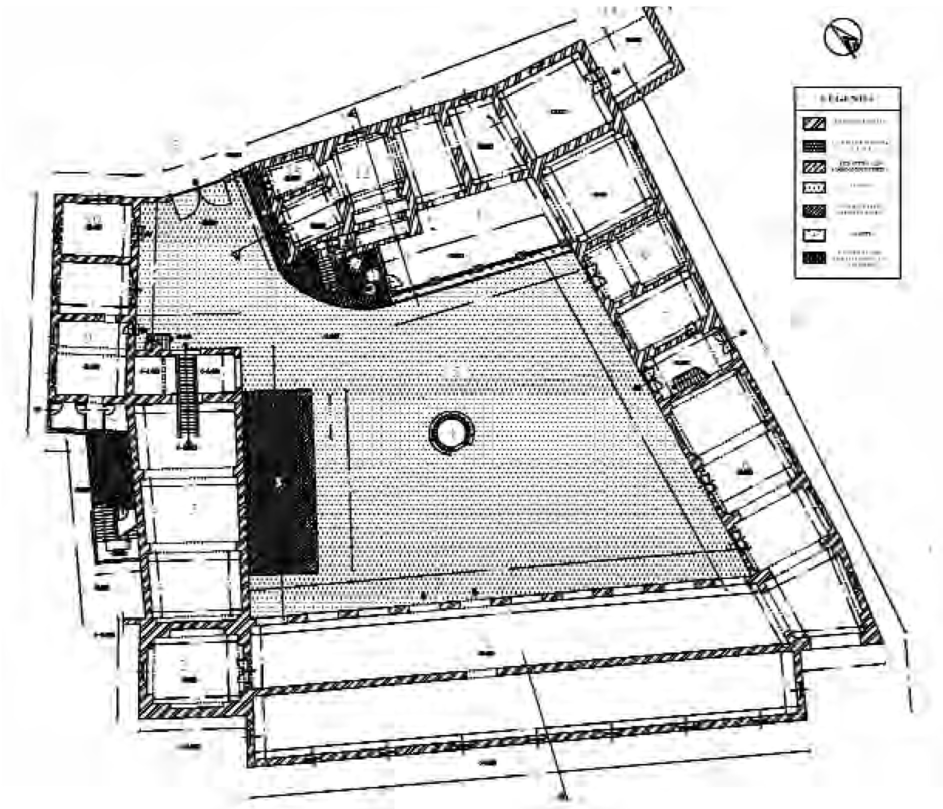

Fig. 1(below) - Plant ground floor : 1, Stable; 2, Pigsty; 3, Wine cellar; 4, Well; 5, Inside courtyard; 6, Deposit; 7, Manure pit; 8, Secondary entrance; 9, Lodging; 10, Store room; 11, Restaurant, already church; 12, Kitchen already room of church; 13, Front door; 14, Entrance of restaurant; 15, Toilette
Fig. 2 - Section on the decovet tower

S. Cucciniello

A FARM IN BATTIPAGLIA (ITALY)
THE MORELLA

Introduction

The town territory of Battipaglia is situated to around km 30 to south of Salerno. The orography, from Salerno toward the south, individualizes an very ample fruitful lowland, the Plane of the Sele, crossed by the river homonym and confined among the Tyrrhenian sea, the Alburnum mountains and the Picentini mountains. The inclusive part among the river Tusciano and the right side of the mentioned river Sele takes the name of plain of Battipaglia. These introductory notes serve to make to understand what has been and is strongly the strategic importance of this tied up territory, for a long time, to the agriculture and the zootechnics. Battipaglia becomes autonomous common in 1929, until then belongs to the amplest town territory of Eboli, castled on the neighbouring mountains, from which the terrestrial and maritime traffics could be checked. This strategic organization involved that the town hall, protected and defended. They populated while the external areas recorded scarce human installations. These installations, deprived of elements of merit but countersigned by simplicity and regularity of the building. So way they were the structures of the Roman installations up to the fall of the empire when the disappearance of the Roman army, and therefore of it's vigilance, it individualized, in the boundaries wall, a fundamental building element. The fortification also involved the adoption of elements of sighting. The tower, symbol of the town hall, moved it to the countries to become tool of sighting and signaling of the danger.
With the Norman ones the principle of the land ownership consolidated it that was added around the Benedictine monasteries to the insignia of the rule "*ora et labora"*.
In 1566, with the new one "inventory" in some territories the concept of defence is revisited against the frequent attacks of the Saracens. The farms, real coffers of wheat, oil and every other, had to have the ability to withstand, even if only for one day, because that attacks were of piracy, sudden, but without sieges. Dangers that were perpetrated among the end of eightieth century and ninetieth century because of the attacks of the brigands and the country revolts.
The ninetieth century consecrated the uncontested predominance of the agrarian middle class, personified by a new figure of the "land gentleman", the "gentleman". These inten-

sified the traditional crops and, at the same time they also lent a particular care to the architectural “facies” of the buildings of the farms, to make her functional to the new demands of representation that these had called to develop. It tooks shape the modern concept of farm as it anchors today, well or badly, testimony is reached there.

1.0 The Farms

The farm constitutes the agrarian structure more important than the history of the midday of Italy. It is the terminal of an evolutionary run that departs from the so-called ones “massae”, land complexes, exactly latifundia, that characterized the great public ownership, primarily ecclesiastical, slow-ancient and tall-medieval.
Rural farms, in regime of latifundium, based essentially on the cultivation of the fields and on the breeding of the livestock, the farms reduce to substance the stratification of a complex century old of art, of popular traditions, of life, of economy, of production, of agricultural and pastoral activity. They certainly testify the poupuling of the environment and the human runs that for many centuries, up to the twentieth century thresholds, they have had a historical role of primary importance. Every farm represents a center of production and organization of the agricultural job inserted inside the great land ownership of Modern Age and partly medieval, dominated from the grain-pastoral latifundium.
The standard characters foresaw to the fround floor numerous rooms, in operation of the many necessary services, for the manufacture, the production and the stored, for which it was essential to hire fixed workers that took stable abode with their families in that places. To the top storey of building the rooms available, always in big number, were destined only partly to the residence of “the *massaro*” and other employees, the most greater part served to the owner for the winter idleness or, eventually, for the brief summer period of the crop.
In the complex of their unitary structure, the farms introduced some elements separated that they entertained the attached services, what the pigsties and the hen-pens, the oven. Only few of the existing farms to the beginning of the twentieth century introduced built separate for the residence of “the *massaro*” and for that of the workers, with you place side by side the stables, the deposits of the machineries and hay-loft.
With the reclamations and the land setups, the transformation of the arrangements of the cultivations is had the particular and meaningful ones, jobs of drain and irrigation have determined and exalted the importance, for quality and quantity, of the attached complementary as the stables, in kind, where activity is stimulated zootechnics, activity with the ovine breeding and of buffalo and the consequent workmanship of the milk from which the production milk - cheese and the famous mozzarella of buffalo, of the Plane of sale.
The stables, to rectangular form, they succeed in also containing over fifty heads, they are always built some distant ones from the residences, paved with beaten of cement with necessary inclinations to allow the drainage of the urines and of the waters of washing, and they are provided of great windows glass door with iron framework.
Everything how much above shows as the factory of the farm was not building neither spontaneous neither approximate, but it was the result of different following adjustments

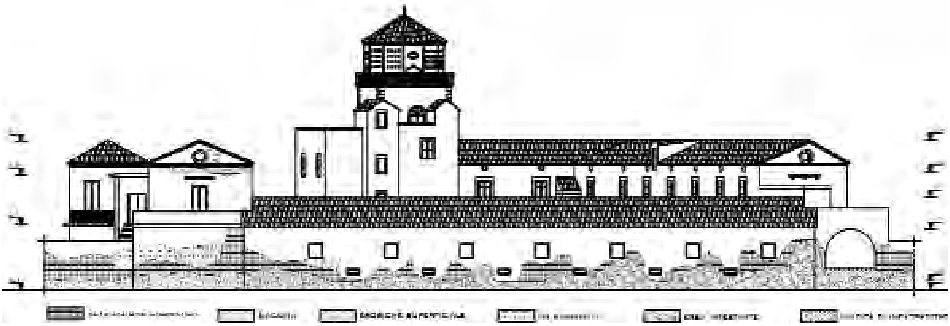

Fig. 3 - Front to south

Fig. 4 - The big avenue of entrance to north

Fig. 5 - The bell tower and a wall with splinters

Fig. 6 (left) - Stair of entrance to the store of wine room
Fig. 7 (top) - The roof of a room of entrance and the old written
Fig. 8 - A "Bufalara"

of the function, and therefore different adaptations, to the demands of the times that changed.

2.0 The Morella

"The Morella" situated along the by local-road Fosso, in territory of Battipaglia, it proposes the fundamental characters of the farm but it dresses again particular importance for the presence of some characteristic elements of thipology what: the tower dovecot, to plant dodecagon form, with roof coverage to twelve strata and situated along the big avenue of access to north (Photo 1), and two neighbouring stable of buffalos and distinguished by the principal body, over all the collateral characters of the peasantry You tower dovecot, tall around m. 19,95 of twelve sides and diagonal of m. 5,20, surrounded from small terrace with handrail, it also served for the control of the workers in the fields. The stable of buffalos are instead to circular plant of diameter m. 10,40.

The farm "The Morella" it is a great factory typical of the local rural architecture. The disposition of the bodies of factory confines an inside court (pict.1), to whose center there are a Buffalo sheds preserved the rests of an ancient well. Other well is situated to the outside on the east side. Both introduce a characteristic dome coverage. The first bodies of factory go up again to seventieth century.

The breeding of buffallos, the production of the milk and the cheese activity were the true fortune of this firm in one with the workmanship of the grape, as testified by the presence of a great ancient store wine room. The strong cheese production induced to the amplification of the structures with the construction of two buffalo sheds or "bufalare" (Photo 5), bodies of factory distinguished by the principal structure, typical of the Plane of the Sele, to circular structure in masonry, with roof coverage, typology derived by the constructive evolution of the largely diffused wood huts in this territory. In such buildings he handled the workmanship of the milk of buffalo.

The presence of the little church, and of the bell tower I still integrate (Photo2) set on the roof, they testify a monastic past. On the wall of the place of entry of the aforesaid little church, engraved on a plate of travertine, it remains still

the writing 2here you cannot find shelter" (Photo 4), that protected the quiet of the religious preventing it

concession of the refuge to whom, in strength of a medieval right, had asked for it. But what equal time would resoundingly have been denied to our day with the transformation and the use in agrituristic firm.

The extension of the estate agricultural "The Morella" is of 32 hectares around today and has a middle elevations on the level of the sea of 40 meters; the ground doesn't introduce meaningful variations of inclination.

Altogether the built volume is in total equal to mc 4.550, that occupies a surface of mq. 750, equal to the 0.23% of the whole ownership.

The principal part of the farm is an articulated building body to court, with the court open to north for around 10 meters on a general development of around 200 meters, The side open of the court is protected from a wall tall 3 meters in which a gate is drawn in iron,

and from which is entered to the complex. Externally to such court two big buildings are situated isolated to an only level with roof to two strata covered by tiles, prepared more to north and turned to deposit of the agricultural equipments, of the straw and of the hay, They is to rectangular plant 14,50 for 7,60 whose height is to elevations 6,90 meters and whose grondes are to elevations 5,10. The roof is to two strata and it's sustained by two arcs in masonry of tufo on which leans the principal wood beams; cite her two "bufalare", situated in front of the front floor of the building, to an only level with coverage "to hut", a big body of linear factory destined to lodgings and the swimming pool.
To west, to the right of whom accesses the court, they meet him, in sequence, two bodies of factory perfectly lined up not, the first comprise lodges to the ground floor, to elevations 0,40 meters, the lodging of the *massaro*, to elevations 4,20 meters and a plain garret to elevations 8,10 meters. the second has a store wine room of ancient invoice to elevations 3,50 meters, a *porcilaia* and on these the attached saloon to the residence of the *massaro*. To south there is the body of factory to a plan and roof to two strata that it entertains the great stall endowed with manger and hooks to hold legacies the buffalos. To east another body of factory is situated with deposits to the ground floor and lodgings to the top storey to elevations 4,55 meters. A body of factory to north of the court, to the left of whom enters from the quoted one gate, entertains to the ground floor the restaurant and the services, to the top storey to elevations m. 4,55 meters and with inferior surface in comparison to the ground floor, the lodgings are situated. The top storey is partly constituted by garret while a modest part raises him to realize the tower dovecot, through a loft to elevations 8,10 meters, still a room, to elevations 10,55 meters and finally the dovecot to elevations 14,75 meters. Behind the stable there are around two hectares of ground destined to the cultivation of the grapevine, encircled by a wall, built in tufa of Faiano, neighbouring place, tall three meters and often sixty centimetres. Through a vain open in the wall it is directly entered to quotes store wine room, very ample, prepared in the basement of the body of factory destined to the main lodging or of the "*massaro*", it served for the harvest and the workmanship of the grape. To it it is also entered by the inside court through a long staircase, wide 120 centimetres, put in work among two backs in masonry, that you/they acted from slides for the transport of the barrels through the aid of ropes.
The pictures 2-3-4 individualize the first floor, the section, treats on the dovecot tower and the south prospectus.
The system of the vertical connections appears complex but, in effects, it is studied for being able to create the most greater facility of access allowing a lot of alternatives. The store wine room, as seen, has two accesses one from the court and one from the vineyard. In effects to all the places can be reached by the court inner, to some it is anticipated a further different possibility as for instance in the house of the "*massaro*" also served by an external staircase to the court, destined only to such access, with the steps in travertine, that, rotating around a column of masonry, decorated with red little brick. To the dovecot (Photo 6) it is entered only with staircases of emergency.
The fronts of the façades are regular and introduce elements of symmetry in the empty of the space window that repeat it to regular forms. The aforesaid form foresees a series

Fig. 9 - The decovet tower
Fig. 10 - Eaves with mouldin in stucco

of vertical with, to the Ground floor, a space light of elliptic form with the horizontal most greater axle closed by a grille by the characteristic drowing, to the first floor, a window to two shutters with loom in wood, with four square glasses for shutter and, above a small space that to let light to the mansard roof.
Overall, episodes of crumbling are not noticed particulary degradation stuff particular, made exception for the two bufalares that introduce a remarkable degradation: the saddle roofs don't exist anymore, the building element of division of the "*buffalara*" and some tiles bricks on the edges of the circular masonry also them dilapidated.
The building surfaces of the principal complex, all you plaster with smooth plaster, introduces an excessive washing away, infiltrations of damp in some points and episodes of lacuna of plaster. In these points he notices the degrade some masonry of underlying tufa. The white color of the walls results faded and in big part darkened by the washing away. It causes principal of this degrade, the lack of the maintenance and the system of canalizations for the outflow of the meteoric waters: the roofs don't introduce eaves gutter and drain-piper for the unload some rain water. The jobs of maintenance are in advanced state of completion and the complex is already in order partly.

3.0 Techniques And Construction Materials

On the choice of the techniques and the materials it plays an important role the localizing. The choice of the materials is naturally conditioned by the available products on the spot, offered by the surrounding economy. The techniques and the constructive systems are tied up to the traditional constructive patrimony, to simple structural typologies but perfectly referable to the scientific canons recognized in the period of execution.
The used materials, coming from the volcanic system of the Vesuvius, have wisely been used and envoys in work from teachers local builder. From the products of the eruptions all the necessary materials to the construction have been drawn: the tufa for the foundations and the carrying masonry, break of tufa for the arcs and the vault of coverage, the sand and the volcanic *pozzolana* to manufacture the mortars and the pumices for the particular termic isolation. In, the tufa has been employed extracted from a quarry by of the near Faiano, but also tufa coming from Paestum.
The wood used for the lintel, for the floors, for the roofs and for the fixtures has been drawn by the luxuriant vegetation of the near mountain.
Of the local travertine is also used for the steps of the staircases.
The foundations, are continuous and realized in masonry of tufa.
It began performing as a wide excavation the anticipated carrying wall, we would tell forced section today, and deep 6 - 7 meters up to the attainment of the so-called one "hard thunder".
On the plan of laying, opportunely "equalized", the blocks of tufo prepared him, in regular rows and preventively wet, that represented the beginning of the load bearing masonry.
The vertical load bearing structure, is constituted by blocks of cemented tufa, and not always, from mortar and prepared to regular rows, with weaving, rarely, to a stone or

rows to two blocks for thickness up to around 70 cms., and finally rows to three blocks for thickness that overcome the meter, as realized the load bearing masonry to the earth plain of the structure of factory of the tower, where a greater there is loaded. The rows were horizontally prepared, linked to story, with the most greater face on the ground of mortar and you adjust in all the sides, filling the interstices with small stones and mortar. On a side of the church the masonry is to big splinter. The masonry has always covered from plaster both to confer greater protection from the nasty weather both to have the possibility to create a decorum. In fact all the external fixtures introduce a frame of plaster in relief and along the grondes of the roofs is realized anywhere a decoration of the moulding with a geometric moulding of plaster (Photo 7). The first stamping is performed on a vespiary of remainders of stone to dry, having the function to get further the damp that going up create circulation of air among the used heap of stones.
The store wine room or "*cellaio*" is covered from a barrel vault whose generating it is an around arc. It covers a surface to form trapezia whose bases measure 8,10 and 7,20 meters for a height of around 17meters. The construction of the barrel vault was realized with hewn stones round arch of tufa, shaped to wedge, prepared the one close to the other to form the barrel, on which was had the material of support, the rock of filling, of mortar manufactured with dust of lapillo and mortar, and finally a rock of lied down on which the floor was leaned.
All the places of the earth plain, made exception for the deposit vain adjoining to the body of the tower, introduces a coverage with a vault to sail, still realized with the hewn stones of tufa shaped to wedge.
The attics of stamping of the garrets are those recurrent and adopted in all the constructions in masonry of the zone. The principal plot of the floors is formed from beams of raw chestnut tree, that is round and without squaring, you lodge in special collections practised in the load bearing masonry. The secondary plot is constituted by the panconcellis (said "*chiancole*" or "*chiancarelle*"), also them of chestnut tree, which were leaned to the beams and normally prepared to them. The beams set to an interasse of 80 - 90 centimetres, after having been cut to measure, they have suffered one preventive "*scorzatura*" and "*attestatura*".
On the chiancarelles a first is manufactured "rock of equalization", bed of ordinary mortar with pozzolana, common sand and slaked lime, mixing to scraps of various nature, so that to guarantee that the superior rock, after the beating, he consolidates well without damaging it. The rock above constituted by a conglomerate of lapillo and mortar mixed with water, it came then beaten in way to be assured rigidity and thermal not conductivity acoustics.
The type of described floor, as says it covers all the vain to the first level, the saloon and the loft of the body of factory of the tower dovecot, as well as the vain ones of the adjoining body of factory to that of the tower. The floor of coverage of some local ones of the lodging of the *massaro* they are refined by the against ceiling in cloth.
The structure of the stable is constituted by a body of factory in masonry of tufo of Faiano with roof coverage with two slope strata (Pict. 6) that put on a wall of thorn of the

thickness of cm. 50 that it divides in two rooms, one turned in turn to real stable and another separated in two places, in one of which there are the machineries for the draught of the milk from the buffalos; the other part is turned to store room. The wall of thorn contains the sleeper of roof on which lean the beams and transversally to them the joists are prepared to inside axis of 30 centimetres, on these the tiles are leaned of cooked of the type to “bent tile and gutter” without mortar.

The coverage of the bodies of factory of the farm is realized with strata roofs, covered by tiles of the type to “bent tile and gutter” put in work without mortar. We find again bodies of factory with roofs to two strata as that of the stable just described, and others with roofs to four strata. On the roofs to two strata they open the skylights that allow a more comfort lean out. The characteristic of these roofs is not to have trusses of support but beams in wood of chestnut tree that directly lean on arcs in stone (Pict. 5) of tufa and transversally to them.

The seismic event of the year 1980 didn’t save “The Morella” structure to load bearing masonry and the most greater damages they were recorded in the dovecot tower with lesions that interested the load bearing masonry both in vertical that in horizontal. The structural interventions have altered partly the native order. They has interested above all the body of factory of the dovecot tower, where proceeds to the substitution of some building elements to the second to and third, floor seriously damaged, as well as to the substitution of the old attics in wood present to the various levels of the tower with floors with bricks and cement on bean put in work in the masonry.

They have been unchanged the structures of the ribbed vault, of barrel vault of the store wine room, saved the remaking of the plaster. In the main lodging a painting has been effected to the beams of the saloon on the store wine room and a papers of the beams of the other floor. On the west side the inside connection has been realized, among the saloon on the store wine room and the remainder it departs some lodging, with the creation of a vain of passage through the aid of flat arches, realize with outlined type “ ipe” and tiles, put in work in the pre-existing masonry. A staircase, in armed cement to two ramps, it realizes the vertical connection among the garden and the vain aforesaid.

The intervention of recovery, in effects, has been both structural and functional. Running over again ancient runs the ownership has held to use the incentives of law to propose a structure revivified, functioning and enjoyable through the creation of an activity agriculturist In fact these contain in if the distinctive characters of the historical, artistic, cultural, folk, religious, of landscape patrimony , of the environment in which it rises an important tool becoming for the recovery of the inside areas from the productive, economic, social and environmental point of view activating tourist flows and a good source of integration becoming to not only the agricultural income, but also a factor that hane within the development of the rural areas in terms over how economic also of the guardianship of the environment and the growth of the rural world.

Substantial the interventions for you vary her destinations of use of the places. In the east body to the ground floor have found place the reception and the offices. The store wine room, where first he worked and wine preserved him, is now destined to the only maintenance in the barrels with exhibitors of appreciated wines and tables of tasting. The top storey entirely destined once to abode of the "*massaro*", introduces three little lodgings for subordinates while the ample saloon has allowed to realize the main lodging. The stable is modernized individualizing a zone real stable, a zone milking and a zone of workmanship of the milk. In the body of factory to west, to ground floor the nearest zone to the vineyard, and with this connected, has become an area for the workmanship of the grape. The vain staircase that brings to the top storey, destined already to lodgings of the subordinates and today for tourists, it separates this zone from that destined to restaurant that develops him, understood the services, for all the ground floor of the body of factory to north, inclusive little church. The first floor of the quoted north body is also it destined to lodgings but with independent staircase that also serves the lodgings drawn in the body of the dovecot tower. The external areas are realized to green, with, besides, a swimming pool realized near the "bufalares" by to destine one to cafe and the other to sale of the products typical of the farm. Such re-examination of the farm has also involved the elimination of some extraneous superfetazionis to the native and ancient structure of the factory.

The Morella is not only a testimony of the building patrimony but done describe, chronicle and history of once passed through the structural organization of the factory, the functional organization of the environments the use of the materials, the technique of their laying in work, and through the work of illuminated entrepreneurs, it shows as an episode, that becomes only in the time type building, can still perpetrate memoirs, messages of culture, technique and history.

Notes

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Fig.1 - South front and loggia: instrumental surveyed surfaces

E. Dassori, R. Morbiducci [1]

NON-DESTRUCTIVE METHODS FOR CHROMATIC INVESTIGATION OF ANCIENT BUILDING FACADES

1.0 Introduction

The chromatic characterization of surfaces is carry out in many research and production fields, from the quality control of industrial product to the effect of color on human behavior and feeling. The chromaticity is widely considered in architecture both for the new design and restoration of a construction. In this last field the colorimetric investigation of solid elements is a current subject in which several problematic aspects have to be analyzed: large area characterization (for instance monochromatic colored plastered surfaces); chromatic surveys of painted facades; analysis of chromatic alteration due to weathering or/and degradation processes[2]. Thus, the color can be considered one of the useful aspects in an ancient building to control the state of conservation of surface.

How light influences on color perception takes some explaining. It helps first to allocate descriptive vocabulary to three distinct levels: the physics of stimuli, the physiology of receptors, and the psychology of post-receptoral processes. The visible spectrum is linearly ordered by wavelengths ranging (for humans) from approximately 400 to 700 nanometers (nm). Newton's well known experiments with prisms yielded the spectral hues, or hues each produced by a particular wavelength of electromagnetic radiation within the spectrum. Sunlight is a mixture of light of all those different hues. But the ordering of colors is complicated immediately by the existence of extra-spectral hues, hues not found in the rainbow, such as the purple needed to connect the endpoints, or colors such as brown. Furthermore we find that a given spectral hue can be matched by light composed of many different combinations of wavelengths, and that there is no simple rule of physics that yields all and only the combinations that match in hue. Those matching combinations are called metamers[3].

The color theory teaches that two different observers can perceive a color in a complete different manner because of many different "human" reasons (for instance, the age, the psychophysical condition, the sensitivity for some particular colors, etc.) or different "natural" reasons (for instance, the illumination, the background, the observation angle, the specimen size, etc.). In nature every object has a color, but the problem is to remember or pass on it, and in architecture, also maintain or reproduce it. A color could change if it is observed through a natural or artificial light; but if a natural light has to be reproduced many factors have to be considered simultaneously, as time, geographic position, season, ect.[4,5,6] After the previous brief introduction it could be clearer that the chromatic characterization of a surface could depend on many factors.

The chromatic analysis of a construction can have several aims, for instance, to choice the colors of a new surface, to test the quality of colors of precast elements, to analyze the chromatic characteristics of an historical façade, to design a conservation project of an ancient building, to verify the results of a building restoration and register them for future applications.

At present, in many cases, the chromatic analysis is made by a visual comparison between the real case and a catalog of hues or, at best, using a general atlas of color, for instance, the Munsell book of color. But because of every previous factor and also because the color of a large area seems more brighter than color of a small area, this direct comparison often can be wrong. The main purpose of the present work is the research of non-destructive methods for chromatic investigations applicable to the three last aims explained before, that is the three different applications to ancient buildings. In particular, starting from the previous introduction, after the choice of two experimental instruments for quantitative chromatic surface surveys, a procedure is get ready for general applications and it is applied to case studies. In the following part the experimental instruments and their possible uses, the procedure and the results of a case study will be presented.

2.0 The proposed methods

The first condition to develop a non-destructive method for chromatic analyses of a surfaces is the reduction of the subjective boundary conditions. Thus, the use of experimental devices is an useful choice to cut down this kind of conditions. Two of the main devices to measure the chromatic characteristics of a surface are the spectrophotometer and the spectroradiometer. The first is an instrument measuring the ratio of two values (standard and sample) of a radiometric quantity (transmittance or reflectance) at the same wavelength; the second is an instrument used to measure the radiant energy from a source at each wavelength throughout a pre-defined portion of the electromagnetic spectrum. In particular, the spectrophotometer provides the chromatic coordinates in every color space and the spectral reflectance graph for a color, independently from the light boundary conditions, because it considers a standard illuminant (typical illuminants defined by the CIE, the Commission Internationale de I'Eclairage); the spectroradiometer records the spectrum radiation of a light source and calculates different parameters, such as chromaticity and luminance. In this second case, the surface is detected as a light source (without contact), so it is possible to control the chromatic variations considering the different external light conditions. In the present work the two next experimental devices are used: (a) the portable spec-

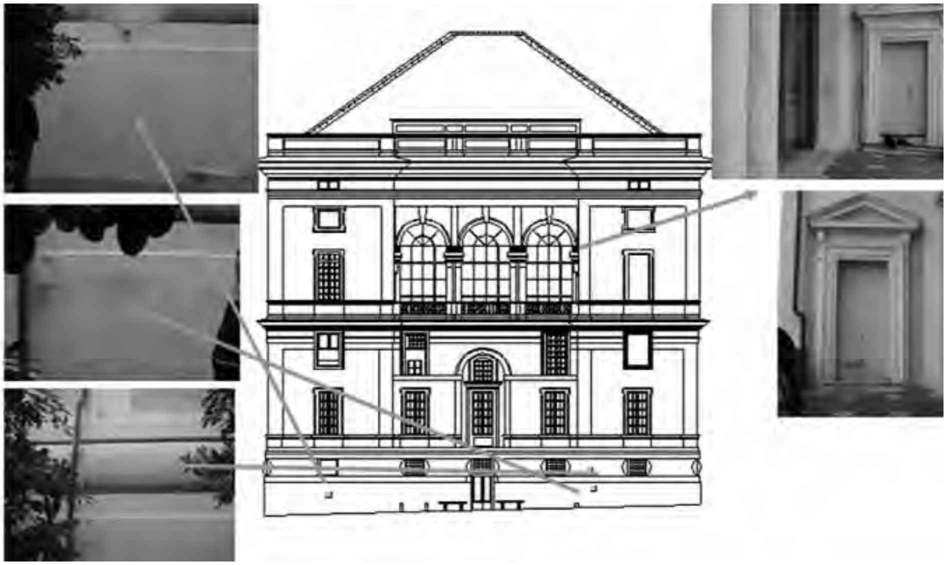
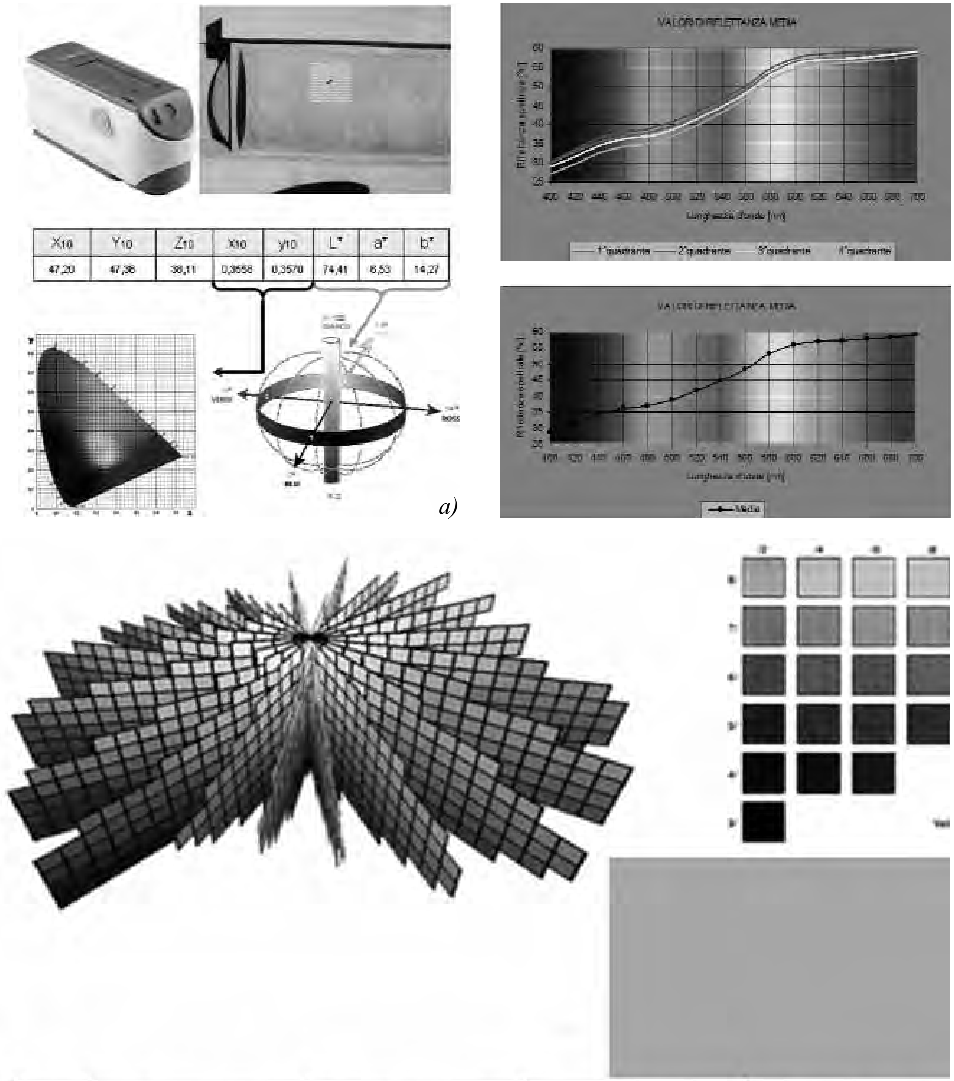


Fig. 2 - North front and loggia: instrumental surveyed surfaces

trophotometer CM-2600d (Konica-Minolta), it provides the visible light spectrum, between 360 nm and 740 nm (step by 10 nm) the main standard illuminants, the 2°-10° standard observer, two different measurement area (diameter of 3 and 8 mm), the main coordinates spaces; in particular in the next application the D65 illuminant, the 10° Standard Observer, the 8 mm measurement area and the CIELab and Munsell coordinates spaces are chosen; (b) the portable spectroradiometer CS-1000A (Konica-Minolta), it provides the visible light spectrum between 380 nm and 760 nm (step by 1nm), the 2°-10° standard observer, the minimum measurement area almost equal to 200 mm^2, the minimum distance to record equal to 362 mm, general measurement area dependent to the distance.

In the first research phase the two different devices are used to evaluate the quality and utility of available different kinds of colors measures: the spectrophotometer can perform a chromatic survey of single small area (for instance, for a painted plaster), or a survey of a large area using many small surveys together (for instance for homogeneous colored plaster); the spectroradiometer carries out the same previous surveys, but the results are dependent of the external light conditions. Besides this second device has to be considered like a “photo camera”, so it is also able to perform a survey of a distant area, but in this case the position, as well as the light conditions, have to put on. Finally the combined use of the two different experimental devices is tested, because it is possible to make the most of the two different recorded data. In



X_{10}	Y_{10}	Z_{10}	x_{10}	y_{10}	L*	a*	b*
47,20	47,38	38,11	0,3658	0,3570	74,41	6,53	14,27

	1° quadrante	2°quadrante	3°quadrante	4°quadrante
H	7,5YR	7,7YR	7,6YR	7,8YR
V	7,37	7,44	7,33	7,24
C	2,5	2,47	2,59	2,74

Fig.3 - Spectrophotometric data: (a) elaboration of the colorimetric functions in the different color spaces; (b) surface spectral reflectance of the single area or their average measure; (c) translation of the previous data in the Munsell system.

particular by means of a numerical derivation between the spectral emission of a surface (spectrophotometer data) and the radiance values of the same surface (spectroradiometer data) it is possible to come to the natural light conditions and so evaluate the different colors in different moment of the day. This last possibility is useful in the restoration project, because the different visual colors during a day can be evaluated. In the proposed methods two geometric masks are necessary to fix the precise measured points and record data in different time (sparing the façade marking). In particular two geometric supports are built that the measures performed by the two experimental instruments can be compared. In fact for the spectrophotometer the positions of a series of small areas are necessary if the survey of a large area has to perform; while for the spectroradiometer it is only necessary to decide the dimension of the survey area. In practice, after the choice and the recording of the measuring areas, the geometrical support for the spectrophotometer can be set, the calibration of the experimental device can be done and the chosen point can be surveyed. After the installation of the spectroradiometer at the distance for the chosen survey, different series of data are recorded in different environmental conditions to analyze the real changes in the chromatic characteristics.

b)

3.0 An example of application

In this section an application of the proposed chromatic survey methods is presented: the chromatic surveys of the south and north facades of Villa Giustiniani Cambiaso after its restoration (Fig. 1-2). The villa was designed and built by the Italian architect Galeazzo Alessi during the XVI century in Genova, a city in the north part of Italy. This case study is interesting because: the fresco painting on the plaster of the south and north facades were just restored and thus their colors are unchanged; different fresco painting techniques were used in different parts of the two facades, thus the evaluation of chromatic effects due to the different techniques can be analyzed; the chromatic effect due to the different orientation of the two facades could be evaluated, thus more detailed consideration could be made about the choice of the pigments to rich the same visual effect with different orientations using different colors; finally the visual effects of the same color in different hours could be observed and so considering in a future restoration project of the east and west facades.

In the Fig. 3 some results by the spectrophotometer analyses are shown. In particular, the three different kinds of recorded data are presented, the elaboration of colorimetric functions in the different color spaces (Fig. 3a), the spectral reflectance of the single surveyed area and/or their average (Fig. 3b) and the mathematical translation of these data in the Munsell system (Fig. 3c). The Fig. 4 syntheses the different results by the spectroradiometer. In this case the colorimetric coordinates and the spectral radiance diagrams are dependent by the day light conditions, respectively, cloudy conditions (Fig. 4a) and sunshine conditions (Fig. 4b). The more obtainable results by the mathematical elaboration of the data from the two different experimen-

c)

tal devices, described before, are shown in Fig. 5. The simultaneous use of the two different devices allows to highlight the chromatic differences between the two hours in terms of spectral reflectance and visual colors.
The presented case study showed the potentiality of the devices used for a construction color survey. Many aspects have still to investigate, in general, the use of other devices (i.e. the digital photo camera, digital video camera, etc.), the reproduction of a color survey on a support (i.e. on a photograph, on a video, etc.), etc.; in particular for ancient buildings, the influence of the weathering or/and the degradation processes on the facades is essential to determine the original colors starting from the actual conditions. At the present these aspects are analyzed to increase and improve the applicability of the proposed methods.

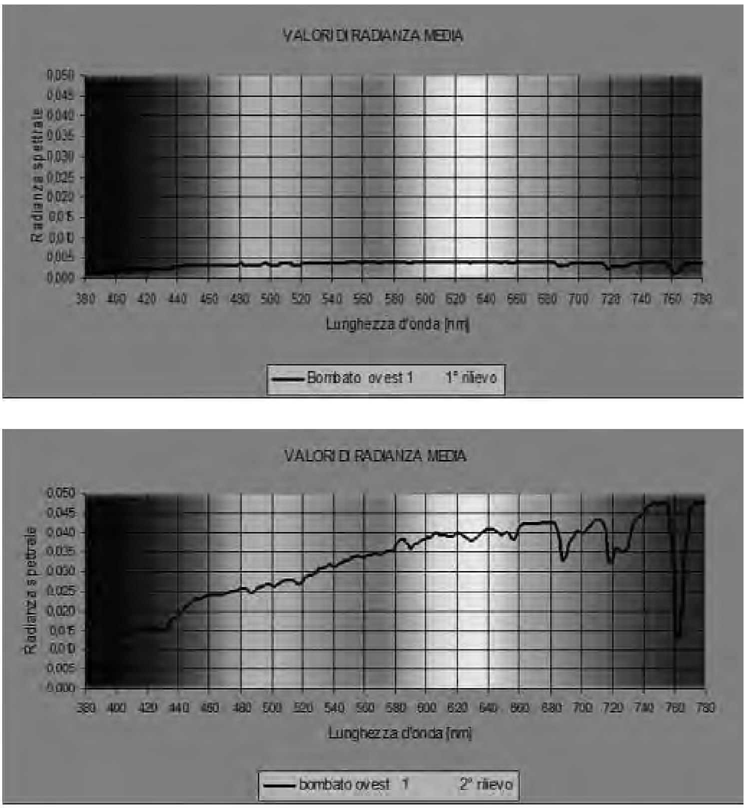


Fig.4 - Spectral radiance given out by the surface, measured by spectroradiometer in different environmental conditions: (a) cloudy conditions; (b)sunshine conditions

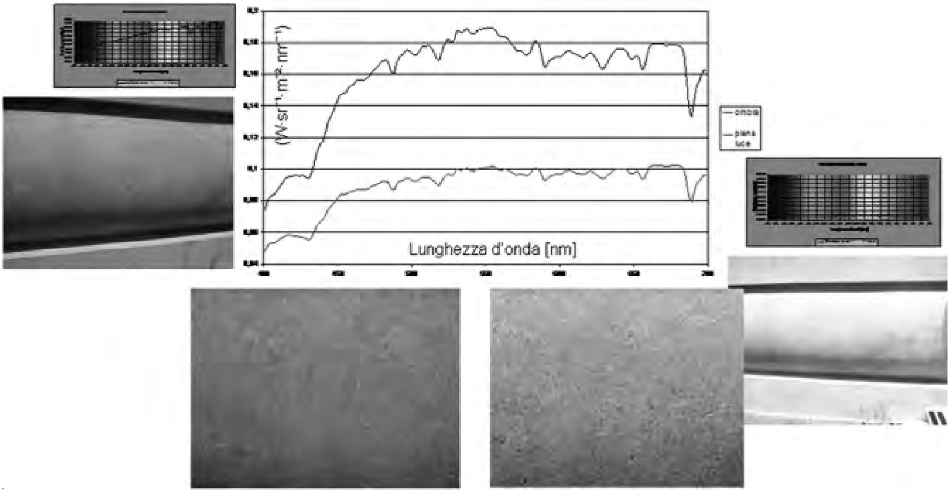


Fig.5 - The chromatic differences on a surface due to the different environmental conditions

Notes

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	TIPO DI INTONACO	Cemento portland	Calce aerea	Calce idraulica	Inerti Calcarei
TRADIZIONALI					
	IC (cementizio)	1			3
	IB (a malta bastarda)	1	1		5
	ID (a calce aerea)		1		3
	IL (a calce idraulica)			1	3

Fig. 1 - Basic materials, used to realize the traditional plasters

MATERIAL	DENSITY ρ0 [kg/m3]	VAPOUR PERMEABILTY δ [10-8 kg/(Pa m s)]	SIZE (dxLxW) [mm]
Perlite	100	1,2	195x195x90
Cellulose	35	5,88	195x195x90
Gypsum	700	-	280x144x12
Sodium polyacrylate	1055	-	195x195x90

Fig. 2 - Tested materials: some parameters and dimensional characteristics of the specimens

Figg. 3,4 - Pictures showing the reproduced traditional plasters and the experimental facilities used for the determination of the sorption isotherms

M. D'Orazio [1], C. Di Perna [2], S. Cerolini [3], A. De Chirico [4]

MOISTURE BUFFERING CAPACITY OF TRADITIONAL PLASTERS IN THE MEDITERRANEAN AREA

1.0 Introduction

The present paper shows that traditional materials, used as internal plasters in Mediterranean buildings, contributed to improve their environmental comfort. Those materials and traditional building technologies, in fact, were able to interact dynamically with the surrounding air, dumping diurnal changes in relative humidity and reducing energy consumptions.
On the basis of a previous research [Stazi, Pauri, Garofoli, D'Orazio, 1994] [D'Orazio, Stazi, 2006] on the composition and realization techniques of plasters used in Italy in XVIII and XIX centuries, this study analyzes the hygrometric behaviour of these plasters and the influence of their absorption capacity on internal conditions, compared to other building solutions introduced by the advent of cement and organic binders for paints. This research is based on several studies regarding the moderating influence of absorbent materials in the conservation of cultural heritage. [Padfield, 1966], [Eshøj, Padfield, 1993], [Padfield, 1998] have shown some study cases where porous internal
finishes were able to buffer moisture changes in ancient buildings.
However, these studies are always related to north - European climates, materials and building technologies. That is why the aim of this research is to estimate the efficiency of using traditional building materials as "moisture buffers" in the Mediterranean area.

2.0 Phases, materials and methods

2.1 Phases

In order to show the environmental comfort improvements that the use of traditional Mediterranean plasters could offer, the research is organized into two phases.
The main objective of the first part was to point out the traditional plasters' capacity of stabilizing internal RH% conditions. For this reason, the following activities were carried out: reproduction of traditional plasters of 18th and 19th centuries; determination of the sorption isotherms and simulation of the interaction between the mentioned materials and the living environments by means of a calculation model.
The aim of the second phase was to verify the preservation of the sorption properties of the pla-

sters, even compared to modern heavily adsorbent materials. Thus, the dynamic hygrometric response to cyclic RH% variations, reproduced in a climatic chamber, was evaluated.

2.2 Materials

Fig. 1 shows the composition of all the plasters reproduced for the first phase activities.
They differ for the type of binder used: lime, hydraulic lime, gypsum and Portland cement (used as a comparison element). The plasters have been named: ID, IL, IG and IC.
Fig. 2 shows some parameters and dimensional characteristics of the materials used in the second phase.

2.3 Methods

The traditional plasters used in the first phase were characterized by a RDX analysis, in order to individualize their mineralogical parts, and by determining the sorption isotherms according to UNI EN 12571: the materials were first placed in a dryer till they reached a constant mass and then in a series of test environments characterized by increasing values of relative humidity (fig. 3-4). The humidity content in the material was established weighing the specimen with an analytic balance till the achievement of a constant mass.
The numerical study concerning the first step of the research was carried out using the calculation model [EnergyPlus v1-3-0 with the solution algorithm EMPD] and calculation conditions fixed on the basis of [Osanyintola, Simonson, 2006] studies.
In particular we examined the interaction between three (IG, IL, IC) of the four plasters characterized and a living environment in a traditional building (brick masonry).
Environmental conditions of a bedroom (36 mc), facing west, with 0.5 ric/h, occupied by two adults sleeping for 9h every night (22.00 – 7.00), were analysed in detail.
Thanks to the calculation model it was possible to obtain information on the climatic conditions inside the room and to assess the sensible heating energy of the room for the different examined situations.
As to the activities of the second phase (dynamic characterization in climatic chamber) we followed the protocol pointed out by [Rode, 2005]. This procedure allowed to get the Moisture Buffer Value [g/(m^2 8-16h %RH)] of the tested materials, that is the amount of water transported in or out of a material per open surface area and per %RH variation, during a certain period of time. Fig. 5 shows a phase of the experimental activity in the Angelantoni CH250 climatic chamber (fig. 6).

3.0 Results

3.1 Traditional plasters influence on the stabilization of indoor RH% conditions

In fig. 7 the composition of the traditional plasters is presented according to the results of the RDX analysis.
Fig. 8 shows the sorption isotherms of the tested materials. These curves reveal the moisture amount absorbed by the material, for each RH% value, referred to the material's weight. The tested materials show considerably different values of moisturecontent. At 60%RH, that represents internal RH% conditions, hydraulic lime-based plaster absorbs 0,053 Kg/Kg% of moistu-

Figg. 5,6 - Pictures showing a phase of the experimental activity in the climatic chamber

		Cemento portland	Calce aerea	Calce idraulica	Inerti Calcarei
INTONACI TRADIZIONALI	IC (cementizio)	----			----
	IB (a malta bastarda)	----	----		----
	ID (a calce aerea)		----		----
	IL (a calce idraulica)			----	----

*Fig. 7 - Table showing the results of the characterization of the traditional plasters by the RDX analysis (---- heavily present; -- fairly present; - slightly present; * traces)*

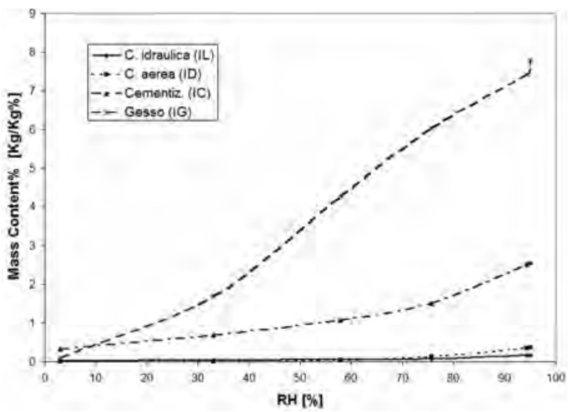


Fig. 8 - Sorption isotherms of the traditional plasters representing the water content measured in the tested materials per RH% level

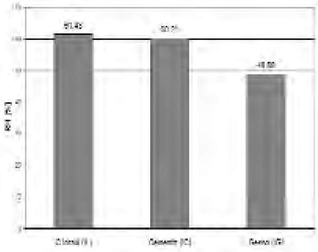
re, cement-based plaster 1,07 Kg/Kg% and gypsum-based one 4,27 Kg/Kg%. Presumably this behaviour is related to the different porous structure (in terms of surface specific area) supplied by the binder.
The results of the EnergyPlus simulations are presented in fig. 9. They refer to a typical winter day and are based on the described characterization results. The graph shows the average RH% level in the bedroom according to the type of plaster used as internal finish. Although in the same environmental conditions (temperature and relative humidity) and internal temperature, gypsum-based plaster is able to dampen indoor humidity level by about a 20% compared to what one could measure in a room with less absorbing finishes.
Furthermore, the presence of a moisture buffering system seems to affect even the sensible heating energy (fig. 10) and in detail the amount of heat necessary for the phase transition. This aspect is particularly relevant since it suggests interesting employments in the field of energy saving and for this reason it will be investigated in the next steps of this research.

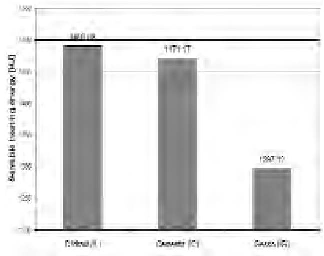
3.2 Maintenance of sorption properties

As the efficacy of the tested materials as hygroscopic buffers was demonstrated, the research was carried out in order to quantify their capability to dampen RH% variations, by determining the Moisture Buffer Value (MBV) and estimating the possible presence of hysteresis. MBV values for the different materials are presented in fig. 11. The sodium polyacrylate has excellent absorption properties, compared to all the other tested materials reported in the scientific literature; cellulose and gypsum follow. Fig. 12 shows the adjustment rate to RH% variations. The sodium polyacrylate is by far the material that reacts more rapidly, both during absorption and release; cellulose, gypsum and perlite come after. The water content that the materials did not release at the end of the cycle has been estimated too. This quantity is an index of the presence of hysteretic phenomena (sorption properties decay). Only the sodium polyacrylate shows a hysteretic behaviour. On the contrary, the other tested materials (cellulose, perlite and gypsum) don't show hysteresis. A final remark should be done, concerning the relation between the obtained experimental results and sorption potential of each material. In fact, the water contents absorbed by the specimens, during the experimental activity, are very low if compared to their boundary working conditions, as defined by the sorption curves.

4.0 Conclusions

The research demonstrated that the materials traditionally used to produce interior finishes in the Mediterranean area are able to act as moisture buffers in our houses, absorbing and desorbing moisture from the surrounding air and contributing to improve environmental conditions and indoor air quality. The research is now proceeding with the analysis of other kinds of finishes and the investigation on the interaction between the finishing materials and the living environment by examining other different living conditions.mental conditions and indoor air quality.
The research is now proceeding with the analysis of other kinds of finishes and the investigation on the interaction between the finishing materials and the living environment by examining other different living conditions.





Figg. 9,10 - Moisture accumulation in the gypsum-based plaster decreases the relative humidity level of the air in the room and the heating energy consumption

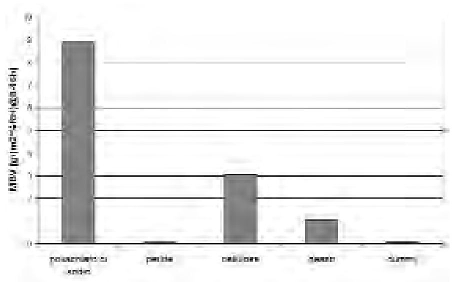


Fig. 11 - Moisture Buffer Values (MBV) of the tested materials

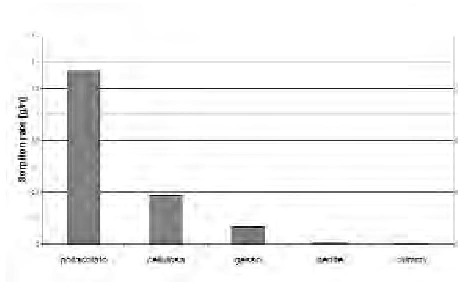


Fig. 12 - Adjustment rate of the tested materials to RH% variations

NOTES

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Fig. 1 - The PV array Serre-Persian (Salerno)

Fig. 2 - The photovoltaic system on the southern slope of the hill Atzenhof-Muellberg at Furth, Bavaria

Fig. 3 - The photovoltaic field in Bavaria-SolarPark Mülhausen in Bavaria

M. Dringoli

WHICH "SMART ENERGY" FOR SUSTAINABLE ARCHITECTURE IN THE MEDITERRANEAN AREA

1.0 "Smart" energy for the sustainability of the Mediterranean architecture

The use of renewable energy sources and promoting energy saving initiatives are commonly defined "smart" energy initiatives because they don't consume non-renewable sources and don't pollute the atmosphere.
Therefore, they are important tools for environmental sustainability, which can be regarded as a benchmark for measuring smart energy needed for the human activities.
However, sometimes this environmental sustainability isn't compatible with architecture and landscape.
In this context, is considered more intelligent the source of energy that is able to combine environmental sustainability with the values of architecture and landscape.
The sources of alternative energy that can be used with greater efficiency in the Mediterranean areas are certainly solar energy , as well as wind energy used also in other region on the earth.
Even if the techniques of conversion of solar energy in other forms of energy are used especially in the Mediterranean areas than in other areas less sunny, they have been object of greatest interest more in Northern Europe countries than in Mediterranean countries especially in Italy.
The development in the use of solar energy is affected by the fact that the use of solar energy requires advanced technology and industrial products resulting from expensive experiments and research, which are easily implemented in countries with a high level of industrialization.
This consideration explain the difficult in the use of this technologies in the so-called "third world" countries.
But in Italy the difficult in the use of solar energy is attributable to a number of ingrained prejudices about their convenience and the practical possibilities of application, especially about its effects on the landscape.
In particular, this kind of approach is shown against the use of photovoltaic panels to convert solar energy into electricity.

2. The architectural integration of photovoltaic

Italy has an insulation twice Germany, but has planned to launch a plan for 10,000 photovoltaic roofs, while in Germany the program is at least 100,000 PV roof (in Japan if they want to reach 70,000 and in U.S. 1,000,000).
In Italy, in Serre Persian Ontario, there is a central that has a production of 3.3 MWp with an area of 55,000 sqm., one of the largest D 'Europe1, which should be an example for all small system, which are very limited in number.
This demonstrate that, in the last years research on photovoltaic technology have been a significant increase in Italy, even if they haven't been an equally widespread use. More often than not are studied different application of this kind of technologies but the implementation of autonomous systems ("stand alone") for small appliances in remote areas not connected to the mains or networked systems ("grid connected") is still very rare and its applications in urbanized areas using integrated systems in buildings is infrequent. Those kind of systems have a great interest for the future plan for many reasons: the savings in materials used for the buildings, the savings in employment land (is impossible fill of photovoltaic panels to fill the plains and the southern slopes of the valley), the possibility of recovering the thermal energy produced.
Recent studies2 suggest a distinction between plants with high and low level of integration, according to the photovoltaic systems are used to make entire portions of the enclosure (glass roofs, shed roofs) or for applications superimposed on other structures (terraces or pitched roofs sloping) or minor finishing works (railings, sunshades, façade cove-

Fig. 4 - Plant-integraded photovoltaic roof of a residential complex in Denmark

Fig. 5 - Plant-integrated photovoltaic facade

Fig. 6 - The entrance to the castle of St. George in La Spezia with the self-illuminating photovoltaic panel

Fig. 7 - Plant with integrated photovoltaic panels covering Kalzip amorphous silicon thin film in Bretten (Baden-Wurttemberg)

rings to set-off). In terms of productivity, the second one are more convenient than the first one because they are less affected by architectural constraints that do not allow to fully exploit its potential. An important consideration is the different effect that the application of the two systems can produce on building's image, and how it may affect the actual applicability of the system. In fact a new building can be designed according to the use of photovoltaic techniques with a complete integration of the components required in the building envelope.

Once acquired this concept is clear that the architectural constraints don't limit the use of the photovoltaic system but become itself a tool of a new architectural language. Only in the adaptation of the constructed responses may have limitation to the integration of photovoltaic systems in buildings, making convenient the use of low-level system integration.

Through a clear use of photovoltaic allow the introduction of a new architectural language, related to high-tech contemporary architecture, but also characterized by their lexical components. This is even more valid in an area like the Mediterranean, where, similar solutions can contribute to energy saving and environmental protection or, rather, sustainable architecture.

3.0 The use of innovative photovoltaic technologies

The comments explained in the previous paragraphs are far from introduce new types of formal constraints. Firstly, the objective is not to optimize energy production but the use of new housing types to produce still a certain amount of energy that does not necessa-

rily make the building completely self-sufficient, but only reduce consumption significantly and, consequently, also the emission of pollutants. Secondly, there are many variables to consider, including choosing the most appropriate solution.The photovoltaic panels can be made according to different types which correspond to different characterizations formal3.
The forms of a single crystal silicon cells, dark blue, corresponds to maximum efficiency, assessed for between 14 and 17% with prospects for further improvement, the surfaces coated with amorphous silicon4, cheaper but less efficient, allowing greater freedom of expression. The amorphous isn't divided in cells, but is formed by deposition of silicon (amorphous state precisely) in thin films on surfaces that can also be broad and curved. The major advantage of amorphous silicon modules is the potential versatility in 'architectural integration of PV modules but also both the form and the color tones that allow to get semi-transparent surfaces used in glass facades.
A significant indication of the convenience of a particular type PV is the EROEI (Energy Return On Energy Investment Company), its minimum value is 3 kWh produced per kWh spent in implementing the system, while the maximum is obtained for more than 10 kWh of "energy gray". The values for the 3 typologies of modules of silicon used is shown in the table below:

Type module	Energy expenditure per 1 kW (energy gray)	EROEI *	Areas covered with 1 kW (sqm)	Installation cost per kW (Italy)
Monocrystalline	6-9 MWh	3 to 5	6 to 9	€ 5-8000
Polycrystalline	5-7 MWh	5 to 7	8 -10	€ 4-7000
Amorphous	3-5 MWh	6 -10	12-16	€ 4-7000

Considering a production of 1,200 kWh/year and 20 years of implantation.

A particular innovative application of amorphous silicon occur in thin films of high-efficiency, in this kind of use the conversion efficiency can be increased up to 8%, while in the standard amorphous silicon modules usually arrives at 6%. Moreover, compared to crystalline silicon modules (in two variants: mono or poly), thin films can be produced using a reduced quantity of silicon, and therefore are cheaper than silicon solar grade. This kind of technology can be used also as a support for steel plates instead of glass plates.
To these technologies that are able to increase the dissemination of photovoltaic panels, should be added the latest innovations. An example of this innovations are represented by hybrid systems in which the same panels are used both to generate electricity and to heat it, or the use of nanotechnology able to convert infrared radiation into electricity.
Hybrid systems use the warming that affect the photovoltaic panels to transfer the heat

Fig. 8 - Complex of wind turbines

Figure 9 – Mini-generator wind turbine manufactured by Renewable Devices (GB)

absorbed from the cells to a fluid (air or water) that allows the next user. Therefore, there are hybrid collector with air or water. The first one are better than the second one thanks their best performance and less caused by the presence of water. They can be used in roof and ventilated facades enriching the services provided from technologies already used in construction. About the possibility of conversion of infrared radiation into electricity, according to information furnished by "Nature Materials" promising results have been obtained by researchers at the University of Toronto. They have converted sunlight and infrared (also with a cloudy sky) into electricity using a plastic material, based on nanotechnology. The use of photovoltaic panels using this material can increase the performance of five times. To get an idea of the potential of this technology it was calculated that is sufficient cover 0.1% of the Earth with this new type of panels to replace all power plants. By now, this system has a great disadvantage related with the cells, in fact the cells deteriorate rapidly when exposed to the sun, until it merges. It is, however, an open area of research that promises extraordinary developments.

It is easy to predict that the use of photovoltaic panels in the roofs and facades may make self-sufficient in energy terms, many buildings. In particularly the architecture will take account of the innovations proposed by the needs of saving energy and reducing air pollution. The integration of photovoltaic modules in the architecture should be implemented like a new language, which is most suited in environments where their use will be more convenient: so, certainly in the Mediterranean areas.

4.0 Wind energy and natural cooling of buildings

Nowadays wind energy is obtained using of blades to the wind, this kind of use affects the landscape rather than architecture. However, the necessities of energy led in to use of large wind turbines that has a strong impact on the landscape with theirs towers up to

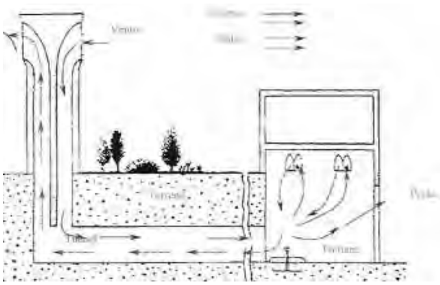

Fig. 10 - Schematic of Iranian wind towers

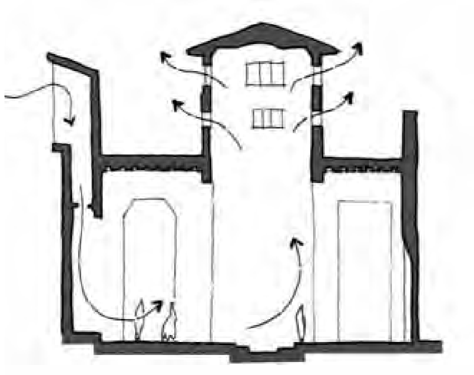

Fig. 11 - Diagram of wind towers Egyptian

150 m. and rotor diameters of tens meters. The transformations of the landscape should be treated with the same respect for the places, which in the past was done in the territories of ancient civilizations. This means that the action of wind energy production should be used with restraint because the impact of the blades to the wind on the landscape is very high, or unacceptable in areas of high historical value, artistic or naturalistic while it is desirable its use with small generators. Very Interesting are wind generators for isolated houses of the kind produced in Scotland by Renewable Devices (capable of 1.5 kW and 4200 kWh per year), or in Germany the LT 200/3dd of AES5.
Should be taken account of that the action of the wind is more intense in the evening and in the night, when the yield of photovoltaic panels is minimum. Therefore, is very important not also the integration of this technologies in the architecture of the building but also the complementarities of the two systems.
Related to the theme of Mediterranean architecture is the use of ventilation towers and wind towers useful for summer cooling and therefore able to reduce the energy consumption required for the packaging, which is becoming increasingly .
The towers realize the circulation of ventilation air introduced into the building by an air intake outer pipe through a basement and brought together in a tower of considerable internal section (consisting, for example, from the stairwell) through which all comes out content. The wind towers are very useful for cooling in areas affected by the presence of intense and frequent wind and with a considerable temperature difference between day and night. In this areas they function even in absence of wind thanks to the night cooling related to the massive walls of the buildings.
Up to now, these solutions did not reduce appreciably the overall consumption of nonrenewable energy sources, especially for the industrial use of energy, however, it becomes

essential to encourage the use, breaking down prejudices on their use and contributing to a new ethic of energy consumption, that precisely in the Mediterranean areas will be expressed through new "intelligent" architectures.

NOTES

1. The largest operative photovoltaic plant in the world is Solarpark Mühlhausen; it is inside the larger of Bavaria Solarpark Mühlhausen, Germany, with a rated output is 6.3 MWp. The largest roof installation is probably the Fischer function Dingolfing, still in Germany, for a total of 3.7 MWp. The largest photovoltaic installation, architecturally integrated, in in the exhibition halls of Monaco of Bavaria, for a total of 1 MWp. The architectural integration consists, in this case, in the use of photovoltaic modules as doors, windows and roofs of buildings. In Germany photovoltaic technologies were used in famous works of contemporary architecture, as Eurogate by N. Foster in Duisburg or the Sony building by H. Jahn in Potsdamer Platz in Berlin.
2. V. F.Iannone, L'integrazione del fotovoltaico in edilizia, op. cit.
3. An effective demonstration of the expressive potentialities of assembled photovoltaic modules is provided by the self-illuminating panel used in the entrance of the castle of St. George in La Spezia, it is obtained integrating the units LED bright in transparent solar modules
4. The cost of one watt produced with this technology is 25-40% lower than other PV technologies (by Ecorete).
5. Widespread is the production of mini-wind turbines built on the model of normal wind towers. They are smallest but, in general, difficult to integrate in normal buildings: However, it is easy to fit they into the landscape and to use for small groups of isolated buildings. ENEL Green Power produces the "Mini Wind" generator, whose standard towers measured 18m, reducible to 12 m, with a nominal power of 20 kW.

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Figg. 1, 2
The agriculture
in urban centers

K. Fabbricatti, S. Oppido [1]

ECOLOGICAL DESIGN FOR LANDSCAPE TECHNICAL ELEMENTS: THE CASE STUDY OF THE SORRENTO PENINSULA

ABSTRACT

The paper deals with environmental strategies for landscape recovering in Southern Italy.
Human action has often added value to the landscape and contributed to define its morphology and identity creating harmony between human signs and nature.
The research benchmark is the European Landscape Convention that points out the present trend in Europe on landscape preservation and landscape management. It describes the landscape as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors".
The research focuses the attention on the traditional technologies and materials and their compatibility with the natural area, in order to preserve the harmonisation between natural and artificial elements in landscape management. It studies some elements of historical landscape in the frame of a typical ecological system of Sorrento Peninsula, as well as the pedestrian paths, the enclosure-walls, the containment walls and a sort of "*ombraculo*", a shading for the production of oranges realized in wood and straw that is employed to build natural greenhouses. These structures have contributed to design landscape and to define the identity of the Sorrento Peninsula.
The interest of this study case can be found in the fact that there is the risk to lose this cultural and environmental heritage because of different requirements of life in comparison with the past, of the economical and social development, of the progressive desertion of traditional technologies based on a sustainable use of the resources.
Keywords: agriculture, local ecological design, natural greenhouse, sustainability.

1.0 INTRODUCTION

The present national and international discussion focalizes the attention on the control of landscape transformations, in areas where the human action has added value to the environment and contributed to define its morphology and its identity.
Landscape is the result of the complex texture of relationships that the local community established with the territory[2]. A clear example is the agriculture: in the past it has defined the morphology of many European landscapes and it had an important role in their transformation and management.
Still today, agriculture is a significant aspect to consider for the preservation of the harmonization

between natural and human factors in landscape. In particular in the extra-urban areas, as the *European Spatial Development Perspective* (ESDP) declared, the modalities utilized in the agriculture represent one of the most important means to contrast the destroying of cultural landscape[3].
In relationship with this cultural context the Sorrento Peninsula represents an emblematic study case. In fact it still retains the signs of the human work to take possession of an inaccessible territory with steep hills.
This area is characterized by a system of technological ecological solutions designed by the local culture, a system that is integrated with the landscape heritage and represents the harmonization between the local constructive rules and the natural components of the area.
This integration between human and natural factors is coherent with the definition of landscape given in the *European Landscape Convention* (2000) that points out the present trend in Europe about landscape preservation and landscape management. In fact this European document describes the landscape as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" [4].

2.0 The Sorrento peninsula

The Sorrento Peninsula landscape is characterized by an important natural and cultural heritage, with the presence of antique rural settlements and rural life. In particular the Sorrento slope of the Peninsula is an area with a degradation towards the cost, where it finishes with tuff falaises: in this territory the groves extend towards the sea.
The modalities to realize and to place the citrus groves, the olive-groves, the vineyards and their diffusion in the Peninsula represent the expression of the connection between the "vocation" of the area and the human action in the centuries. These groves are harmonically inserted in the context, preserving a biological balance in the territory.
Agriculture is a strength in this area. If we look at the citrus groves we can notice the excellent human care: there is a first protection realized by long-trunked trees, followed by rows of olive-groves and then a traditional structure realized with wood, in order to shelter the citrus grove from the wind, the heat and the cold[5].
This is an antique tradition of the Sorrento Peninsula; in fact since the Angioini age the techniques of the citrus groves were careful[6].
This environmental and landscape heritage is recognized by the local government: the Province of Naples in the *Chart of the environmental values and the areas of natural and landscape protection* in the P.T.C.P.[7], defines parts of the Peninsula like areas with an agricultural-environmental system of high historical, cultural, environmental and landscape value, that must be preserved.

3.0 The landscape elements

The Peninsula landscape has an aspect strongly marked by human action: the agriculture has transformed it by the terraces, the pedestrian paths, the containment walls.
In particular, the rows of the citrus groves, the pergolas and the system of wind-break realized in wood, characterize the landscape of this area of the Campania Region and they represent identity factors.
The context is homogeneous, with some recurrent technological-morphological solutions that rep-

resent the local constructive lexicon. These solutions are the mark that in the past the human action was able to solve practice problems and contribute to the landscape quality, realizing the integration and mutual collaboration between human practices and natural and morphological land's components.

Therefore in order to preserve this local ecological design, the research focuses the attention on the technical elements of this system: the pedestrian paths, the enclosure-walls, the containment walls and a sort of "*ombraculo*" realized by wood and straw for the protection of the groves.

These elements represent the components of an ecological system, based on the use of natural local materials and traditional techniques: the walls characterized by the white colour of the calcareous stones, the steps of the beaten tracks with calcareous stones too, the paved, the stockades with chestnut-wood and the characteristic structures for the protection of the groves, realized with straw and chestnut-wood.

The knowledge of this local lexicon is very important in relationship with its aesthetical value in the landscape design but, most of all, because in the past this system was able to solve problems connected with the uses of landscape with ecological solutions based on technical elements with adequate environmental performance.

4.0 A NATURAL GREENHOUSE

4.1 THE ORIGINS

The use of the typical systems for the protection of the groves in the Sorrento Peninsula dates back to the XIX century. They became a characteristic element of the area, named "*pagliarelle*" because of the use of straw (in Italian "*paglia*").

These structures were first born to shelter the groves from the wind and the cold; they are a sort of natural greenhouse, realized with natural materials as wood and straw.

The diffusion of these elements gaves a particular appearance to the landscape and allowed the production of the famous citrus fruits of the Sorrento Peninsula.

In fact the climatic limits of the Campania Region aren't suitable for the citrus fruits; but in the Sorrento Peninsula the orography is characterized by a valley that is shelter from the cold and the wind by the Lattari Mountains. However in case of very cold and windy winters without an adequate protection the groves could suffer great damage and death [7].

In order to solve this problem, since ancient times the farmers realized protections around the groves: a pergola built with chestnut-wood stakes and surmounted by the characteristic "*pagliarelle*", a sort of natural cover that protected the groves from the state of weather, like hail, wind and night-frosts. With the same aim they designed a sort of wind-break: vertical structures realized by panels of chestnut-wood listelles.

The morphology of these structures contributed to define the identity of the area and the need to find a considerable quantity of chestnut-wood to realize these structures, caused a change in the landscape of the Sorrento Peninsula: in the hills around Sorrento the chestnut growing replaced the alder growing.

At first the citrus groves were located near the little built-up areas and they were the classical "garden" of the Peninsula; therefore the "*pagliarelle*" and the pergolas were diffused in the urban centers too [7].

Fig. 3, 4
The protection system of the groves

Fig. 5, 6
The "cogna" and the protection system of the citrus groves in the landscape

Today these local solutions have an aesthetical, ecological, functional role in the territory and they represent an important example of landscape management based on the harmonization between natural and human factors.

4.2 Materials and techniques

The traditional protection of the groves in the Sorrento Peninsula is based on two elements: the vertical wind-break structures and the thatch.
The wind-breaks are placed at right angles towards the prevailing wind direction or around all the perimeter of the grove area. The realization of these structures was, and it still is today, completely hand made and it requires the ability of the agriculturists.
They are realized with vertical strips of chestnut-wood, named "*chierchie*", fixed on a sturdy structure of chestnut-wood listelles.
Instead the horizontal structure named "*pagliarelle*" is realized with mats of straw tied up with strips of chestnut-wood and are large about 1.30 x 2,00 meters. At first the agriculturists leant these mats directly on the foliage, then on the *pergola*.
The pergola is named "*prevola*" and is realized in chestnut-wood stakes: the vertical elements are named "*allirti*", the horizontal and oblique elements are named "*currienti*".
The components of the pergola are hand-fixed by tying steel wire, without the use of riveted joints.
The farmers usually place the "*pagliarelle*" on the frame in October or November; in April these panels are piled up on the pergola, realizing a sort of hut named "*cogna*", that is very characteristic in the peninsula landscape[8].

4.3 Ecological value and preservation of the biodiversity

In the Sorrento Peninsula the characteristic structures for the protection of the groves are an example of ecological elements but they have also an important role for the preservation of biodiversity of this area.
In fact this system of greenhouses realized only with natural materials produces environmental conditions under these structures: according to the experts, the scarce lighting and the temperature control reduce the vital functions of the trees and give typical organolectic properties to the Peninsula's citrus fruits, famous in all the world[8].
Therefore these structures were born in order to shelter the groves from unfavorable environmental conditions but they have produced important transformations in the characteristics of citrus fruits, in particular of lemons.
The environmental performance of these typical structures have a great influence on the quality of the local production of citrus fruits; then the preservation of this constructive tradition represents the conservation of a cultural, material and biological heritage and it is necessary to preserve the quality of this local production.

5.0 Local development and "multifunctionality" of the agriculture

Government policies for the management of the complex phenomena produced by the interaction among human activities and the natural system is turning towards giving a new role to agricultural activities; in fact, they are now identified as central tools for the management of the environment

and its resources. The compatible use of the territory with a re-balance of production models can lead to the planning of a correct use of its resources that can be maintained in time and also increased. On the contrary, the nowadays not-management model that moved from a well distinct hierarchy of productive models to a substantial anarchy of the same, leads to the destruction, in terms of landscape, of a cultural heritage stratified in years and to the often irreparable loss of a non renewable resource bearing witness of building and cultural forms disappeared by now.
In this frame, the agricultural activity, on one side, uses natural resources, produces goods and contributes to the economic sustainability of the rural societies, on the other side it can foster development of further functions, not only productive, assuming a role of safeguard of the territory, producing goods and collective services connected to the environment and landscape maintenance. To this new meaning of agriculture is given the name of "multifunctionality", to indicate that the primary sector has the ability to develop territorial functions (landscape care, resources maintenance), productive functions (food safety and health, quality, improvement of natural and cultural resources, animals well-being), social functions (vitality of the rural areas, stop to depopulation, recovery of traditions), environmental functions (biodiversity, trash disposal and recycling, balance of gas emissions)[9].

6.0 Conclusion

The case of the Sorrento Peninsula is an emblematic example that in the past the human action was able to integrate its works with nature, especially in the rural areas where the natural and human factors have designed the landscape.
On the contrary today the technological innovation often causes a twisting in the agricultural systems and the loss of an ecological approach towards land's resources.
In the Sorrento Peninsula for example the traditional "*pagliarelle*" are often replaced with plastic nets for economical reasons and practicalness: this caused the loss of environmental performance of these structures and a different impact on the environment. But it also caused the loss of the aesthetic and cultural value of these elements of the landscape.
The knowledge of these traditional constructive techniques and their capability of integration with the natural context is necessary in order to guide future interventions towards the preservation of this harmonisation between nature and human actions, in accordance with land's sustainable development.

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P. Fiamma

INNOVATIVE DESIGN ENVIRONMENTS FOR A SUSTAINABLE ARCHITECTURE

1.0 Introduction

In the past, nearly always, the architectural design was really sustainable: buildings were built according to the rules of arts, developed (during the centuries) from the tradition.
Today, the actual resources for a modern architecture, are always more and more complex.
One of the causes of a latent design in terms of sustainability in the new buildings, consists in this complexity itself: a failed “meeting” of the different aspects involved in design activity.
This division of design is not typical of the building tradition of the past.
The area of research that concerns these innovative technologies is part of the growing complexity of the current needs of the design of a “sustainable architecture”, which is made more and more complex by the nature of the architectural product itself.
International equips of research are developing some form of interaction between the building design actors.
For the future of sustainability in construction we needs , tools, methods, cognitions, technical components... to realize and to develop an effective interaction between the operators involved in the building process (from the idea to the end of the life-cycle of the building). This work aims at filling a specific gap of discipline between two neatly defined stances. On one side, the new studies of the aesthetic aspects of design, on the other side, the studies which is typical of analysts, conducted at different times from design (before or after the design). But, to obtain a sustainability dimension for the architecture, we think that it is necessary to go hand in hand with the design as this is developed. This will favour the on-going process of a project in independent steps, allowing the recovery of its meaning as an expression of a holistic methodology: a single and simultaneous concept of all the aspects involved (structural, economical, functional etc.).
What is really important for us, is the significant relation between this holistic cognitive approach to design and the traditional design of the past centuries.
To develop a sustainable architecture, the design concept itself needs to be sustainable since an early stage and during every phase.

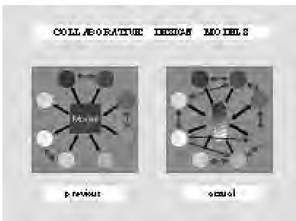

Fig. 1 (below) - Different models of collaborative design research vision
Fig. 2 (big) - Grab interaction of simple 3D objects in a physical space at our Lab

2.0 NEW DESIGN COGNITION AS…

There are two important points of view, about the actual phase of the 'digital dimension' of Architecture.

- The first is "Digital Architecture" as Architecture from digital models.

"Now let us try to question our ideas of architecture "together" with the tool we have with us. And let us ask ourselves, "What if our architecture were to resemble even more the potential of our computerized models?" We would like the flexibility, intelligence, speed and, as we have said many times before, interactivity of our digital model to be the special quality of constructed architecture. A property not just of our computer screens but of our architecture, constructed exactly just as the measured, ordered and centred concept of perspective led to an architecture "in its own likeness and image".

(A. Saggio, Flying Carpets, 2002)

- The second is "Digital Architecture" as Architecture from digital information.

"Information is the greatest commodity of this age. The vegetable we buy at the supermarket is 90% information (research, marketing, distribution). The same, only more so, goes for appliances or automobiles. In addition, more and more people are producing goods that are "pure" information. In other words, information is the key to this age and electronics are its main tool. Now in order to talk about the Architecture of Information, because of the very nature of the subject, we must necessarily take a short step backward." (A. Saggio, Interactivity, 2002)

But, we prefer to use the word 'digital" to suggest a new *cognition* for the normal way of thinking architecture design. In addition, we prefer to use "virtual" to suggest a new *environment* for architectural design. Why?

Because we thinking that these types of devices are not only "tools". If these types of devices are used as tools, also they are tools… but if there are using in according with there "potential" meaning, in these case, they are not just tools. They are environment of new design cognition.

3.0 THE FOCUS OF THE RESEARCH AREA

Today the challenge, it is not to communicate Architecture through new tools.

Today the challenge it is not to create new digital informative system for Architecture.

The most important challenge is to understand definitely the rule of the new technological resources for Architecture, and specially, if is possible to develop new environments specifically build for sustainability architecture.

We think that the point could be: we must discover "the new" as *resource*, not just using "the new" as *tolls*.

Please note. Resources for ...? What is really interesting for us? What's the focus for the several different disciplines that studying Architecture? And for the designers, the architects, the engineers…what is really important? And, in the same time, we must understand what it is really important for the people.

Probably, it is possible conclude that for designers and for people and for a research point of view the most important focus is to design an Architecture *really* for people. What means Architecture for people?

Definitely "an Architecture" for increasing the life quality standard of people housing. But, on this direction, is it perhaps possible to thinking an Architecture that doesn't include the request of sustainability? At today, could Architecture for people don't be sustainable?

4.0 Sustainability and complexity of architectural design

The sustainability of built architecture means the sustainability of designed architecture.
Today the architecture design is always more and more complex.
The most important point is the control of the total process: from the idea to the end of the life cycle of the building. Thinking in terms of sustainability means thinking in terms of the total process.
The concept of the sustainability of the buildings, in fact, is closed related to the concept of the durability of the buildings themselves.
How is possible to maintain the complete control of the total process/product during the design/construction/management phases of a life of a building?
The "impact" of a sustainable choice, must to be evaluating during all the process, to be *really* sustainable. The benefit is during the time. To find the "best" choice, it is important to have the possibility to evaluate different options, and then to select the "best". It is necessary thinking in terms of "build as one", in terms of a holistic approach.
A sustainable choice must be validate from a several points of view.
The choice must be "sustainable" for the evaluation of many different actors, with different background, and different knowledge. And these actors must select, all together, the best design solution. Actors must have an efficient level of interaction between themselves.
The designers must have a fast and complete form of interaction. In the actual normal way of thinking the architecture design, the sustainability of the product, includes the possibility to management the complexity of the total process. To manage the complexity of the process/product the concept of interactivity is a very important keyword to understand the challenges of the future.

5.0 New cognitive approaches for architectural design

"Build as one" = "Design + construction + management of life cycle" as one.
How is possible to obtain this focus in the complex world of building construction?
Please note that the complexity of process/product "iter" increases every day. Developments of products, specialization of actors, continuous changes of rules and lows, administrative needs, bureaucratic procedures… are every day more complex.
The number of the pieces of puzzles increases…then it is necessary to allow a complete interaction between all these pieces of puzzles. The traditional way of interaction between actors, can not offers a really answer .
To save money and time, choices must be fast… often it is really impossible to evaluate different solutions to resolve problems and needs of design, because it isn't time, and people must design fast. Time is money, it is impossible to extend the time of design.
It is necessary to find new methodologies using that will be possible to compare more solutions. In fact, the sustainability of the choices means the sustainability of the design, and the sustainability of the built architecture itself.

Today we have several resources from ICT technologies. It is important to develop ICT technologies in according with the architectural needs. The focus is to understand if is possible to develop, not just tools, but a new *design computing and cognition* too.
Complexity of the process/product probably needs new resources to develop and to control this complexity itself: these resources are only tools? If they are only tools, we can not have expectation about real answers, about real solutions. We can have only a pure "actualization" of traditional processes and procedures.
From the overlap between Architecture and ICT we think that today it is possible to obtain a new design environments where understanding the *real* consistence of the actual challenges.
A new "environments" for architectural design could be an answer for the new architectural needs, especially for the needs in order to obtain a sustainable buildings.
It is necessary understand how the new ICT technology could be help the architectural design, and if the traditional approach of architectural design, could be changed from new cognitive resources.
The overlap between architecture and ICT technologies could be a new research area for have results and benefits.
Nowadays there are two important research areas that studying the changes of the traditional architectural process design, introducing a new computer scientist resources: the *Collaborative Design* and the *Building Information Modelling.*

6.0 The "challenge"

The environment has always affected the view of design. Changing environments means changing the view of design. We think that "the environment" could be an incubator for the view of design… but what means, at today, "environment"? This is a cognitive evaluation.
In our research vision, "environments" is not just a physical dimension, but a theoretical one. The theoretical approach has always two parts: one is cultural, one is technical.
Both aspects are strong related. The environment that has generated the conception of Pantheon, was the mental dimension of mathematic and geometry.
The environment that has generated the conception of renaissance Architecture, was the discovery of modern perspective.
Today we think that the environment, more then others factors, can generate the architectural conception: the modern concept of design environments is strong related with the meaning of "virtual environment".
The virtual environment as "site" of design, is a way to understand the always news relationship between the designer and the reality. This way is necessary in the actual world. Could be a great mistake don't understand the actual transformation of the society.
The meaning of space and time are definitely changed. And it is so evident that "the wheel it is not the modern leg". (The wheel has dramatically changed the previous normal way of thinking reality. Using wheels people has changed the concept of space and time: using wheels the word was not just bigger, but also "different"). Virtual environments are a different dimension to understanding reality, and to understanding the object of design as future

part of this reality. Processes and products must be change, because are changing the environments where they are developed. There are different samples of these new virtual environments, with different levels of complexity.
The challenge is to understand the relationship between these virtual environments and the possible benefits for the architectural process/product.
In addition, the challenge is to understand if is possible to design new environment in that the architectural view can be modified.
Basically: we have two different colours (red for architecture and white of computer science) or we could thinking a new pink environment, where is possible to develop for the future new ideas for the red architecture and the white computer science?

7.0 Virtual cognitive environments

Thinking the actual development of the collaborative design research area for Architecture: The research proves that the sustainability of the process/product is strong related with the design of new methods to resolve the interaction between actors, during all the time of design.
The focus is to obtain a new "logical environment" where could be possible to have a complete interaction between people they working on the same design, but, for instance, in different places or time. (Gross e al., 1998; Jeng e Eastman, 1998; Reffat e Gero 2000; Kvan, 2000; Kolarevic e al., 2000; Kalay, 2001; Rosennam and Wang, 2001; Woo, Lee e Sasada, 2001; Carrara e Fioravanti, 2002)
Designing this "logical environment" (and the related new software) means understanding new opportunities to realize this designers-interaction, in order to obtain the sustainability of the building design/construction/management.
In fact, actors are invited to use these new collaborative working environments to design the future construction. They can work really together, even if in different times.
What is changed is, i.e., the normal way of thinking the process/product. No more a sequential phases with different actors, but a new phase with a simultaneous interaction between many actors.
The background of singles disciplines can be shared, from one actor to the others, in different levels and in several manners.
The Building Information Modelling has a similar approach: to build a logical model of the future building, in that all the data are strong connected. Today there most important software house of BIM software are Nemetschek (Germany) and Autodesk (Usa).
In addition there are several research works about no-standard solutions too .(Eastman 1999, Laiserin, 2000, Fiamma 2003). The BIM model is a "unicum" with different knowledge levels. Actors must think the building as relationship between technical elements.
These constructive elements are generated directly (in parametric mode) in the virtual space. From the same model, every actor can extracts output on different format (3D objects, schedule, traditional data papers, animations, drawings).
To use BIM approach is necessary to think the building directly from the constructive details. In both approaches, changes the concept of the design itself.

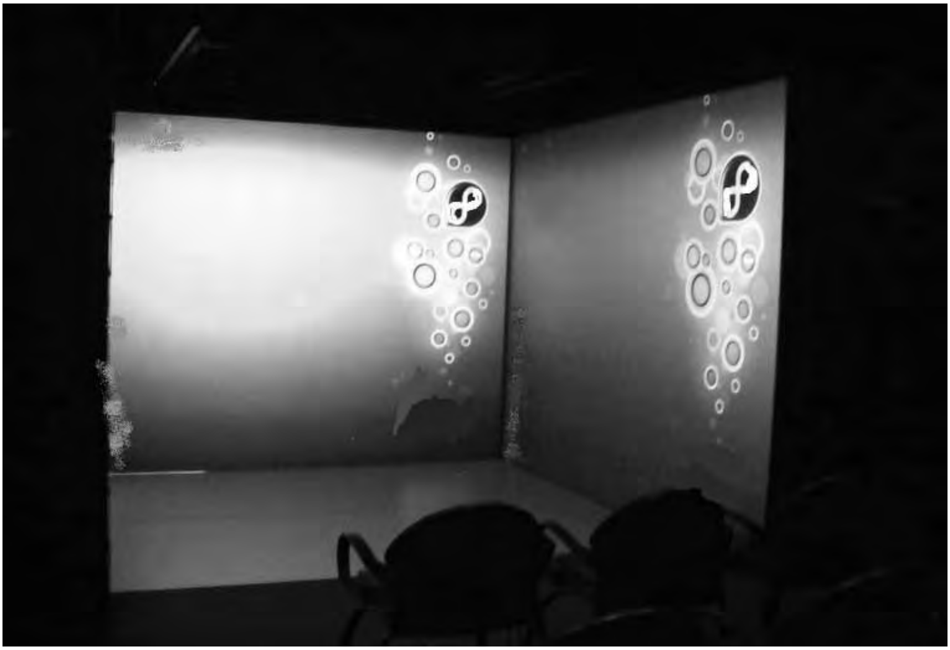

Fig. 3 - "4Walls" Cube Automatic Virtual Envir. Purdue University, Indianapolis, Indiana.

Fig. 4 - "4Walls" Cube Automatic Virtual Envir. Purdue University, Indianapolis, Indiana.

The interactivity mode design that allows a holistic approach, changes the way to understanding each contribute for the common work. On this way it is possible, i.e., thinking more solutions in the same time, and evaluate all possible benefits from a different point of view. Every solution could be verified from the beginning of the process.
Even if the process could be really complex, the final solution will the best between several options, and that means, i.e., to have less expanses during the life cycle of the building, or to design the building in according with really sustainable needs.
Different actors have had the possibility to evaluate more aspects involved in there choices, but only if they have specific environments where that it is possible.
During the last years the logical models of collaborative design and building information modelling are changing. The BIM technologies are more and more powerful and include all the disciplines involved in a building process. About C.D. vision, there are today several studies in order to move from a one single centred logical-mode, to a different system, in that it will possible to change different levels of knowledge through different levels of interaction.
The collaborative design approach offers the opportunity to new design cognition; based on a new possibility of interaction between actors they are involved in the design process.
The sustainability of the future building is strong related to the evaluation of several options in order to choose the best final solutions for each aspects of the design/construction management process. In the virtual environment, the actors can have a form of interaction with the model of the building itself. Is a logical-functional scheme that can have different format of output?

8.0 Interactivity of designed architecture for the sustainability of built architecture

To organize the several contribute from different actors during the process, it is necessary to find always new ways. In fact, to communicate the concepts, the backgrounds, the choices, virtual environments are day by day more sophisticated. From some years, the research about virtual environments evolves to rich virtualised environments. The goal is to verify the conception of the design before the phase of the building construction.
A sustainable choice means to understand how will be the performance of the building during the years.
Is very important to understand the possible design's mistakes before the construction of the building.
In addition, when actors work all together to finalize the results, they need environments that allow a very complete mode of interaction, between they and between them and the model of the building.
The model of the building, today, is not just the model of the shape (a geometrical model), but a constructive model (i.e. in according with the Building Information Modelling Techniques) that include a very complex data base of each constructive components. What is important is to find the best mode to have a real interaction with a "complete" building model.

9.0 Our Lab of Immersive and Interactive Architectural Design

One year ago we have design, build and calibrate a new lab in our University, one of the firsts in an Architecture or Civil Engineering Department in Italy.

The system is an immersive device with grab mode for virtual objects. The system is completely tracked and several people can understand the interaction mode of the operator. At this time we are exploring the overlap between real interaction with a 3D Bim objects and scientific perceptualization of data design. An important follow out is the cognitive implication of this procedure for the traditional architectural design.

Today the "state of the art" of the new technologies, allows to touch the virtual model and to have a force feedback. In addition, different actors from different places can work on the same model, in real time, in real scale, in new interactive virtual environments rich virtualized.

10.0 Sustainability of the architecture as a complete control of the design choices?

We think that for a really sustainable architecture, architectural design must increase the possibility to control the complete process design/construction/management.

Controlling all the aspects involved in the process, means to reduce the possibility of design mistakes, and, in a second time, to reduce the possibility of construction mistakes.

Collaborative virtual environments are the "places" for the future of design/construction/management process., a new resource for a sustainable architecture. The way is already open: designing new environments for the design of new buildings in according with the sustainable way of thinking Architecture. We are working about.

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C. Frettoloso [1]

ARCHAEOLOGICAL SITES AND MEDITERRENAN CITIES: ACCESS AS AN INSTRUMENT OF INTEGRATION

1.0 Archaeology and its context, the need for integration

The Mediterranean city manifests itself in multiple forms that derive mainly from different geological types of underlying soil, the proximity of the sea, the building materials at hand, the climate, and various historical events that took place there. Inside this variety it is possible, however, to trace certain criteria that, on one hand, concern urban stratification and, on the other, urban transformation.

The current image of the Mediterranean city is, in fact, the product of a complex series of events, both tangible and intangible, that have occurred over time and that represent the creation of new itineraries.

The need to adapt to both major and minor changes causes a continuous renewal both to us and the environment that surrounds us. Changes that deepen those material and immaterial layers that make up our cities. To avoid losing contact with what we were in the past, it is important to create a dialog, any form of communication capable of sustaining an integration and awareness of the past, both in terms of time and of space. It is important to establish links, a "zipper" network to preserve the integrate layer of events and objects that otherwise risk being destroyed or lost due to the human need for change and modernization.

The knowledge of the past becomes a unique key to the understanding of contemporary cities. Our attention moves then to the theme of integration, or more specifically, to the strategies and tools needed to achieve this goal.

In particular, this study hopes to focus attention on the delicate relationship between city-archaeology, transformation-conservation, access-heritage, and on the central issue of use as a dual instrument of dialog and possession. In fact, cultural heritage in the field of cultural exchange forces us to rationalize and revitalize public access and to define methods of intervention capable of optimizing the objectives of extending knowledge and maintaining conservation. This should be done with an awareness of the specific archaeological features of each city, together with the specific needs of urban renewal.

When we "work" on archaeological monuments and artefacts, it is always difficult to define the discussion of the perimeter of the area. This problem derives mainly from the

changes in expansion that have taken place over time. It is a strategic knot inside the tight network of cultural-spatial relationships found in each specific context. The cultural relationship concerns, above all, the historical link together with the more complicated one with the modern user. Whereas for the spatial relationship we mean the physical connection between the archaeological monument and its context. This articulated system must be kept foremost in mind when developing specific strategies to extend knowledge on one hand while maintaining and integrating the historical context.
Knowledge, use and integration are the prime requisites for preservation. "The search for appropriate access to archaeological heritage, a universal wealth belonging to all mankind, becomes a principle motive for a new compatibility between conservation and access, between respect for the integrity of historical-artistic heritage (…) and public enjoyment of the same."[2]

2.0 Sustainable strategies for access and use of archaeological heritage

The code of cultural heritage and landscape defines protection as the "*exercise of functions and the regulation of activities based on adequate information to identify objects inherent to cultural heritage and to guarantee their protection and conservation for public use*".[3]
The term "access" goes beyond the literal meaning of "enjoyment" to include the final goal of protection and conservation. It has a more articulated and complex meaning which include delicate questions dealing with social-economic and architectural considerations. The first reflection to make concerns the relationship of cause and effect between "public access" and the "deterioration of the artefact", monument, or site. This motivates a search for experimental, innovative solutions aimed at finding sustainable use.
It is easy to understand the reasons for this which can go from decay and deterioration caused by extensive walking over a site to damage caused by emissions of carbon dioxide often found in poorly ventilated rooms overrun by hordes of visitors. The first problem is the need to rationalize the itineraries. From a strictly architectural point of view, an archaeological site requires walking paths that do not visibly disturb the ruins nor alter the building materials while guaranteeing continuity and clarity of the tour. Permission for public access to an archaeological monument involves numerous, often invasive interventions[4]. It is necessary to overcome legal problems dealing with transforming a site into an open air museum, to provide necessary protection-alarm systems, to guarantee the safety and well-being of visitors, to ensure easy and safe access to the site, to create adequate lighting and artificial illumination.
There is also a problem of interpreting archaeological texts and transferring this historical information to the public. The cultural level of the user must be considered when dealing with texts and artefacts which are "incomplete and mutilated".
The access strategy referred[5] to is mainly intended as an instrument of knowledge and possession of the cultural heritage which is, in itself, a project. The lack or inadequacy of such has serious consequences for the heritage, both in terms of deterioration, interpretation, and understanding.
An access system, characterized by a high level of information developed for the needs

of a specific user, is sustainable considering the following guidelines:

- Protection
- Well-displayed, easily read information
- Physical accessibility to the exhibits and the site

Conservation is tightly connected to the concept of access and use intended as the final goal. Let us consider the rationalization of interconnecting systems with the target of avoiding overcrowding and reducing the flux of visitors in a particularly sensitive area. The ability to easily "read" a site in order to better understand historical links and contexts must include special itineraries, organized chronologically within a "story" or narrative to promote interest and understanding of complex past events.
Correct access also reconsiders difficult aspects of concept linked to graphic indications of the pathways.
The itineraries of a museum system should be changed according to each individual site, to the technological level of the infrastructures, and should include the following features:

- Logical-visual continuity: Critical aspects concern the need to create for each sector a continuing narration or story. This means that information acquired in a specific part of an itinerary can be easily recognized and found in later moments of the tour.
- Visitor overcrowding and flow: The first requirement to satisfy is avoidance of overcrowding in both directions, by establishing a main system which reduces to a minimum points of intersection between the two directions (these might occur in particularly panoramic or functional areas). Especially in open spaces group access will be frequent. Therefore, there should be areas organized and equipped for rest, snacks etc., these could also be organized with a constant distance between them (so as to become an additional reference point). Overlapping of groups and individual visitors should not be underestimated. Slow down and traffic jams can easily occur so a well-planned route should create stops for rest, refreshment and additional explanations.
- Easily read graphics for itineraries: The graphic network works to reduce apparent confusion by showing an unfamiliar landscape in a logical sequence. Using the typical museum graphic method system we should avoid a labyrinth where the visitor feels he is always returning to the same place and not, in fact, completing the planned circuit. Undifferentiated charts should not be used since they confuse the visitor and slow down the visit.
- Articulation of the itineraries: A well-planed exhibit, based on scientific criteria, requires clarity and easy reading but it need not be boring. It is important to prepare the visitor for the various experiences that will follow. There are multiple ways to do so, from a gradual informative preparation, a regulated slow down of the itinerary, a partial perception block, in order to reach the distance desired for the appropriate comprehension. Expanding and narrowing the passage of visitors is a simple way to achieve this. The use of bridges, doors, and whatever else may be necessary to make the visit easy and comfortable. These can also have a dual function with technological and informative elements.

The use of computer technology to expand interpretation and understanding of archaeological heritage constitutes a stimulating research area with significant developmental prospects. Public presentation of archaeological heritage requires more then traditional instruments to satisfy the modern day user. Specifically, the application of multimedia and virtual computer technology, especially on site, seems to offer a valid response in terms of knowledge and interpretation. In particular, computers offer the capacity to create excitement and stupefy the spectator by using virtual technology to recreate lost scenes. The use of multimedia technology as a support at archaeological sites (inside an urban area) plays a strategic role regarding the heritage in its individual context.

I refer, for example, to the creation of informative spaces where it is possible to reconnect the urban fabric with the pre-existing archaeological one, evidencing the urban, social, and formal aspects. Working on the "information" components offers an opportunity to safeguard the material from useless harm at times when intervention might provoke damage. It could represent an alternative to undue, unnecessary intervention6.

An access system that contemplates integration as an acquired method of visiting a site with innovative computer support technology gives us the best possibility of reaching our target. An easy "reading" of the site intended as the possibility of establishing an authentic relationship between the user and his heritage. He would be better able to understand the evolution of the material and, above all, he would be more able to "read" or imagine the "missing pieces".

There is a stronger possibility of creating a winning itinerary which captures the visitor's attention. It could create a kind of story in which people and events seem evident, and one in which the visitors understand the relationships and their unusual aspects. Sustainability, from this viewpoint, should be understood both as a possibility to leave the artefacts unchanged as well as to motivate public interest in the role of protagonist. The visitor is the principal actor in an informative itinerary that may use high level technology in a new way to communicate with historic material and with the context that surrounds it.

Notes

1. PhD in Technologies of Architecture and Environment, Dep. of Recovery and Construction of Architecture and Environment, Second University of Study of Naples, Faculty of Architecture.
2. L. Manzione, "Archaeology and city: the transgression of limits", 14 may 2000, from www.architettura.it.
3. Regulation "Code of Cultural and Environment Heritage", art. 10 Law n.137/2002, part I, (art. n. 3).
4. The degree of invasiveness in archaeological areas brings up another problem still being researched and under open debate: accessibility and the relative problem of eliminating architectural barriers.
5. The subject under discussion is the core of a PhD thesis written by Caterina Frettoloso entitled "Low and High Tech applications for the cultural use of archaeological areas", tutor prof. arch. M. Marocco, PhD - Department of Research in Technology of Architecture and Environment coordinated by prof. arch. M. Isabella Amirante.
6. The use of multimedia technology on site, besides being an instrument to expand knowledge, offers the opportunity to elaborate methods of alternative interventions in the policies used to preserve archaeological heritage. The introduction of multimedia systems used in different levels of interaction has brought a new outlook to the thesis. Attention has changed from investigation of the excavation to that of understanding and using the heritage.

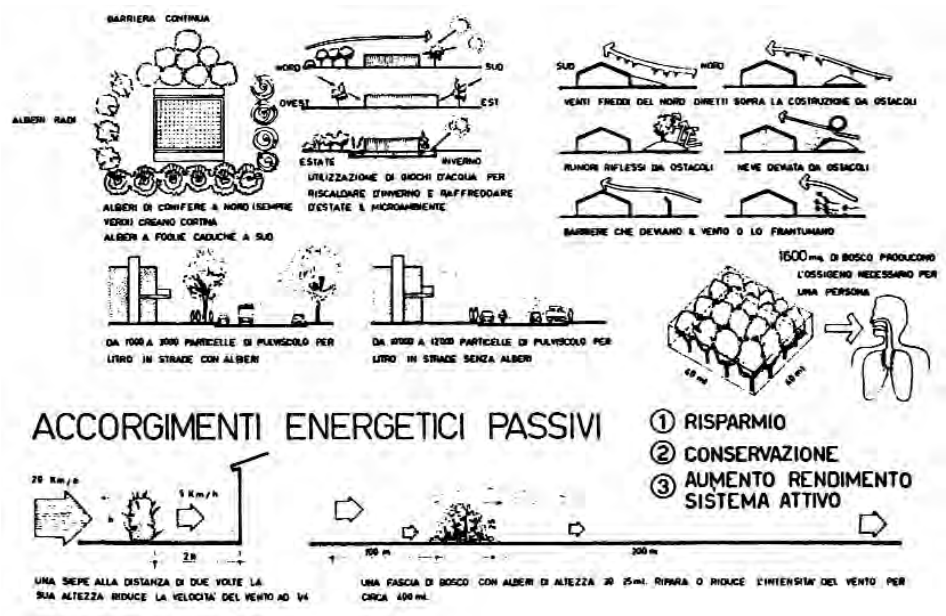
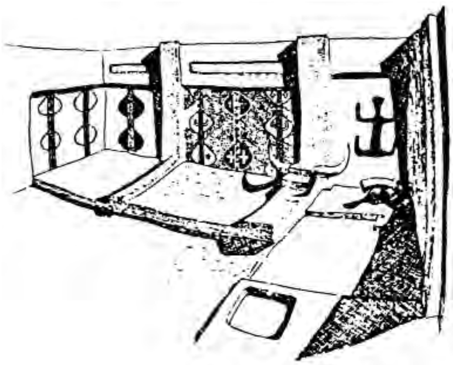


Fig. 1 - Expedient for climate correction



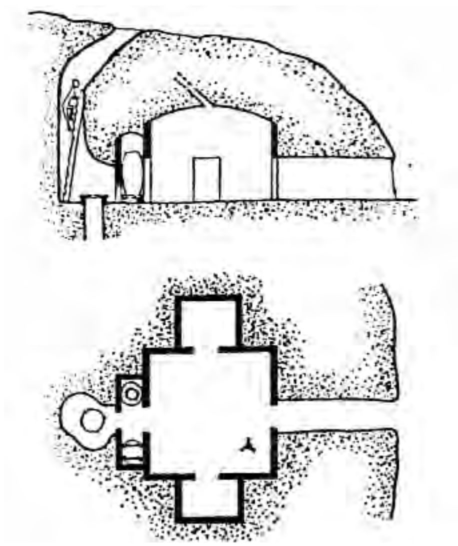


Fig. 2 (top) - Beds, couch , sits, were included in ancient Anatolian houses

Fig. 3 (right) - Section and plan of nigerian underground house

A. Gison [1]

LANDSCAPE AND NATURAL ENERGY ON THE COSTIERA AMALFITANA

The topics proposals from the employment of natural energies to low cost regard use it directly of the climatic factors us species if reference to the configuration of some organisms inhabited to you is made with only local characters. The climate and the nature of the places have contributed to the formation of building systems whose conditions of inhabited well-being are assured from use of natural energies saving on elevate consumptions to you accustom them[2].
These aspects have been to the base of programs of search lead in the period of the years fifty with building relative studies you to the production through the experimentation not only tending shapes to obtain better performances of the building one but also resuming theories of technical urban planning approximately the disposition of the buildings on the territory.
The theories that appear in the designs contained in the experiences of Diotallevi and Marescotti[3], in resuming the principles of the iso-orientation, moreover resumed are from some reconstructive models of varying synchronic of the "elementary domus" that obvious in some typologies of the neapolitan hamlet, supply a useful contribution to the attempt to use the "solar one" in the production building.
The sun, the shape, the location of the inhabited areas has had always one they influence in the transformation of the physical space and must be held present in the technological applications for they optimal employment.
Of other part the experiences of Garden City, Broadacre City, of the Siemensstadt, have constituted for the architectonic culture of the Modern Movement an only partial experimentation in how much, also with a reduced territorial index, the buildings did not appear adapt you to a equisystem of the values acclimatize them natural[4].
It cannot also deny that in the constructions the habits of the local populations realized second through some adaptations to the climate emerge constructive solutions originate them are for the shelter from the atmospheric agents who for the contribution of energy to the vital necessities of the individual.

1.0 To plan with the climate

The activity of search that, under the flag to plan with the climate, has delineated some methodological principles and has had the merit to characterize models through which has been rendered

possible one more deepened appraisal del climate and building microclimate[5]**.** The climate with its range width of parameters concurs to suggest to various possibilities of solutions and organizational models of populations[6] that they have realized first shelters inhabited to you [7] .
On the depositor of the relationship man-atmosphere searches in relation to the energy flows have been had that the individual exchanges with surrounding atmosphere (fig. 1).
It seems opportune to remember the function acquitted from the trees that through barriers always greens or to short-lived leaf contribute protected from the wind while the gushing fountain and games can determine one microclimatic correction of atmospheres in the summery period.
In spite of the scientific advances in relation to the study of the climatic aspects us employee from physical factors, like the atmospheric pressure, the brightness, temperature, the twenty, the humidity, the solar radiation and chemical like the composition of the air, the water, of the ground, let alone biological about the conditions of the humus of various atmospheres, the cultivations, the forests, the incognito appears still multiple in how much, also with relative searches to the dynamics climatology, is still difficulty in the combination of the elements that regard relative aspects to the biologic.
In the complexity of such arguments it cannot be denied like primitive people to you, aware or less, be able to use and to control much better the climate for their shelters inhabited to you with ingenious solutions[8]. The relationship between atmosphere and climatic context, offers numerous examples (figg. 2, 3) in which emerge solutions various between they but adapted to the climatic or microclimatic context or such yields with simple adjustments: as an example the parameter of the exposure favouring emphasized in the sun during the winter period favours one good temperature in of inner atmospheres of the residence and on the contrary in the summery period. it seems obvious that such simplistic sagacity, even if fundamental, does not exhaust the problem in how much the individual, presence of other characters of the situated one, like vegetation, tree-plantations, flatulence, vital humidity of the area, and other factors and processes that influence it, is carried to answers, also of technological type, than they are characterized in the installation system.
To take part in tradition[9] of the bioclimatic architecture does not mean to reduce the participations to the choice of the guideline and to the shape of the building but to tie the plan to the specificity of the place and the structures form previewed them the employment of able materials second to enrich the atmosphere and to improve the feasibility conditions.
Such aspects promote the possibility to resume in critical terms us, the constructive and technological characters hand on you from the tradition and in particular to that architectonic premises that the Rudofsky defines *Architecture without architects*[10].

2.0 Local architecture

In order to define the spontaneous character of constructions realized without the aid of technicians, but derived from the culture and the requirements of primitive populations[11] has been delineated the expression of the so-called *vernacular architecture* through which the origin can be comprised and the development of some building typologies that still form episodes of valuable acclimatizes them (fig. 4).
The climate, the atmosphere the materials concurs in varied measure to not only deepen the orig-

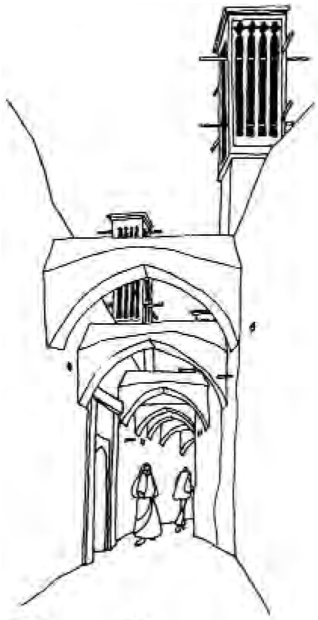


Fig. 4 - A typical Islam street

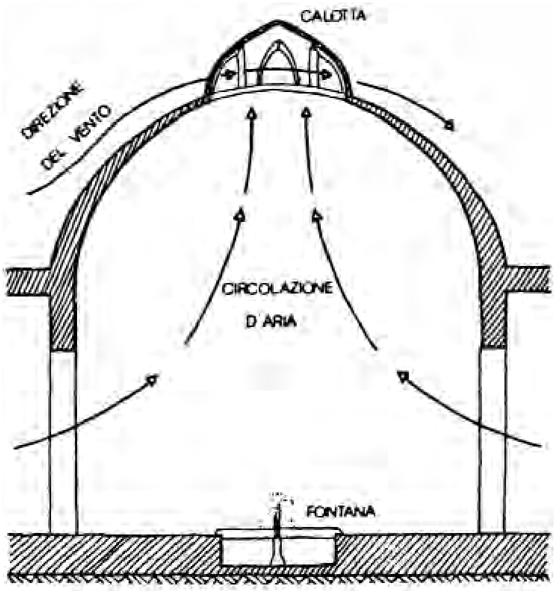


Fig. 5 - Functional plan of Islamic dome

Fig. 6 - Form of Penisola sorrentina e Costiera amalfitana

Fig. 7 - Vaults in Conca dei Marini

*Fig. 8 - Farm-house on the monti Lattari lok-
ing on Costiera amalfitana*

inal connecting woven one but also to comprise the origins and the evolution of the local architecture.

The relationship between climate and architectonic typologies does not constitute only a rich historical patrimony - they acclimatizes but she promotes also plan models revolts to improvements of the comfort inner[12] through ingenious expedient on the activated inner ventilation from systems of cover with dome (fig. 5).

A read again of the atmosphere, on the base of the local characters confirmation the presence in the nuclei inhabits you of the relationship man-atmosphere and the adaptation of the building hands-manufactured ones to the best living conditions also with I use it of natural energies.

3.0 The environmental conditions of the Costiera amalfitana

The conformation and the exposure in the Costiera amalfitana constitutes a natural atmosphere whose conformation allows to characterize in some local constructions the adaptation to the exploitation of the climatic factors being given to place to a paradigmatic system for one review to us of the local typologies.

The course of the Peninsula sorrentina - amalfitana (fig. 6) is characterized from an immediate of the altimetry variation in how much, in a steep area and narrow, it is passed from the sea level to altimetric quotas approximately thousand meters. The position of the mountain chain that ago they give ridge to the peninsula, with its east-west course characterizes two depositors: first all the solar one towards the gulf of Salerno is constituted from the Costiera amalfitana, while the exposed other towards the gulf of Naples introduces little extended steep and with some plateau towards Sorrento. The definition of the characteristics of the area delineates in a narrow area and subordinate to jolts of atmospheric pressure and temperatures quick passages microclimate to us that re-echo on the answer building. The field of search on the topics of the local architecture appears obvious in some solutions of the rural building that it finds in the coastal territory and neapolitan islands a good ones I use of the natural factors. The diversity of the architectonic and structural shapes imposes, in rural house[13], the examination of various factors some of which introduce one tightened relation with the landscape and with the physical atmosphere that influences the conformation of the usable levels of the manufactured one and, adapting itself to the climate, it determines the comfort inner by means of expedient uses you from local constructive techniques (fig. 7).

The disposition of the takeovers, protect from the course of the surrounding atmosphere and the prevalence of inhabited typologies located on the reduced terraces of the slopes constitutes one characteristic peculiar of the takeovers on the Costiera. Their diversity, some with defined exposure to equi-solar towards the Costiera amalfitana and others to hilly or looking on to the gulf of Naples, is emphasized from the expedients for the exploitation of the bioclimatic member for the inner well-being of the atmospheres that takes part in the design of the residences with openings and terraces supported from arched in masonry, covered roofs of tiles or typical cupolas formed from extradosed times (fig. 8).

The depositor of coastal the little steep but exposed to noon, for attenuating itself of the clino-metric conditions, is marked from an agricultural activity that is placed side by side and prevailed on the peach.

The characteristic trellis works and the terraces have a bioclimatic function of primary importance, in how much offer a differentiated permeability of the elements of frontier of the residences to second of the external climatic conditions for the attainment of adapting comfort acclimatize them (fig. 9). Such situations, associated to the landscape, constitute that entirety that has been defined climber scenographical architecture[14].
In this context the rural dwelling, also giving space to aspects forms them, it is completed in its structure from the agricultural use and dipped in garden it cultivates to citrus groves and vineyards to you.
But except little exceptions, the typologies are nearly always rectangular and of simple shapes, ugual a number of premises to the flat earth and the Association of Bologna, you nearly sew some always with the hearth low placed side by side from the fireplace for the winter heating, the generally external scales and the covers to time or with bitumen or cemented flat terrace (fig.10).
The use of the traditional materials of is much diffusing: to the heap of stones gained from the cemented local cliff with mortar common in the carrying structures, ago reply the use of porous and light materials, as the bricks it pierces to you or the so-called ones *mummarelle* used in order to lighten supports of the times and the layers of lapillus soak to you in latte of lime[15]. The technique of execution of this cover, entire executed by hand from the architect-craftsmen by means of a particular beating, concurs to obtain, beyond to a favourable condition of comfort inner, an pleasant effect in how much on the finish grain is developed, with passing of the time, a patina moss vegetable that contributes to the microclimatic condition inner to the premises. To such proposed, must to remember that the realization of the extradosed times by means of is gone of cooked it is still alive in Apulia, Lucania and Calabria provinces influenced for century from the byzantina tradition.
According to Pane type of construction cannot acknowledge as it graduates them evolution of the spherical dome or that conic section of the *trulli* in Apulia.
Finding again a common origin of structural types pertaining to works of various countries can lead to an abstract plan with which it is risked more not to recognize the particular one than those regional shapes that, for being historically understandings, go studied in their peculiarity.
The bioclimatic defense of the shapes of cover lowered of the houses of the coastal one can be understanding from climatic requirements like the strong sun exposition, for their exposure to the solar beams but above all in order to facilitate the sliding of rain waters let alone from the availability of the local material of construction.
Other element to read as bioclimatica defended it is the frequent external and inner plastering of the houses with the characteristic whitewashing of the walls to the aim to reflect the solar beams. Such characteristic and formal aspect has often made to be born the misunderstanding of a heritage of Arabic influences on these types of factories.
According to Pane[16] **"***Arabic houses are in the Mediterranean east that along the coast African.... is normally to flat cover. Examples of times or cupolas, in these regions only are supplied from the mosques or from burial monuments.....d' other admitted part also the Arabic derivation also for the houses to time of the Campania, is just in Sicily that because of the long Arabic domination, such derivation would have had to manifest itself: and then like explaining the fact that just in Sicily is rare much the houses to time? Instead these s they find again much often in the Greek*

Fig. 9 - Terraces in the amalphitan country landscape

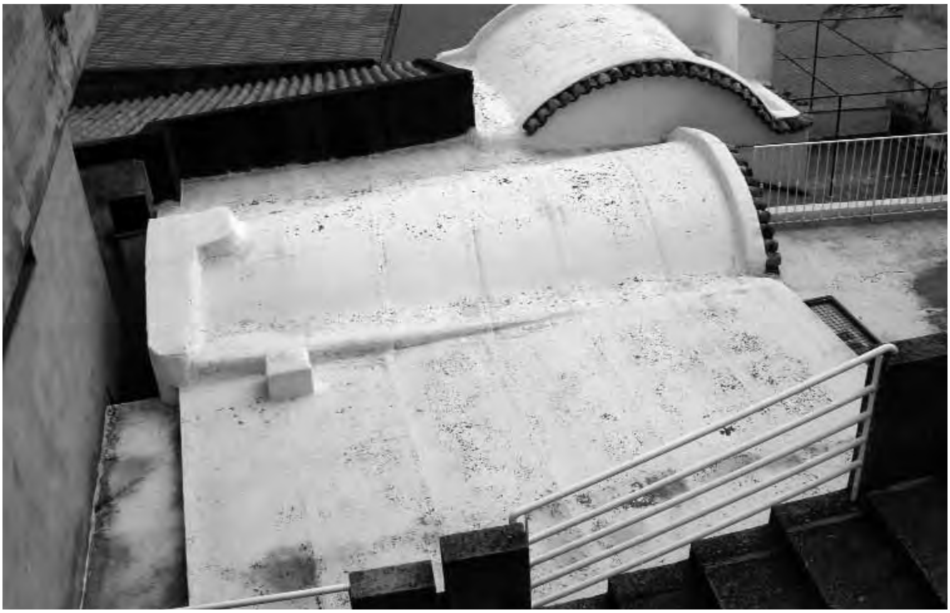


Fig. 10 - Covering of rooms in Costiera amalfitana

islands: as an example in those of Mikonos and Santorini, where it is possible to state the presence of environmental conditions them and climatic many neighbours to the Neapolitan coasts: scarcity of lumber, vulcanic nature of the ground, presence of pozzolana and that is of a material to prefer for its used lightness and in the construction of the vault “.

4.0 THE CITY TAKEOVERS ON COSTIERA AMALFITANA

A recognition of the characteristics of the coastal atmosphere cannot neglect the entirety that the anthropic modifications and the natural members have induced on the territory whose several and complex geomorphologies entities, have conditioned in peculiar way are use it of the ground that the organization works them of the territory. The southern depositor of the chain of the Lattari mounts extends along the coastal arc, from Positano to Vietri, whose city model (fig. 11), characterized from the presence of remarkable landscapes values and acclimatizes had them also to the strait relationship with the sea, appears compact, while on the higher coast developing itself in a typically agricultural-forest within, hires scattered character.

Exceeded the tunnel of the provincial road that, salting from Castellammare di Stabia of colleague two depositors of the mountain chain, opens the scene of the plateau of Agerola whose territory is formed from several villages.

The territory of Agerola is crossed from a deep one and rugged impluvium o that it divides the fractions that have been gone developing around points of particular interest of the territory, designing a landscape characterized from meandering paths that, going back the ridges of the hills meets, in the higher part, the luxuriant mantle of the coppiced forest. Crossing the nucleus Caprile and Campora, the locality of S. Lazzaro is caught up, to peak on lived of Conca dei Marini and true and just the observatory on the Costiera one. In the reduction the intense work is distinguished with which they have been rendered practicable inaccessible lands on which they have been constructed isolated houses with annexed gardens on terraces supported from alternated masonries to dry to groups of houses to terrace that they are met as is approached to us you wrap coastal.

The practical one diffused much of the conduction of the vine to trellis work in the cultivable spaces, obtain beyond to effects acclimatizes them much happy also function of climatic correction in how much, extending on the covers of the houses, not only allows to refresh below atmospheres but also protect from the sun the superficial mantles.

Several villages there are also in the scene of the takeover of Tramonti near the Valico di Chiunzi in which the geographic aspects and the anthropic takeovers they are melted in an unit acclimatizes them similar to that of Agerola with goes it them, uniform in two deep ones basins, crossed from the torrent *Regina Major* who ends up to sea in the adjacency of the takeover of Maiori.

The sun, the glare marine the quality of grounds, orography of the area with to the source presence numerous and the various exposures of the depositors have determined the development of one remarkable variety of microclimates due also to the diffused presence of slopes generally much steep. The variety of the coastal landscape does not lack to introduce some episodes of exceptional value acclimatizes them between which the fjord of Fury whose tightened inlet it prolonged to the inside of the coast determining vegetation and microclimatic conditions of remarkable interest. A relative analysis to the more recurrent typology in the traditional amalfitana build-

ing is constituted from the aggregation of rising of elementary cube to a flat solo, often with a small porch on, realized with masonry carrying in platered local stone with time to spherical segment or lowered, vulcanical jetty in work with inert of nature that concurs to reduce lessened the support and, to concluded work, makes to emerge on terrazzo the upper wing surface of the structure.
The conformation of the cover and the materials employ allow to you to simplify the waterproofing problems and outflow of the meteoric waters that collections on the supports lowers to you, water with drain-pipes gargoyles or embedded in the thickness of masonries.
For the smallness of the level ground spaces in uneven orography of the places the more recurrent coupling of the elementary building module is that one in "line" but in the inhabited places it lives to you meet articulated shapes of aggregation more. In the isolated constructions on single lotteries, the typology in "line" comes presented on two levels: in some cases the constructions are enriched from open galleries and climbing exteriors with scales in order to catch up the advanced plan.
In the villages it lives to you, the articulation of the constructions is made up in complex structures that become a member of in a driven in one to intercross themselves of penetrations conditioned in great part from the nature of the areas on which they have been constructed and that gives to interesting place solutions acclimatizes them.
The reading of the territory, on the depositor of the gulf of Naples, characterizes not only the numerous emergencies acclimatizes them that they characterize the smaller steep regarding the Costiera amalfitana but also remote traces of fortifications to defense of the ancient Republic of Amalfi whose predominion has conditioned the increase and the development of agglomerates city premises to you.
The organization of these last ones, like as an example that one to average coast of which had Pimonte, in origin, to the fusion of various rural inhabited places isolates to you, also invested in the time from processes of degradation and exact opposite to areas congested and ambles to you rural to low demographic density, seems to suggest also territorial political new hypothesis with the use rations them of the existing resources, in order to experiment and to stimulate initiatives of architectonic recovery of the Castello angioino of Pino or emergencies acclimatizes them.
In the high part of the famous depositor the presence of extended forests of chestnut tree coppiced and high stalk while the typology of the houses appears rigidly conformed in order to face the climatic factors us and the rare ones snowed in the winter period. The finding of wood united to local the limestone stone, has made so that these were the used materials more in the constructive activity of the zone also because their use particularly was adapted to resist to the humid climate and the rigid winter temperatures.
The massive conformation of the old rural houses, of usual, to two plans connects to you between they from inner scales (fig. 12) with the flat destined earth to agricultural uses but equipped of the necessary external spaces in some case it delimits to you from arched, is from searching in a better compatibility between the thermal ability and the permeability of the elements of frontier in connection with the twofold direction in which the thermal energy moves.
Regarding the characters it works them and structural who have been notice to you in the part less steep of the coastal amalfitana, common aspects can be found are from the structural point of view that for the employment of the local materials: but the massive masonry use cannot not be found

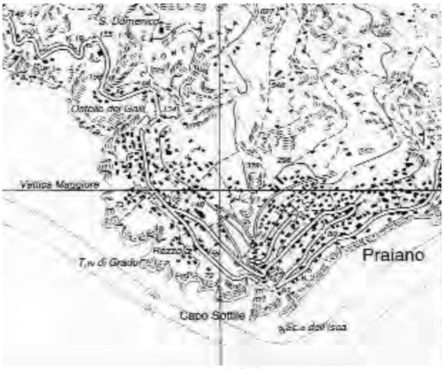


Fig. 11 - Little countries in Costiera amalfitana

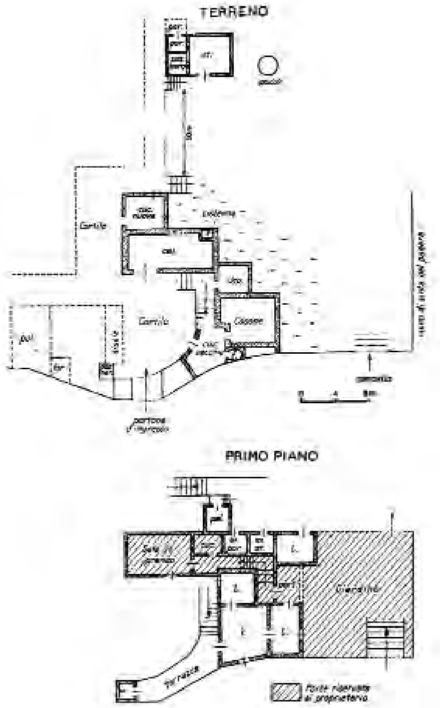


Fig. 12 - Plan of rural house

Fig. 13 - Ancient farm-house on hill of Sorrento

much of gray local tuff regarding that yellow of the coast of Pozzuoli for its vesuviana origin (fig. 13).

The reason of massive structures is from searching in the direction of a better compatibility between the thermal ability and the permeability of the elements of frontier in connection with the twofold direction in which the thermal energy moves. But the masonry necessity sturdy is obliged also from the system of covers formed from estradossate times of the type already described constituted from the struck one of lapillus, replaced for requirements of usury of the time, with roofs to stratums of interlocking tile the microclimatic aspect of greater interest regards the system of protection from the atmospheric agents of the extended citrus plantation of the peninsula that prominence in the landscape of the zone. Such structures, supported from wood poles, are constituted from interlaced cane panels that they allow a ventilated shelter of the plantations that are much sensitive to the cold and could be damaged in the quality of production from exposures to low temperatures.

The correction of the microclimate involves economic aspects of survival not little account even if part of territories a time densely producers has been assigns to you to tourist activities of greater rendering.

5.0 Conclusions

From the delineated schematic picture emerge as with architectural and town-planning traditional it is expression of an able entity to adapt itself to the characteristics acclimatizes them and climatic, recognizing to the local populations the ability to elaborate a habitat model legacy to the strait local relationship between atmosphere and resources.

Notes

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4. P. de Meo, (a cura di), *Una casa equisolare*, Fondazione "Ivo Vanzi", Napoli, 1981;
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11. B. Rudofsky, Architecrture without architects, Museum of Modern Art, New York, 1964;
12. "Etnologiche culture" in D.A.U. "Dizionario Enciclopedico Architettura e Urbanistica" diretto da P. Portoghesi, Istituto Editoriale Romano, Vol. II, Roma, 1969;
13. V. Bacigalupi, C. Benedetti, *Progetto ed energia*, Ed. Kappa, Roma , 1980;
14. M. Deep, L. Franciosa, L. Pedreschi, D. Rocco, *La casa rurale in Campania*, L.S. Olschy and, Florence, reprint 1986;
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16. R. Pane, *Capri*, Edizioni Scientifiche Italiane,Napoli, 1965.

Fig. 1, Fig. 2 - The "stazioni balneari" between 1920 and 1950, with old sails and orientated tents; the same stazioni today, with catamarans and the typically dense "ombrelloni".

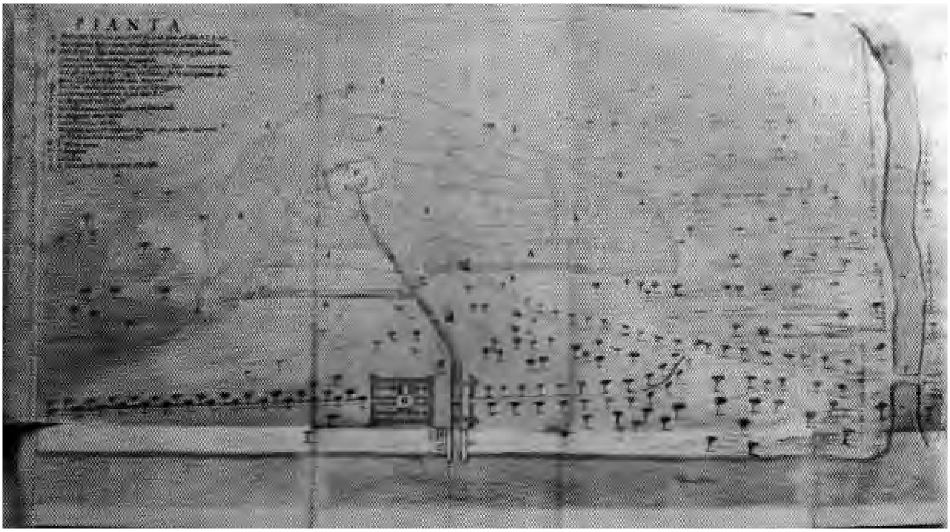

Fig. 3 - Map of the salt ponds and Cervia Nuova, XVII century

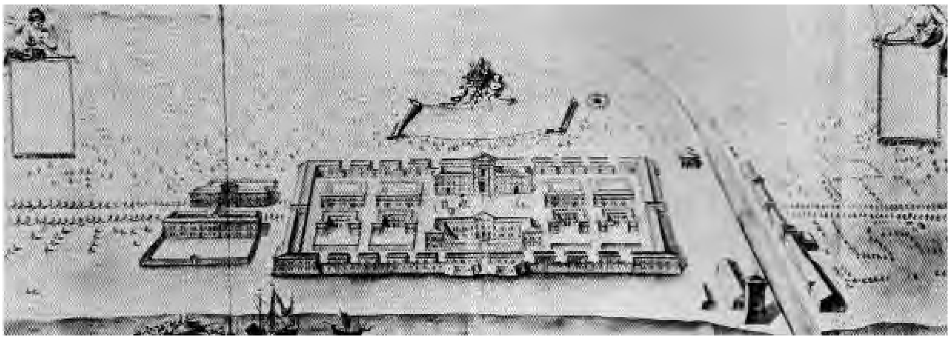

Fig. 4 - Perspective view of Cervia Nuova, pen coloured washes, Windsor, XVIII century

L. Guardigli [1]

CERVIA - MILANO MARITTIMA: THE MERCIFICATION OF CULTURAL REGIONALISM

1.0 On regional architecture

Regionalism, intended as a strong link to uses and customs of a region, is usually translated into *regional* – or *vernacular*, or *local*, depending on authors – *architecture*. In many cases regional architecture is well identifiable inside its defined boundaries and building types are recognizable; sometimes these boundaries are flexible and unclear, depending on historic transformations, and architecture easily reflects external influences. Regional architecture is built over the years and identified by some characters that can vary from the repetition of entire building types to the presence of some architectural details, or specific materials, or colors, etc. Identifying typological variations inside a region is always a feasible operation: the stronger the cultural and political identity of a place, the stronger the characters of regional architecture and the success in the identification process.

It is interesting to question if there are places where regional architecture does not exist, or has been eliminated, or it is so weak that is very difficult to analyze. This should be the case of big metropolitan areas, all over the world, or newly developed, or deserted areas. This statement is usually uncorrect. In conurbations like New York, for example, one wouldn't expect to find any sign of regionally recognizable architecture. Surprisingly some very typical buildings of the New York region, extensively described as such, are present in the City or around the State.

As we said before, regional architecture is constructed over the years. Nevertheless, this construction can be quite recent. In this second case it is probably more correct to call it *regionalist architecture*. The term *architecture régionaliste balnéaire* has been used in France in recent research projects on XIX and XX Century architecture[2]. Variations and transformations of regionalist architecture can include picturesque, romanticist architecture. Among them some ambiguous solutions have turned architecture into fake picturesque: this is the case of exported models travelling over places and settling down into unfamiliar contexts.

Regional architecture is by all means traditional architecture. At the same time the term regionalist architecture can be applied to traditionalist architecture. Although we agree that regionalist/traditionalist architecture has good reasons to exist and should be promoted, at least for the financial success of many operations and the level of satisfaction of the customers, we understand the reaction of modernists against regionalism/traditionalism regarding the unavoidabil-

ity of globalization. Regionalism, it is often said, is anachronistic. Nevertheless, this debate has often to do with style rather than with a correct idea of regionalism.
Something little different is, in fact, what critics of architecture call "*critical regionalism*", which starts within the modern movement and means interpreting the characters of regional architecture into "new regional modern architecture".
Critical regionalism, as was theorized by Kenneth Frampton, identifies a possible alternative to internationalism, a correction to it. Therefore, critical regionalism is not a complete code or a style, and the word retrospective is not meant as a negative term. It is considered as an instrument, a critical approach to the kind of architecture that is considered too conventionally attached to the International Style. The goal is to adopt efficient parameters in evaluating spaces and materials and is favourable to develop «a strong and full-of-identity culture, that maintains the contacts with the universal technique»[3]. The strategy is not to adopt the one of populism or nostalgic-sentimental regionalism; it uses two instuments: mediation, in order to mix universal civilization and the elements that could be derived from a physical place, and inspiration, to be led by the quality of the site. There is a strong link between this approach of critical regionalism and the "*genius loci*" of Norberg-Schulz. Lewis Mumford reflected upon this problems too. His idea of "regions", far from being aristocratic, critique of the liberties of the Welfare State, is almost identical to Kropotkin's anarchist idea of «decentralised …small units, responsive to direct human contact» (The City in History)[4].

2.0 THE IDEA OF ROMAGNA THROUGH ITS SYMBOLS

As an example of the construction, or the non-construction, of regional architecture over the years, here we talk about the town of Cervia, placed on the adriatic coast within the boundaries of the *regione Emilia-Romagna*, in Italy. More precisely, the "real" region is "*Romagna*", being this the territory which marks the cultural identity of the place. Romagna is the part of the administrative region of Emilia-Romagna, which is located south of Bologna and includes the provinces of Ravenna, Forlì-Cesena and Rimini[5].
How old is its cultural identity? The historian Roberto Balzani, in his wonderful book, says that «the sanguine and generous (*sanguigna e generosa*) Romagna that is kept by our imagination, has its origins in the XIX century»[6]. The territory of Romagna, whose boundaries changed over history, was for centuries under the power of the Papal State and during the italian *Risorgimento* was considered a symbol of the "italian issue" (*la questione italiana*), a reaction – *riscossa* in the words of Giuseppe Mazzini – against that power. Pascoli, Carducci, Oriani, De Amicis contributed to the definition of this place, depicting Romagna for its italian vocation and celebrated its identity creating a gallery of symbolic places to which Mussolini gave the physical evidence (*concretezza*) of a patriotic itinerary: the Arch of Augustsus, the tomb of Dante in Ravenna, the monument of Baracca in Lugo, the Duce's birthplace in Predappio[7]. Therefore, the idea of Romagna, as a region with a specific cultural identity, is something fairly recent. Balzani concludes: «Overcharged by history, Romagna is a little mirror of the nation, in which the ironic and sentimental profile of the italian province is reflected».
Regional architecture reflects the history of the region; while rural architecture in Romagna acquired its architectural identity during the XIX century, as inland was densely populated and

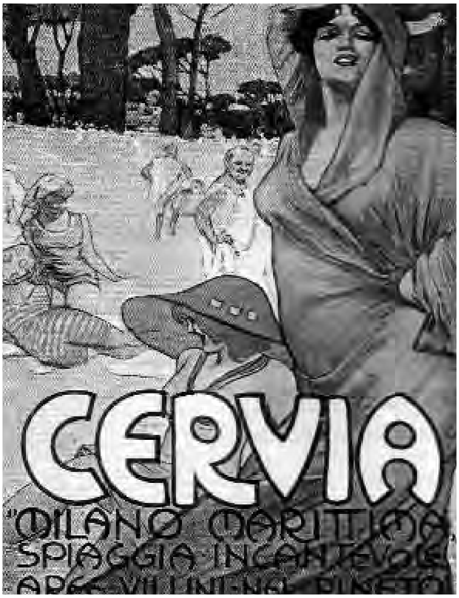

Fig. 5, Fig. 6 - Drawings by Palanti, promoting the new town of Cervia-Milano Marittima
Fig. 7, Fig. 8 - Palanti's villa (left), and design for a new "villino"(right)
Fig. 9, Fig. 10 - Newly designed "stylish villini" in the pineta.

Fig. 11 - Google's image of Cervia and Milano Marittima, 2007; the "square" of XVII century Cervia Nuova is centered below; the "ring" of the" new garden city" Milano Marittima is at the top; the" pineta" is the black spot to the left

Fig. 12, Fig. 13 - Images of Milano Marittima, 2007, from inland (left) and from the beach (right), both with the two skyscrapers giving identity to the place.

agriculture strongly developed, we can't say the same about the coastal area, which was literally split from the *campagna*, and, even more, from the *collina*.

"The sea", as constitutive element of the regional cultural memory, becomes significant between the two World Wars. The beach resorts (*stazioni balneari*) had existed for a long time, since XIX century, but were not strong enough, in terms of image, to give identity to the coast. This was due to the small amount of population, to bad economic conditions and the idea of coastal areas being malarial places.

Something changes during the '20s. In 1923 Francesco Balilla tries to describe his homeland in a magazine, published in Foligno: «The coast is "gemmed" (*ingemmata*) by small rident and multicoloured coastal villages, from Rimini to Ravenna». During the period 1920-1950 the marine subject became full of coloured sails and fishing boats, and the contrast between the green of the *pineta* and the blue of the sea emerged. Unfortunately, all this was replaced by the concrete condominiums of the post-War boom in economy and tourism (Fig. 1, Fig. 2).

In his final chapter Balzani, talking about the coastal areas of Romagna, uses the term "mercification of the cultural regionalism", quoting the new symbols of it: the big umbrellas for sun protection (*ombrelloni*), the "regional fast-food" (*piadina*), the memory of the past ("*Amarcord*") – meaning I remember, in dialect – . Fellini's *Amarcord* is establishing a contact with the world of before (*col mondo di prima*), but for him Romagna is only a dimension of the memory. Fellini goes to Rome but in Rome he builds «a place of memory on which he projects a shadow of what was unconfessed and ambiguous in his mind» (Fig. 1, Fig.2)[8].

3.0 CERVIA-MILANO-MARITTIMA: THE INVENTION OF A PLACE

There was basically nothing built along the adriatic coast until the XVII century. The coast was considered an unhealthy place to live. In this desert land, in two beautiful bird's eye views a new planned town, to be built near the saline ponds, was depicted (Fig. 3, Fig. 4)[9]. This perspective view of the new town is among some drawings of the followers of Carlo Fontana (1638-1714), the architect of the *Reverenda Fabbrica Apostolica*. As the prior's palace is recognized being designed by Francesco Fontana, son of Carlo, the perspective drawing is probably by him, who strongly collaborated with his father on many projects. The design for the palace dates back from 1702, and in that period he could have done the design for the new town too. The rectangular town is shown with a big square in the middle and the prior's and the bishop's palaces facing each other; it has got the look of a fortified town, with the original fishermen houses and houses for the salt ponds workers (*case dei salinari*) built all around along the walls [10].

We talked about a slow start in tourist economy during the late XIX century. In 1907 Giacomo and Piero Maffei obtained a concession by the town of Cervia, «with the goal of building holiday villas (*villini*) and give value to the beach». By that time Cervia had 9.000 inhabitants, with a slow economy, based on salt production, agricolture and fishing industry, with an illiterate population, dealing with unemployment. In the last two decades of the XIX century a pioneering phase of tourist development was launched, favoured by the construction of the railroad in 1884, with the improvement of the hygienic conditions, in this malarial territory, and the construction of important infrastructures like the "bath station" (*stabilmento balneare*)

starting from 1882.
It is now when the promiment figure of Giuseppe Palanti comes in[11]. Palanti was *cartellonista* and *figurinista* for the Scala of Milan and teacher at the Accademia of Brera. In 1911 he started the *Società Anonima* "Milano Marittima", with other prominent figures of the milanese middle-class. The SA was specifically created for the development of the city of Cervia; the final contract was signed in 1912. Giuseppe Palanti had the intuition of building a "garden city", or "city for the holidays" for the *piccola e media borghesia* of *Lombardia*. The urban design started with some drawings of Palanti, a sort of abstract design, representing two circles with radial lines starting from the centre. The development was interrupted during the First World War and reprised in the '20s, when a new company, CIVAM replaced the first one. A second new image of Cervia was created, in what we can call a new town, a "duplication of the historic town" on the other side of the channel. The pine trees (*pineta*) were its most powerful symbols (Fig. 5, Fig. 6). Under the umbrellas of the trees some dozens villas were built in eclectic style, among which Palanti's house (Fig. 7, Fig. 8).

4.0 Cervia-Milano Marittima: actual conditions and perspectives

Cervia-Milano Maritima had its boom after the second World War, like other cities of the adriatic coast of Emilia-Romagna. This boom literally changed the waterfront and partially the skyline of the original garden town of Milano Marittima; the spaces between *villini* were filled with high density 3-4 floors condos. The rule was to keep the height of the buildings under the level of the top of the pine trees, so that nothing could be seen from above, except two skyscrapers. Two tall concrete buildings were allowed to stick out in hazel and white color: a two-towers skyscraper by the sea, and one inside the *pineta* (1956), both designed by the engineer Eugenio Berardi. The rest of the urban fabric is a mix of hotels and small private properties, with the most various typologies, only some of them having some architectural quality. With this process, which stopped only in the late '70s and was in common with other cities along the coast, the spirit of the original town was betrayed.
The '80s were the years of building refurbishment and preservation; a plan for the conservation of the original 60 *villini*, treated as "historic buildings", was made. This was not much, compared to the amount of volume being erected; these past ten years are characterized by a big change in the idea of holiday. As the concept of quality increased and competition among tourist oriented towns in the Mediterranean area grew very fast, Cervia started a new program towards "environmental quality". A flower exhibition in May was promoted, a golf course was placed behind the *pineta*, walking paths and biking routes were built, etc. In the meantime the "town for fun" of the discoteques and pubs for the young people was created on top of the middle-class vacation place: new shops were created in the core of the garden city and noise and confusion raised as well as house prices. In a process where there is not much more volume to build, part of the hotels have been remodeled or turned into smaller properties (which incentives in terms of new volume to be added), and a new style of life is being generated: interior design for discos and bars is booming, some stylistically imported colonial style houses are coming up along with ultra-modern solutions (Fig 9, Fig. 10). The town is definitely becoming the place for a "fashionable" young italian middle-class.

Cervia-Milano Marittima is an example of construction of a peculiar identity. This identity now embraces the picturesque papal settlement of Cervia Nuova, a fancy milanese middle-class vacation garden city, ugly developments from the economic boom of the second post-war period and, finally, recent fancy night-clubs, all mixed up with popular fast-food (Fig. 11) and some sport facilities. The economy of the town still relies on tourism.

We shouldn't obviously talk about a regional cultural identity: the recent constructions have dramatically obscured the XVII century city of the fishermen and the garden city of the '20s (Fig. 12, Fig. 13). On the other hand the city is very active and, as new structures are now replacing the image of the booming city of the '50s, prices for the houses are still growing. Tourists come not only from Italy but from abroad, recognizing a certain quality of this place, which today relies on a multi-faced identity, that includes the recognition the peculiar character of a *città romagnola* of the coast. This character relies also on its architecture, but specifically on "its regional mercification", represented by disco-pubs, *piadina* booths and historic restaurants serving good fish. Cervia-Milano Marittima is a place for architectural experimentation and innovation where new local/regional identity is continuosly generated, sometimes chaotically; it is ground for architectural conquest like many other coastal areas in Italy, but with good quality, compared to italian.

Notes

1. Professor at the University of Bologna, Department of Architecture and Regional Planning.45, 2, pp.44-60.
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4. L. Lefaivre, A. Tzonis, "Lewis Mumford's Regionalism", in Design Book Review, Issue 19, winter 1981, online publication; A. Alofsin, "Die Frage des Regionalismus", in M. Andritsky, L. Burckhardtetal, (ed.), Fur Eine Andere Architektur, vol. I, Fisher, Frankfurt, 1981.
5. There are recent political initiatives for the autonomy of Romagna: "Progetto di legge. Romagna: identificazione della sua storica delimitazione", in Regione Emilia-Romagna. Supplemento speciale del Bollettino Ufficiale, VII legislatura, 10, 24 luglio 2000; in the past A. Spallicci, "Autonomia regionale" (discorso del 4 giugno 1947), now in Id. Opera omnia, VII, pp. 430-436.
6. R. Balzani, "La Romagna", collana L'identità italiana, Il Mulino, Bologna, 2001.
7. A. Mussolini, "Romagna", Conferenza tenuta in mIlano la sera del 15 marzo 1928-VI alla "Famiglia Romagnola", Milano, s.i.t., 1928; G. Bosi Maramotti, "L'immagine della Romagna nelle biografie di Mussolini", in Studi romagnoli, 1983, XXXIV, pp. 585-596; G. Bellosi, "Romagnolità e regionalismo tra le due guerre: interventi di Piero Zama", in P. Zama nella cultura romagnola, atti del convegno di studi, Faenza, 14-15 novembre 1986; Biblioteca Comunale, Faenza, 1988; G. Piovene, "Viaggio in Italia", Milano, Mondadori, 1966.
8. F. Fellini, T. Guerra, "Amarcord", Milano, Rizzoli, 1973, pp. 19-20; M. Caminiti, "La grande spiaggia", in F. Fellini, La mia Rimini, a cura di R. Renzi, Cappelli, Bologna, 1967.
9. Plan of the salt ponds and the new city of Cervia, end of XVII century, Rome, B.A.N.I.C., Fondo Corsini 661, f.20; perspective view of Cervia Nuova, pen coloured washes, Windsor, XVIII cent., Royal Collection, RL 10331, Windsor Volume 185, B&H 705; probably made by Carlo Fontana
10. G. Gardini, "Il progetto della nuova città", in Polis Idee e cultura nelle città. Cervia, Koiné, Milano, anno IV, n. 14, pp. 8-11
11. Lombardi R., "Giuseppe Palanti", in Polis Idee e cultura nelle città. Cervia, Koiné, Milano, anno IV, n. 14, pp. 26-27

Fig.1 - Sassi of Matera, Italy

A. Guida, I. Mecca [1]

THE DURABILITY OF THE PATRIMONY BUILT THROUGH TRIALS AND EXPERIMENTATIONS ON SITE. THE CASE OF THE SASSI OF MATERA - ITALY

1.0 Introduction

The heritage of the past is testimony to the ways that civilizations have lived and transformed the natural environment over the centuries. One can plan appropriate interventions to restore and render usable again, the places and spaces of the past, first, through observation and then by learning about historic buildings. In order to restore historic centers efficiently and with cultural consistency, it is necessary to acquire a detailed understanding of the building materials and techniques used, not only for single buildings, but for an entire heritage site of buildings, which are often the so-called "poor buildings". Thus, one must know how to identify the real building problems and define a methodological process before then passing on to interventions. A methodological intervention has been identified and applied to a study case in which the need to resume a dialogue between the various disciplines that embrace this sector of cultural-historic heritage restoration has been demonstrated. In fact, only through an interdisciplinary approach, is it possible to plan and carry out interventions, limiting possible errors in evaluation and decisions. *"(...) reunited, they will build a small, valid reference point, in order to not lose sight of the <<right path>> for appropriate preservation interventions."* [2]

2.0 Identifying an Operative Planning Methodology

The methodology identified and applied to a study case, is easily dividable into three larger phases capable of encompassing the entire operative course of action, from the idea of execution to the intervention, as well as the management of the intervention work being undertaken.

The *experimental-knowledge* phase can be subdivided into other micro-phases, which ultimately, give life to the "understanding" of manufactured things. The course of action in various ways or through different processes allows the operator to have as much information as possible about "manufactured things". This is possible above all through collaboration between other disciplines. Thus, intervention work must take into consideration an understanding of:

- Geological and morphological aspects of the sample area;
- The interaction between the structure and the land: including characteristics of the soil and past or potential effects;
- Type of urban center and changes made by man;
- Shape and dimension: evidence of all the elements that make up the object of intervention;
- Building components: foundations, walls, attics, covers;
- Building condition: possible collapses, violations, restoration, significant reinforcements, evaluations of the static behavior of the object;
- Materials: physical and chemical characteristics of the materials used and their resistance;
- Building techniques: mode of assembly of the traditional materials present in the object to be restored;
- Analysis of the degradation of the object to be restored;
- Analysis of interventions already made;
- Acquisition of results of precedent experiments and tests, both in laboratory and on site;
- Planning for new experiments and tests (in laboratory and on site) to provide missing or insufficient data;

The *technical-building* phase can become a new field of experimentation and verification of the types of choices made, in fact, once the work enters into the phase of execution one can already have the first results of the effective validity of the intervention, through:

- Realization of the intervention: propostition and verification of plans;
- Monitoring of operative activities carried out during the intervention (diagnostic analyses, productive parameters of the building site, planning activities, etc.)

The *management* phase becomes a natural continuation of the executive phase. This, in addition to maintenance and management of the work, involves monitoring and validation of the intervention over time through tests and a maintenance plan. The validation phase looks at the relationship of the intervention to requirements of reliability, durability, compatibility and the possibility for maintenance, which allows for a definition of Quality over time (Qt)[3] of the intervention carried-out. Quality over time is a component of global Quality (Qg), and guarantees the ability to maintain the performance levels required during the planning phase and verified during its realization, throughout the useful life cycle of the product and/or intervention. Thus, the initial quality of the work is maintained in a determined amount of time, without any additional costs. This methodology has been applied to a study case (the Sassi of Matera) following the various phases described.

3.0 Case Study: the Sassi of Matera

The choice of the Sassi of Matera as a study case, where the durability of the restoration interventions can be evaluated, is for multiple reasons. The Sassi of

Matera constitute an enormous historic and architectural heritage that in recent years, after more than forty years of abandonment and degradation, is slowly returning to life thanks to restoration interventions. Experiments with new materials on some sites have been made in the course of the work, as well as monitoring of results and evaluating the work in different environments (underground structures which are completely dug-out, mixed structures that are in part dug-out and in part constructed, as well as structures that are completely constructed). The Sassi are characterized by an extremely delicate ecosystem in which there is an ageless equilibrium between the architecture and the environment, in part altered by the work of man, with unique characteristics (geomorphologic adaptations, degradation that has been greatly accentuated by the surrounding environment and by the state of decennary abandonment), which allow one to find solutions, easily transferable and adaptable to the same restoration problems in other, similar contexts.

4.0 The "rule of art" as an interpretation of manufactured things

The preservation of an enormous historic heritage and its significance, up to the 19th Century, happened almost unconsciously thanks to periodic maintenance which was the most diffuse way of efficiently maintaining architectural structures in order to prevent the risk for extensive restoration interventions. This way of constantly operating over time has proven very useful because when practiced cyclically by workmen and skilled technicians who understand the history and materials of architecture, interventions are quicker and more efficient and the use of economic resources is limited. In the recent past, this custom has been lost along with the understanding of these building restoration techniques. The standardized fabrication of building elements, the introduction of new materials and the diverse needs of those using them, has caused many manual techniques to be lost; these can be found once again in old manuals and books on architecture *"(...) in the memory of he who could work with old systems based above all on the ability to apply, a bit at a time, available materials in a way that allowed one to obtain the maximum amount of solidity and durability in relation to the economics of the building.*"[4]. On the basis of an awareness of the values and meanings of manufactured architectural works as an expression of the building traditions of the past, it is possible to choose the most suitable techniques for philological compatibility, economy and mechanical efficiency, and to utilize them in the restoration of historic buildings.

It is necessary to establish an indissoluble relationship between *understanding* and the *project*, *"(..) no intervention can be thought of without understanding (...) the approach must be humble, without arrogance of any kind, including cultural arrogance, just as the materials must be humble, with which the historic buildings have been built (limestone, plaster, wood, stone, brick/tile, and sometimes iron) but which have challenged the centuries or millenniums"*[5] .

Understanding building techniques of the past becomes a reliable way of defining building quality implicit in the good *rule of art*.

In Basilicata, like everywhere else in the world, cities, monuments and small buildings have been built utilizing local materials. Often these architectural works seem to be one with the surrounding environment, the constructed element is integrated and loses itself within the natural environment, as with the buildings of the Sassi of Matera.
On this site, the type of walls recurring throughout the Sassi are those originating from the technique of assembling discreet elements; in some cases where parts of the walls are elevated you find an "*asacco wall*" with two sides in stone and a central nucleus filled-in, uncompressed rubble and cemented with non hydraulic mortar; the floors are supported mainly with vaulted structures both regarding the more important architecture as well as smaller buildings, while the roofs, with the exception of a few cases which are vaulted, have been built with wood and tile.

5.0 Technological Tests

Based on data from earlier tests and experiments carried-out in the sample area, as well as visual evaluations of traditional and new materials used in restoration interventions, a need for new tests and experiments in the laboratory and on sight has been established [6].
Technological tests have been carried-out to determine the physical, chemical and mechanical characteristics of the materials used in the creation of the Sassi dwellings (tufa, mortar and stucco), in order to evaluate the compatibility (chemical, physical and mechanical) of possible new materials to be used in restoration and to validate the choices made during some interventions, as in the case of the use of particular inorganic reinforcements in the rock mass.
This trial of tests, carried-out entirely in the laboratory, allows one to understand the chemical and physical characteristics of the materials, and thus, contributes to determining the mechanical characteristics, (for example having established the porousness of the stone, helps determine certain mechanical characteristics). In addition, these tests give indications regarding the compatibility of old materials with those used in restoration, as well as giving indications regarding the nature of external degradation.
After obtaining results from the analyses carried-out, lab experiments have been done in order to improve the characteristics of the limestone taken from the underground structures, thanks to the application of reinforcement. In addition to the static degradation both of the rock mass as well as the dwellings (both dug-out and constructed) most of the main problems and degradation found in the underground environments and above ground dwellings in the Sassi are due to the presence of water and lack of ventilation. The problems associated with the presence of humidity are evident both directly on the rock mass as well as on the plastered walls.
The hygienic restoration of the underground structures in the Sassi of Matera present notable difficulties due to the extent of the environments to be restored. In fact, in these cases, a need for intervention on the entire wall has been demonstrated, due

Fig. 2
Matera, Italy

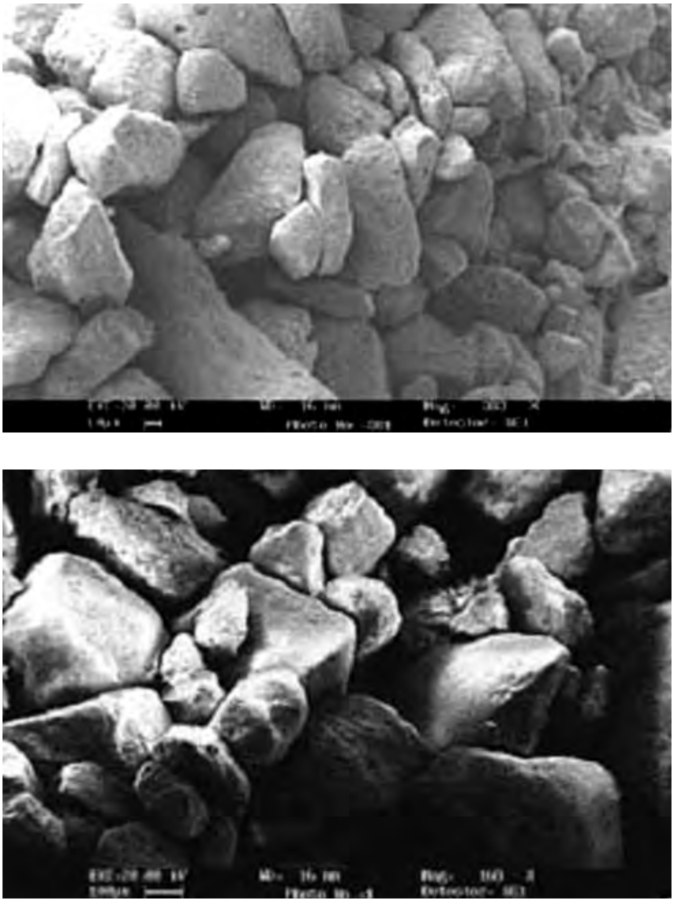

Fig. 3, 4
Microscopic Images

to the humidity caused by being in constant contact with the rest of the tufa that lines all of the underground walls. In addition, the reinforcement and restoration interventions of these environments are conditioned by the strict regulations that require one to use products that don't cover the walls and that don't alter their color, leaving the environments intact and thus, with all the exterior characteristics of the walls unaltered [7].

It is paramount that the treatment guarantees that the walls have good "*perspiration*" in order to avoid the formation of superficial layers that could, over time, break-off when under pressure from the water present in the walls to be treated.

A product that helps to stop humidity in the walls must be used, slowing down perspiration and eliminating eventual water residue on the walls. This can be achieved through thermo ventilation and forced air exchange.

The underground walls act as a sort of "sponge", consequently with a sort of "*drainage effect*" that once dried, reabsorbs the water present in surrounding areas, which is then in turn given off as humidity into the environment. Thus, a constant equilibrium between the water present in the environment and that, which comes from the walls, must be identified. In essence, the amount of water present in the environment is proportionate to the amount that collects on the perimetral walls, until equilibrium is established between the humidity of the entire underground environment and that which is in the walls. Not being able to create a complete and continuous barrier to the water, as has been previously affirmed, the solution to the problem clearly lies in intervening in the regulation of both the amount of water as well as the speed at which it is taken from the walls.

A lab experiment was carried-out on various samples of limestone taken from some underground environments being studied, which were treated with a stabilizing material.

An inorganic material with specific characteristics that are well suited to the needs of the site was used for this experiment: reinforcement that doesn't impede the characteristics of the limestone, that is suited to the chemical structure of the base material (limestone), that allows the limestone to maintain its porousness, that is very durable, not very invasive and which doesn't alter the natural color of the rock.

A product such as this is easily prepared on site, but when testing, it is applied in the laboratory to rocks and blocks of stone taken from the structures. The main active ingredient of the product used is a mixture of soluble aluminium. The property of reinforcement is due to the formation of an aluminium gel, which moves into the pores of the stone, creating a type of electrostatic interaction that increases internal cohesion, and reduces crumbling. Experiments brought about the decision to use products with a Lime base (P.C.), an Aluminium base (P.A.) and a Silicon base (P.S.).

The results obtained have been confirmed both by visual comparison as well as using images from electric scanning microscopes, of all samples. The best mixture used for intervention was the P.S. one, in fact, it has:

- The best response in terms of density, porousness and variation;
- The best visual impact, in the almost unaltered coloration of the rocks;
- In the net improvement of the technical characteristics, which are similar for all three products applied.

Aside from the results obtained from the following experiments, the choice to use the P.S. mixture and not the other two for reinforcement, is due to a prediction of greater durability for the intervention, because such a product has the same base composition as the original rock and hypothetically it should have the same degradation. As has just been said, this should be supported by on site experiments and by monitoring over time, in order to really evaluate the duration and processes of degradation.

6.0 Conclusions

The experimental research of this project constitutes the first phase of understanding the environmental equilibrium, the materials, technology and the problems of the site to be restored. The analyses, still in course, extend to the evaluation of the static and technological interventions, as well as functional adaptations necessary for a correct and complete definition of planning for the durability of the restoration.

Notes

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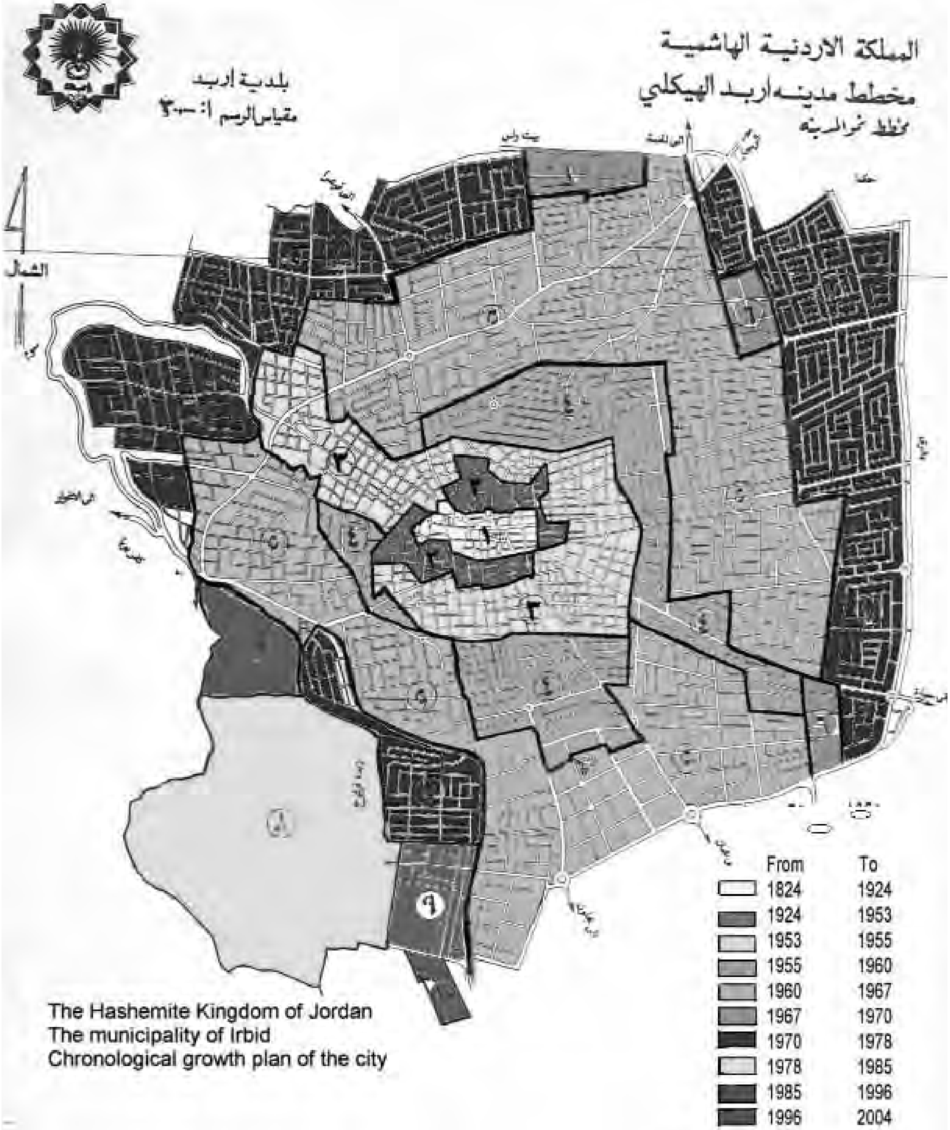
المملكة الاردنية الهاشمية
بلدية اربد
The Hashemite Kingdom of Jordan
The municipality of Irbid
Chronological growth plan of the city
From To
1824 1924
1924 1953
1953 1955
1955 1960
1960 1967
1967 1970
1970 1978
1978 1985
1985 1996
1996 2004

Fig.1 - Irbid

A. Guida [1], M. El Khalili [2]

METHODOLOGY FOR THE CONSERVATION OF THE ANCIENT ARCHITECTURAL HERITAGE WITHIN THE CONTEMPORARY ENVIRONMENT

1.0 Introduction

The future of living goes across the need to recuperate and requalify buildings and parts of the city characterised by recognisable and definite architectural, technical and technological values.
Actually, the project is formed in two main dimensions the first one is the theoretical approach in dealing with the problems in the urban fabric and the second one regarding the practical matters of dealing with the cultural heritage. Those two dimensions will be discussed intensively and they will be integrated to meet the needs of the rehabilitation project and finally, to get out of a new practical methodology in dealing with the historic sites and buildings in an advanced and practical scientific manner.
In more details, the first dimension is for the identification, recording and documentation through scientific surveying techniques. The surveying will not be only a necessary instrument of documentation but also a critical method essential for a complete understanding of the spatial complexity of cities and buildings. Survey will not be limited to the determination of the geometrical and dimensional characteristics of a building but it will be also for investigating constructive and decorative details as well as take into account the historical, stylistic features, and topographical features of the settings. The survey will enable us to conduct a critical evaluation of the current situation for the historic sites and buildings that will suggest the right and degree of intervention for the rehabilitation project itself and for "The Common Character Scheme". Furthermore, surveying, almost automatically, involves a historical research that is an essential part of the survey itself.
During surveying work, special emphasis should be given to the identification and diagnostic analysis of the various types of deterioration and their features such as causes of structural failure, dynamic failures, and Soil failure, in addition to the surveying of the structural defects of buildings.
The historical critical research must go back to the genesis of the building, pointing out the different phases or its development. In this way, the survey explains the history of the architectural and urban fabric, reflecting the chronological and formal phases of construction.
In the philosophical context of the rehabilitation project, we should keep a balanced relationship between theory and practice in which the project should not be an abstract ideological

paradigm but it should be extracted from the analytical studying of the existing cases in the field in which they will be later practical if it was implemented dynamically.
“The common character scheme” will be in a will-defined methodology starting from the documentation phase of the project, in which the scheme will be important for the rehabilitation project itself because of the rapid development of the city of Matera (Italy) and Umm-Qais (Jordan) as well as the new additions of buildings and facilities during the project. Therefore, we should have a planning control, which could be the best method for controlling the pressure of new buildings or functions at historic areas.
This research is interdisciplinary in its nature and the tasks will be divided into multi phases in which each phase will adopt an area of interest in the project in order to be taken in an intensive manner or a careful analysis of the studied cases. Furthermore, those phases should make a correlated study that will be able at the end of the research to get pure results of the studied cases and to take a decision accordingly for the requirements of the rehabilitation projects.
A general aspect of the research is regarding to the regulations and norms analysis related to the security aspects in order to take them into consideration and to respect the right criteria and standards of the new functions, which are implemented in the rehabilitation projects. In the other hand, we should respect the regulations that should be adopted during the field works.
All of these aspects of the current world caused to marginalize the importance of the cultural heritage as a part of the identity of the local community, what is needed now is the adoption of new trends, not any traditional ones, but creative and modern ones in order to manage, conserve, and protect our cultural heritage, however, nowadays the role of the historical town on socioeconomic development of small and medium cities in Mediterranean regions not possible without a policy of conservation and preservation which is insufficient alone without sustainability efforts to channel the transformation so as to adapt the towns to the needs of their local community and new ways of life for the survival of the historical centers in their artistic, historical and environmental values.
Therefore the cultural heritage should be revived and reengaged within the life of local community and trying to re-qualify them to be active in our life and this could be achieved by programs and projects that are able to recover all its values and potentialities. The best tool in our hand for reviving the cultural heritage sites is the rehabilitation and recovery interventions in order to make them dynamic within their context, and trying to reveal its hidden aesthetic and historical values. The task of the rehabilitation projects here is regenerating the original functions and uses of the cultural heritage sites and monuments within the realms of authenticity, regulations and common norms.
In this research, we are trying to establish new insights and practical ideas in the field of rehabilitation toward saving the cultural heritage, landscapes and settings from the rapid changes and destruction factors in addition to the neglect and miss functional uses.
Two areas of study, Matera in Italy and Umm-Qais/ Irbid in Jordan. are very challenging and simultaneously a stimulating case for taking new paths in dealing with the cultural heritage in terms of rehabilitation projects that they should take into consideration the topics of security, norms, stability, exceptions, and reforming regulations.

2.0 Methodological approach

The above mentioned considerations point out the complexity of the issue in question and the necessity to face the retrieval problems following a rigorous approaching procedure, based on the following operating stages:

- Establishing new insights and practical ideas in the field of rehabilitation through conducting an analytical research for studying the historical, typological, and technological factors, for creating a mature process that is quite effective in the scope of rehabilitation.
- The exploitation of historic sites and buildings by transforming their role as just being a physical part of our culture into a dynamic and active role, to be then a source of inspiration and scope of mind for the future development.
- Conducting a rehabilitation project guided and designed to protect the historic buildings from destruction and decay through refreshing their dead functions as well as their hidden historical and aesthetic values.
- Achieving an advanced mode of interdisciplinary work to establish an extraordinary methodology in creating an adequate rehabilitation process for the recovery of the dead functions and to get the highest potentialities from the cultural heritage sites.
- Providing an intensive controlling and monitoring programs for the recovered and revitalized functions of the historic buildings, in order to insure their maintenance and sustainability.
- Achieving safety of historic buildings and their settings through revising norms, standards and regulations regarding the historic sites.
- Establishing a total mass of creative urban development characterized by the involvement and recruitment of history in architecture through the proposed “Common Character Scheme”.
- Insuring that the rehabilitation project is highly directed for local community benefits in Matera and Umm-Qais.
- Preparing a comprehensive conservation plan for the historic sites, as well as a master plan with larger context by considering their natural and cultural settings.
- Establishing “The common character scheme” as an urgent need parallel to the rehabilitation project itself and to be implemented as an effective tool for avoiding the disturbance of harmony between the rehabilitated buildings and the new additions or installations.
- The application of “The Common Character Scheme” as a stimulating effort regarding the formation of new urban standards, regulations, design concepts, awareness, new projects and the discovery of the old traditions used in the construction of historic buildings and their original functions.
- Instilling awareness and responsibility in the minds of the local people of the great wealth in historical knowledge and the importance of heritage as a part of their identity.

3.0 Historical Background

The two cases from Matera (Italy), Umm-Qais and Irbid (Jordan)

The research is focused in two main important cases from Matera in Italy and Umm-Qais/ Irbid in Jordan from the fact that they form ideal contexts for conducting this type of research that will enriches our experiences as a result of their diverse historical and cultural heritage in terms of architecture, townscapes and landscapes.

Matera.: In the case of Matera, it is a historical city that forms as a whole one monument, in its topographical and landscape aspects, in the characteristic of its streets and its cluster of buildings.

Irbid city center: At present the center suffers a state of total degradation. Now, the historic city have been mostly dissolved within the modern city.

Umm-Qais (Gadara): The modern town of Umm Qais is the site of the ancient Greco-Roman and Islamic town of Gadara.

The historic towns in Basilicata and Irbid are characterized by their special cultural heritage aspects in terms of typology, styles, property, and building conditions, in addition to their regeneration and reintegration with the contemporary state's development should be studied and guided properly through an integrated scientific and interdisciplinary work, guided and designed to prevent its destruction and decay through refreshing their dead functions as well as their hidden historical and aesthetic values.

The need of the rehabilitation projects in both Matera and Umm-Qais sites are urgent since they have faced the same problem of expropriation of the original dwellers from the historic cities of Matera and Umm-Qais as have been thought it was the proper decision of intervention in those two sites, but in the contrary, most of the buildings in the two sites are appearing now to be as dead organs, in addition they lost their authenticity and the conservation works are not as competent as it was desired.

The functionalities recovery of immense scale historical center with articulated characteristics including historical and architectural forma that is known as Matera, we should take into consideration the recovery of the potential and various functions in addition to the installation of new functions that are suitable for the historical city such as residences, services, and handcrafts.

The rehabilitation process should not be taken as merely a recovery project for lost functions or as a generator of new adequate functions to the historic buildings, but also to be an effective tool for going through an analytical research for studying the historical, typological, and technological factors which , are important for guiding us in the creation of a mature process that is quite effective in the scope of rehabilitation as being dealt as a dynamic but not rigid processional mechanism in dealing with the historical centers in such projects.

In the other hand in the few forthcoming years it will be taken seriously in the urban planning issues for the new cities, in townscapes recovery and the most important issue in the recovery and vitalizing the burdened cultural and natural settings. In other words the historical centers and the cultural heritage should be viewed, from now and then, as a dynamic innovative environment for generating new designs, architectural characters, and functional values that should be installed within the new cities in which if it was implemented wisely it will change the most fatigued historical centers to be an essential part of the modern cities.

4.0 The Common Character Scheme

The aim of this scheme is to create a methodological process of extracting a "common character" from the historic sites and buildings in order to create common shared values between the modest architectural heritage parallel with the most complex and modern ones. The main

Fig.2 - Irbid

concern of this scheme is the revival of the architectural and cultural heritage in addition to maintain harmony in the historic sites especially when we conduct a rehabilitation project.
The main body of this scheme is formed from three main dimensions: The first is the comprehensive studying of the historic sites and building and this will be achieved from the documentation phase of the rehabilitation project, furthermore this will include identification analysis, understanding, formulating designs and inspirational aspects. The second dimension is the conservation works including all of their requirements in the field. The third dimension is the whole consideration, regarding the historic sites surroundings, settings, historical and aesthetic values in addition to the relationship between the historic sites and the local community, from the fact that the locals could be the best interpreters of their cultural heritage and its internal and external values.
The three main dimensions are correlated with each other in order to form a scope of mind and stimulation of new ideas in terms of common character. The main topics interested by this scheme will be texture, style, colour, scale, and general features of the cultural heritage sites and buildings.
The application of the this scheme will be a stimulating effort regarding the formation of new urban standards, regulations, design concepts, awareness, new projects and the discovery of the old traditions used in the construction of historic buildings and their original functions. In terms of dealing with the new additions and installations within historic sites and buildings, we should establish a controlling plan and a monitoring tool for the inspection of the new additions and their compatibility with common characters derived from the scheme. Moreover, the already existing new additions should be studied separately and to propose the proper ways and techniques including reshaping, reorganizing, and alteration of their general features according to the common extracted character from the scheme.
The careful study and diagnostic analysis of the historic sites and buildings through this scheme will reveal their dynamic and active role in urban re-development as well as in the rehabilitation projects. Their historic and aesthetic values will be protected and revitalized by their practical application in the common character implementation phase for the new additions and installations within historic sites and beyond. The application of the common character in the rehabilitation process will increase the authenticity of the rehabilitated buildings in addition to their settings. Furthermore, its applications will be not merely an ordinary procedure for the new additions but rather as an important tool for the correlation, harmony and sympathy between the original historic buildings and their new additions that may be installed during the rehabilitation process to form later a unified context.

5.0 THE USAGE SAFETY IN THE ENVIRONING REQUALIFICATION AND RECOVERY PROCESSES OF THE HISTORICAL CENTRES

The quality of the built architectonical space has, nowadays, an important role in all the retrieval and reconversion operations of the urbanized areas in very strongly characterized sites.
Any retrieval and restoration procedure and technique of the existing heritage cannot prescind from considering the materials and the building technology used to realize the architectonical work where a necessary intervention is required. If in the past the debate on intervention methodologies was based mostly on their efficacy, nowadays, after a ten-year period of applying, experiments and testing, a new subject has been considered: that is to say the physical,

chemical and structural compatibility with the existing manufactured article. The integrated use of traditional and modern technologies seems to be the only way to be followed in order to grant an adequate preservation state and a right philological approach to the cultural work, whatever we consider it.
The research belongs to the scientific interest oriented towards items always connected with the building retrieval, and being part of the urban side, and with the environing retrieval, but looking carefully at those subjects such as the requalification, the exploitation and its linked use safety.
The research deals with keeping the building architectonical and techno-functional values and the antropicised territory, by following the existing rules and building standards and by granting necessarily more and more high and specific performances.
It is well known the role that, in the latest years, the retrieval has gained in the building field through an exploitation and optimization of the existing heritage, to be confirmed to the new needs of a modern way of life. The existing town, and particularly the historical centres, have been, step by step, reconsidered by rediscovering not only the chance of avoiding the destruction of the mostly important resources, together with the loss of buildings, very interesting for their cultural and economic value, but also the surprising skills of replying to the social consequent demands. It has been more and more affirmed the trend of taking over centrality that has made necessary, to retrieve, to preserve and to requalify, using specific criteria and methodologies, buildings and parts of the town, especially if characterized by particular historical, architectonic and environing values.
We have to add to all this also the changed approach as regards the historical – artistic heritage considered not anymore as a burden for community, although high culturally and socially valued, but as a primary resource for a territorial consistent and balanced development, not anymore limited to a rigid protection action, but aimed to link the restoration with a research of the right functions, considering these as an essential link useful to the preservation. Obviously this operative philosophy shows an insurmountable limitation in the compatibility of the using destinations with the historical nature, the structural body, the delivering-functional qualities of the building both if it is of monumental character and if it belongs to urban historically interesting sets such as the historical centres. It follows that also in the retrieval of historical heritage, the intervention planning, although considering the indications of technical rules, should however aim to preserve the architectonic and environing values, and that this link seems to be hardly reconciliable with the difficulties of satisfying rules and building standards, accessibility and safety setting of the interested sites (use of the road, stability and good condition for receiving visits etc.).
This difficulty – when sometimes not clear impossibility – that involves, as already said, an increasing number of sites, underlines the need of setting theoric, technical and technological instruments able to face the problems of reusing and the keeping on using in a right way and not anymore by borrowing methods strengthened in new building interventions or, worse than this, by applying functional and/or technological solutions already tested on the new one.
This is also the case of the “Sassi of Matera”, a historical town, considered in its whole as a monument, for its topographic side, for its landscape side,for its roads or its building sets. The approach to the restoration/retrieval intervention should foresee the use of methodologies and technologies necessary to integrate the traditional and the innovative aspects. We should con-





Fig.3,4,5,6,7 - Matera: a new functional image of new tertiary areas


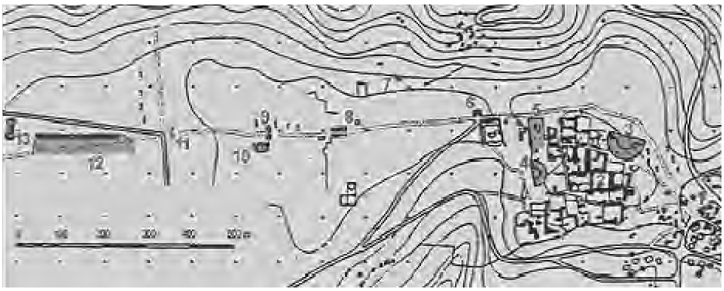

Fig. 8, 9 - Gadara: Umm-Qais

sider planning approaches with a mostly important element, the environing one, very determining in the evolution process of the Sassi.
It is necessary to set the specificity of the retrieval plan, that is to say to define, at first, the field, the contacts, the autonomy, the complexity of the relationships with the whole environing system. The main premise, in order to operate in a right modern preservation plan, can be summed up into this assertion: “To preserve means to know”. Supposing that this assertion is valuable, we can say that the retrieval intervention plan can and should be elaborated on the base of technical-scientific, formal, historical, delivering – functional and rigid data gained through a preventive and cognitive project that employs, on its turn, the historical and archivistic researches, the metric and diagnostic survey. The intervention plan should be preceeded by a right diagnostic plan in order to reveal the secrets of the subjects where it is necessary to intervene by making experiments and a good series of tests.
In the hypogean structures, just like the Sassi of Matera, the idea of modernity can also take destructive aspects in controlling the inner environing qualities and comfort based on a technological equipment corresponding to the new needs coming from living these environments. The retrieval and refunctionalization of a so huge historical centre and with so articulated historical – formal – architectonic characteristics such as the Sassi of Matera ad Umm-Qais/ Irbid, go necessarily through convincing themselves of and considering the useful multiplicity of functions to be installed, for example the residence, the facilities and tertiary etc.
Reconsidering the study about the history, the typological and technological components and also about some problems linked to the functional conforming, the actual research aims to locate some behaviour rules instead of rigid fixed processes. A many sided charming area, such as that of Sassi of Matera and Umm-Qais/ Irbid in Jordan, shows a demand and at the same time a challenge inside the scenary where the actual research programme is going to be carried out, that is to say as regards the retrieval, the refunctionalization and the reconversion of space and architectures, for whose re-use some features like safety, stability, prescribing rules, derogation and conforming seem to be very important.
It seems necessary to underline that the intervention aim should be that of granting a linguistic continuity between the past and the future, in the humble respect of environing heritage that is, however, the fundamental element towards which we should address the effort sinergy between the public and the private field, among available resources, plans and realizations, but also the processes of a planned maintenance.

6.0 The use safety in a monument and in an historical centre

The purpose of the Research Group, is to face the retrieval and exploitation of a so strongly characterized site, the Sassi of Matera and Umm-Qais/ Irbid, prototypes and models of all the interventions methodologically reproducible in all those historical centres with great historical architectonic and environing features.
The research activity will be divided into two different phases aiming, on one side, to gain documents and files using scientific and instrumental valued techniques in order to control the processes of failure and functional/structural degradation; on the other side aiming to a retrieval project, a safety setting and rebuilding of the performance typological features and of living and environing standards.

The historical-critical study will be mastered through the survey using scientific methodologies, the documents and the classification of architectonic organisms, historical sites and parts of environing fields chosen in the study case. The knowledge, the retrieval, the functional reconversion go through the awareness of a new functional image, that should foresee the setting of new residential, facilities and tertiary areas.
A general aspect will be that of the collecting and the prescribing rules analysis related to the problems of safety linked to different new "uses" that will be individualized and to the "cases" of derogation to the existing provisions of the law.
Moreover the problems related to the realization of the retrieval projects, to the sites and to the different problems of "accessibility" and "safety" will be integrated to those more general that will be part of the principal body of the research programme.
One of the research aim will be exactly the "Analysis of the accessibility ad use safety condition on the platform GIS of Sassi of Matera and Umm-Qais/ Irbid, where the related problem starts from observing that the exploitation of cultural works cannot leave out of considering its use quality, globally meant, the availability of facilities at their preservation condition, and the accessibility to the use safety.
These last two aspects are usually considered as obtained data, just like conditio sine qua non, in order that a monument object of exploitation will be used or will keep on being used.
We also have to say the use safety is considered as data to be analized and valued if the accessibility to everybody is granted.
As regards the Sassi of Matera and Umm-Qais/ Irbid, the problem is largely wider as to the only monument, both for its extension and for their morphologic features that force us to consider carefully those "critical aspects" that limit the accessibility and are considered as use insecurity conditions. At the same time those "virtuous" situations, part of the local building culture or coming from a recent careful planning, should be counted.
The recordable cases will be so many that it will be necessary to consider a catalogue, analysis and management instrument, to be geo-referred in order to link use safety and accessibility matters with other informative "levels" such as the preservation of the built heritage, the urban infrastructures, the actual geo-morphologic condition of the site, the occupation status of the real estate, the residents – tourists flows etc.

7.0 Expected results

The expected results join the acquirements, analysis, catalogue operation and classifications of all the research and tend to work out an intervention list useful to the technological and functional retrieval of this historical heritage of the Sassi of Matera Italy and Umm-Qais/ Irbid in Jordan.
Moreover, this integration should be considered as a methodological inter – discipline approach between tradition and innovation, based on a detailed study of needs expressed by the user and by the possible technological alternatives in order to be satisfied logically with the expressed values.
The theoric and methodologic route, structured through the above mentioned phases, will have results as follows:

- The catalogue operation, the classification and the comparison of the formal, geometric and forming features of the buildings, of the sites and of their environing and territorial areas.
- The definition and the analysis of the technological – building characteristics present in the research area
- The definition of a practical Manual Abacus which will provide diagnostic research protocols to be used in the condition survey , in the project and in the test of fixed interventions on typical manufactured articles of the Sassi of Matera and of Umm-Qais/ Irbid.
- Function, shape and transformation of the existing building heritage: technique and prescribing rules procedures
- Setting up and implementing the GIS in order to monitor and classify the use safety and the accessibility, inside the individuated territorial system.

The achievement of each result will be seen as an advancement step into the research.

8.0 Conclusions [3]

The results – which have been drawn from this experimentation - can be used in order to define:

- Creating a list of buildings, classification, and comparison of different aspects including forms, geometry, design, materials, constructive techniques and pathologies of the historic sites and buildings, in addition to their natural and cultural settings.
- Creating new standards for the new additions and installations within historic sites and buildings, adopting "the Common Character Scheme" not only for stimulating new designs, but also, as a total, in the evaluation and criticism of proposed schemes and completed projects that could be arisen in the future.

Notes

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2. Assistant Prof. Head of the Department, Hashemite University, Queen Rania's institute of Tourism and Heritage. Department of conservation science Zarqa – Jordan mkhalili@hu.edu.jo or mohd_khalili@hotmail.com
3. Chapters from 2 to 4 by M. El Khalili; Chapters from 5 to 7 by A. Guida; Chapters 1 and 8 by both the writers A. Guida and M. El Khalili

Fig.1 - Locanda of S.Martino (before the intervention)

A. Guida [1], F. Fatiguso [2], A. Pagliuca [3]

CHANGES IN USE IN THE TRADITIONAL ARCHITECTURE: A WAY TO AN APPROPRIATE REHABILITATION. EXPERIENCES IN THE "SASSI" OF MATERA

1.0 Introduction

The "process" continuity (i.e. formal, morphological and technological) of the historical building heritage, above all in the case of "traditional" architectural and urban systems, can be ensured by an appropriate approach to the problems of both re-use and continuation of use that, by setting up specific theoretical, technical and technological tools, could allow the overcoming of the widespread practices of methods change, consolidated in the interventions. However, interventions of the building heritage for functional adjustment have been often become, particularly in the historical centers, an "accomodation" of the buildings to the function of accommodation, with transformations and compelled introduction of new elements that have altered the original typological and morphological characteristics. This is true in both attribution of new functions and the simple maintenance of the original ones. Such a criticality is emphasized also by the apparently simple preservation of residential destination, mainly in the historical centers: once, the quality of life allowed spaces and endowments that are no more suitable for today's quality requirements. Since it is not possible to imagine that a part of a city, with a considerable extension and emblematic value, has a standard of living not suitable to modern requirements (considering also the consequent social, economical and cultural implications), it is obviously necessary to refer to guiding models for performance designing, that could determine solutions able to offer quality standards in line of new buildings ones, respectful of the historical, architectural and morphological characteristics of the existing building heritage.

2.0 Functional and technological compatibility for quality, in reusing the "Sassi di Matera"

In his masterpiece "Cristo si è fermato ad Eboli", Carlo Levi perfectly describe, beyond the drama of the image, the incredible living system that has been created over the centuries, together with the congestion and degeneration of its tissue, typical of the last years. Omitting the complex historical and legislative events of these last fifty years, the object, a small building system, collected around enclosures and along galleries, districts, terraces and streets, and the quantitative dimension of such recovery operation, in part already laboriously begun, propose the methodological problems connected to the intervention on the existing buildings. Several studies and researches made in more or less recent times, a Code of Practice and a Handbook of Recovery demonstrate, as to the "Sassi" of Matera, the necessity to face the recovery by understanding the urban environment and to define a cultural tendency and a code of practice, that could allow to live in the "Sassi" again, without any alteration of its characteristics. Many other aspects of the complex recovery operations are somehow neglected, as the operating reality and some argued results can demonstrate.

Research has already faced the aspects connected to the knowledge of the sphere of intervention, to the hygienic improvement of the environment, to the monitoring systems and no-destructive tests for the control of indoor quality, as well as those referring to the problems of introducing technological services [1] [2] [3] [4]. Here, we will focus the attention on the mostly functional topics, underlining as the change of destination of use, although appearing as a "transformative-like" action, could often ensure in reality a more appropriate preservation of the original morphological, typological and technological characteristics.

The recovery and re-functionality of a such a widespread historical center, with articulated historical, formal and architectural characteristics, as the "Sassi" of Matera, have necessarily take into consideration the different functions to be included, as residences, services, etc. There is a focus on clearly complex problems that involve an original interdisciplinary form, based not only on the empirical level of the dialogical-communicative comparison amongst several designer engineers, but also on the ways of action that could consider the interference and superimposition sphere of the different subjects and on the relationship between the knowledge of existing situation and the performance requirements connected to the new use. Therefore, the consequence of the recovery action is much more than a mere moment when to chose the modality of required performances, but it becomes an accurate study of both users' requirements and possible alternatives, in order to satisfy them in coherence with the architectural characteristics of the existing structure.

By studying the relation amongst building, new destination of use, relative requirements, consequent technological equipment and preservation of the existing values, once defined the "system of values" (i.e. all limits that the architecture sets to the possibility of changing and adjusting to new requirements, without loosing its own characteristics) and the "system of uses" (i.e. all the technical and technological choices coming from the individuation of the requirements and of the performance purposes), it is possible to define the system of congruencies amongst them, i.e. the system of relations that link them up in terms of technical and cultural acceptability.

The system of uses, as a whole of technical and technological choices coming from the performance that users require, is made by possible approaches to functional (and relative technical-technological) problems, that is to say from possible way of action in leading a re-use intervention. In comparison with a more general classification, already done [X], newly introduced requirements and performances (and, operatively, characteristics and elements) can be simply "added" to the existing architecture. Such a superimposition can be carried out with a variable accidental degree, going from a controlled process where new

Fig.2 - Locanda of S.Martino (after the intervention)

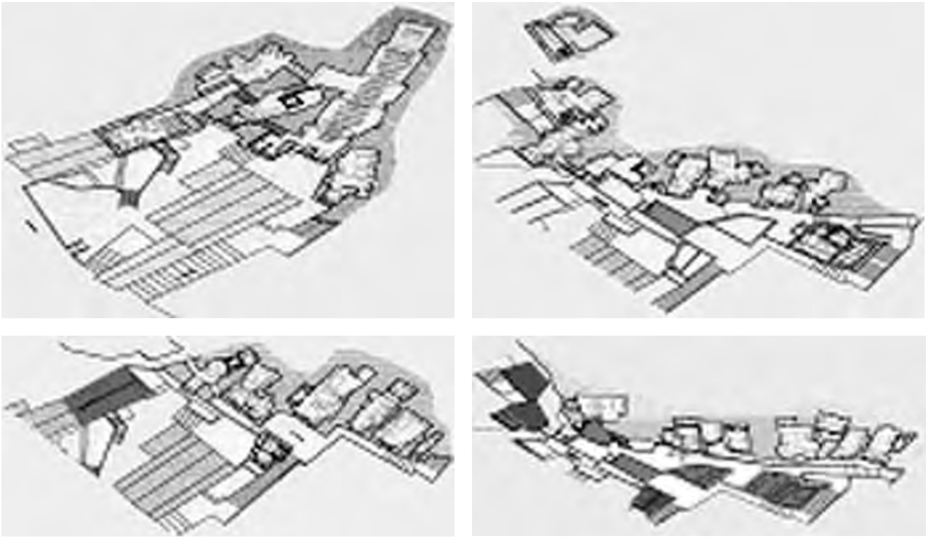

Fig.3 - Functional layout and typological arrangement of the Locanda S. Martino

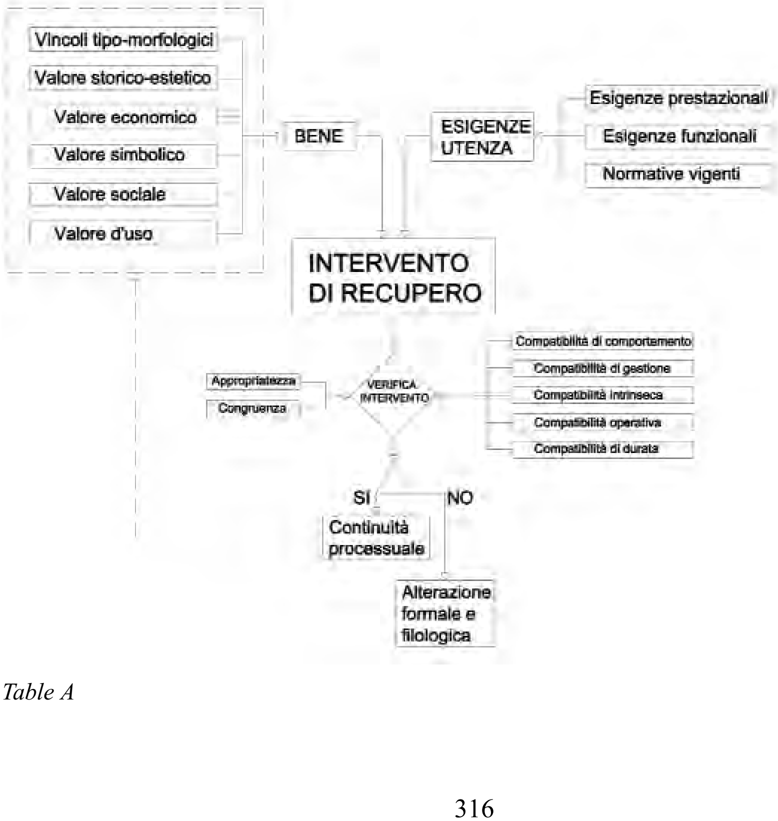

Table A

performances and elements combine with the building system configuration and gain a formal validity in defining space, to a process without any specific control where they are added to the existing configuration, without establishing any kind of relationship with it and in a complete lack of interest. Another quite spread and formal action procedure consists of a presumed "integration" of performances and elements in the existing architecture, that disguise themselves into structural elements, causing to them a heavy tampering. The determination of compatibilities and congruities system goes through the analysis of different procedures on the basis of the values system of the "Sassi" of Matera.
A "congruent" recovery allows to verify the appropriateness of the choices, becoming a global action – going over the logic of "case by case" – concerning both conservation and necessity of maintaining the historical nature (the historical "accumulation") – that is to say to make it legible also through its changes (but not identity cancellations) – and necessity of accomodation the existing buildings to several new users' requirements.
In the superimposition procedure, the appropriateness (respectful of the existing building in its material aspect) is associated to the variability of relations between performance and elements, on one side, and existing architecture, on the other (so, as above-mentioned, between the "system of uses" and the "system if values"), that does not ensure the conservation (integral or integrated) of formal and special values in particular. Therefore, it is a not-absolute appropriateness, since it is necessary to verify, as final result, in which way and how intensively the new elements are related to the existing architecture. Therefore, if the superimposition action is coherently and particularly controlled, giving a sense of continuity between the old and new, it cannot affect the typical logic of the architecture of the "Sassi", in its formal, special and material aspect. Whereas, the superimposition of new functions, performances and elements, without any interest in and connection with the original structure, generates a clear-cut distinction between new uses and the particular architecture of the "Sassi" that, instead of solving and improving the dualism between old and new, it heightens its sense of opposition and extraneousness.
The simplistic traits of the presumed integration action and the consequent and desired inexistent interaction between new and old elements prevent this procedure from any possible congruence. The concealment inside the building structures, a procedure particularly widespread in the residential recovery, if it seems to respect a logic of not distortion of existing formal and spatial values, in the reality it is the less exacting way to develop the architectural-distributive-functional recovery procedure, in a complete autonomy. Therefore, the apparent predominance of the esthetic character hides the incapability to an interdisciplinary approach, that often becomes the consequent cancellation of the existing material characteristic.
The considerations carried on point out that the essence of intervention quality, referable to the functional architectural-formal, material and static-building aspects, is the "quality" of the choices and implemented solutions and the "quality of connection", concerning the relation that intervention establishes with the old building. These remarks, result of the evolution of the contemporary discussion about the recovery of historical architecture, explain, in the case of the traditional urban spheres, the widespread choice of maintaining the original destination (changed only because of the historical impossibility of mainte-

nance) and of the use of traditional intervention techniques, almost contrasting the introduction of new functions and the use of "modern" materials and technologies, quite often dogmatically adopted and without any sufficient and deep preliminary verification of their effects. Such a series of obviousness do not have to be in any case represent a theoretical preclusion for implementing functional also innovative choices, whose role can be found in the definition of a new balance between space, preserved materials and new functional and technological elements: not a requirement of modernity that is an end in itself, as already said, but a way for preserving and for connecting tradition – when this cannot answer to specific requirements – to the contemporary world. The aim–as synthetically clarified in the table A - is not the transformation of building organism but its preservation, the connection between modern performance requirements and the respect of its authenticity, of its original building language and of the necessity of preserving it in the course of time, through new and more appropriate functions, in order to allow a possible recovery of spaces and structures that could be otherwise reinserted with difficulty in the procession life cycle, unless without avoiding heavy tampering.

3.0 Case studies: the "Locanda di S. Martino" and the "Hotel S. Angelo"

The above-mentioned approach has been verified in the two representative case studies, two receptive structures, the "Locanda di S.Martino" and the "Hotel S.Angelo", different in their function but, at the same time, similar in forms and architectural peculiarities, that can confirm all methodological considerations described in the previous paragraph.
In the case of the "*Locanda di San Martino"*, the aim of the intervention was recover and functionally adapt real estate units, always used as residences, partially built and almost entirely dug in the rock, in order to recreate that "unity of neighborhoods", typical aggregations of the ancient districts, restored in a revisited hospitality tourist identity: the particular configuration of the spaces inside the "Sassi" allowed to create articulated spaces with several rooms that, maintaining the original configuration made by millennia of human presence, are equipped with all common and complementary facilities and services, offering a good performance quality and indoor comfort.
The morphological organization the identified structure can be particularly adapt for this transformations into aggregation of independent unit, but organically connected, thanks to the natural presence of existing urban connections as road network and natural connectors amid units. If, from one side, the articulation and the extension of the intervention area represent a complexity of the problem concerning urbanizations and technological equipment, on the other side, the spatial distribution and the typological characteristics of the system (essentially the series of the one-room units) simplify the system the service network. In fact the distributive-functional preservation of the original characteristic of the independent unit breaks down the whole of the above-mentioned system rendering it a sum of individuals simple networks.
Pictures 1,2 and 3 are an example of what has been just said.
The same methodological exacteness in interventions, characterized by apparently different problems, is evident in a recovery and reconversion intervention of another structure located in the "Sasso Caveoso", for realizing the "*Hotel S.Angelo*", a second receptive

structure. It includes a series of rooms constituted of different real estate units, deeply articulated in their spatial organization end in their morphological and building characteristics. Also in this case, the structure has the same technical and technological characteristics described and analyzed in the previous case study, developing a horizontal and gallery-like distribution, by using the existing roads network that now becomes a real distribution open space. The above-mentioned concept of "appropriateness and congruity" can be easily confirmed in these two interventions of functional, structural and material "controlled transformation", that allowed to transform these typological residential aggregations into receptive structures, where housing-units kept their peculiar characteristics, but have been equipped with connections, services and facilities in order to adapt each single space to elevated quality standards.

4.0 Conclusions

Case studies clearly demonstrate how the typological and morphological complexity of these housing-units is apparently an unsolved problem: they become the way through which it is possible to transfer the architectural and historical heritage to future, that could be otherwise endangered. Therefore, a appropriate and compatible intervention is in the definition of the new destination of use of the spaces; knowing the values of the "past" is an important way for approaching the future. Therefore, the evaluation of appropriateness and congruity, the system of compatibilities, represent a clear indication for possible choices, in order to recover the building system of the "Sassi", preserving its values.

Notes

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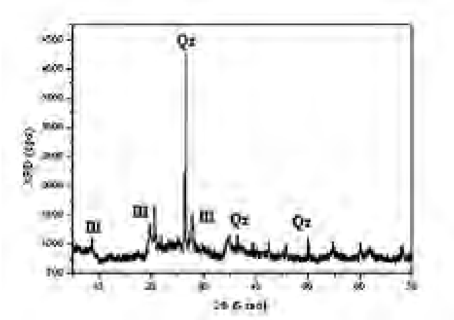


Fig. 1 - XRD spectra of clay

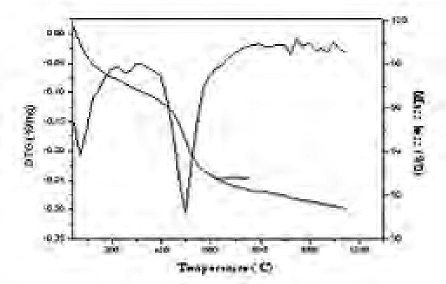


Fig. 2 - TG-DTG curves of clay

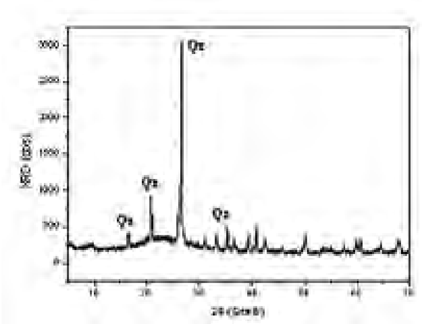


Fig. 3 - XRD spectra of ceramic waste

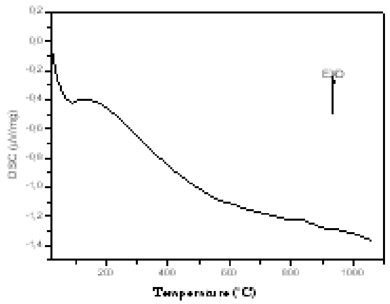


Fig. 4 - DSC curve of ceramic waste

MIXTURE (%Wt)	X = Chamotte		X = Sand	
	Smaller Dimension	Greater Dimension	Smaller Dimension	Greater Dimension
95% Clay ; 5% X	1.00	0.93	0.98	0.99
90% Clay ; 10% X	0.91	0.82	1.00	0.98
85% Clay ; 15% X	0.91	0.79	0.95	0.98
80% Clay ; 10% Feldspar; 10% X	0.84	0.79	0.77	0.82
85% Clay ; 5% Feldspar; 10% X	0.88	0.77	0.79	0.77

Tab. 1 - Percentage shrinkage in drying of several mixtures

M. Guzzo [1], D. Vuono [2], A. Nastro [3]

INDUSTRIAL CERAMIC WASTES USED IN TILES CHARACTERISATION OF OBTAINED PRODUCTS

1.0 Abstract

The aim of this research is to determine the chemical–physical properties of ceramic tiles with wastes of sanitaryware industry used as inert material instead of the sand.
The first step of the study is the determination of properties of wastes. The characterisation of this material is carried out by XRD analysis, SEM and EDX analyses. The clay raw materials used in tiles production are extracted from Rosarno's quarries (Southern Italy). The characterisation of clay is carried out in the same way of wastes.
The tiles are fired at 1080°C and pressed at 300 bar. The shape of the frame is rectangular having dimensions of 5,5 cm x 11 cm. The mixtures are composed by feldspar, clay and ceramic wastes in several amounts. The water content of slip is 10 wt %. The colour of products is red due to high iron amount of clay. The classification of obtained tiles is carried out using UNI–EN norms. The water adsorption, mechanical strength, abrasion analysis, chemical resistance are determined. The linear shrinkage and shrinkage after firing are determined too. The classification of tiles is BIIb or BIII (UNI EN 99). The obtained results are compared with those of tiles with sand used as inert material. The mechanical properties are higher and water absorptions are lower for tiles with ceramic wastes. We can conclude that the tiles with wastes are better than those obtained with sand.

3.0 Introduction

The question of the waste material disposal has become more and more an international problem. The use of the dumps does not provide a solution to the problem, moreover this could create an amount of wastes with negative consequences on the environment and human health. The most effective way of dealing with disposal wastes is to recycle them. Once some material has been used, it does not necessarily become a waste, but it can be cleaned and recycled without changing its compounds. Interesting results were made by A.F. Gualtieri and A. Tartaglia who studied the thermal decomposition of asbestos and recycling in traditional ceramics[4,5]. M. M. Jordàn et al. performed application of sewage sludge in the manufacturing of ceramic tile bodies. Their research shows the

results of the substitution of clay for sewage sludge in different proportions in a ceramic body[6,7]. T. Baseggio et al. carried out a feasibility study on the immobilisation of tannery sludge by producing a ceramic product. The main purpose of his work was to test the clays used in the manufacture of a ceramic that could incorporate tannery sludge[8]. Guzzo et al. have produced ceramic tiles using industrial wastes coming from hydrometallurgical industry of the zinc. The study shows how it is possible to recycle 6% of the weight based on zinc[9].
In this work rather than using sand, we propose to insert waste of vitreous-china (chamotte) within tiles made of clay and feldspar. The intent of this research is to establish whether the use of chamotte allows to decrease the material porosity and to improve the bending strength.
Its use is inexpensive and ecological. Indeed, it is the reutilization of an industrial waste that allows to economize on the disposal costs and to use it, in the mixture, as a substitute for more expensive materials. There are many other reasons to promote the use of this material; for example in the technology field:

a) The chamotte is not an inert material because it is made up of ground wastes; so it has a flux action that allows to reduce the feldspar in the mixture;

b) Thanks to its high alumina content (23-24% on average), the use of chamotte in the mixture improves the connection between vitrification/deformation, if it is rightly substituted with quartz and feldspar.

c) Instead of quartz, the use of chamotte allows to reduce the transformation quartz α – quartz β and its negative effects.

3.0 Experimental

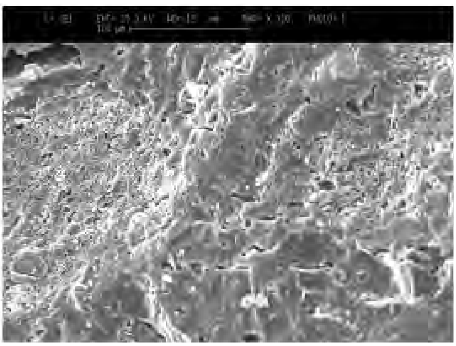
All raw materials and the ceramic waste (chamotte) have been analysed through X-ray diffraction to determine the crystalline phase of every single sample; then, they have been analysed through thermal analyses (TG, DTG or DSC) to study the change of materials during the increase of temperature.
The samples were identified by powder XRD on a Philips PW 1830 diffractometer using CuKa radiation. The scanning speed was 0.02° s^{-1} in the 5–45° 2 range. The thermal stability and the mass loss were determined by thermogravimetry, DTG, DSC using an STA 429 Netzsch instrument. The speed of temperature increase was 10°C min^{-1} in static air. The temperature range was 20–1100°C[10].

4.0 Results and discussion

Figure 1 shows that clay is predominantly made up of illite, quartz and traces of oligoclase.The diffractometric analyses highlight that the illite phase has a basal refraction at about 10 Å (corresponding to 8.7455° 2?). The XRD pattern does not show impurities in clays, but it is necessary to use additives. Figure 2 shows the TG and DTG curves of the clay used. At the temperatures of 100 e 500°C, the DTG curve shows two high peaks. The first peak marks the loss of zeolitic water, the second one shows the loss of structural water. The TG curve marks the loss of weight.

MIXTURE (%Wt)	X = Chamotte		X = Sand	
	Smaller Dimension	Greater Dimension	Smaller Dimension	Greater Dimension
95% Clay ; 5% X	3.11	2.68	4.40	4.43
90% Clay ; 10% X	3.43	3..38	3.85	3.78
85% Clay ; 15% X	2.97	2..97	3.30	3.21
80% Clay ; 10% Feldspar; 10% X	2.42	2..35	2.15	2.22
85% Clay ; 5% Feldspar; 10% X	2.74	2..81	2.65	2.70

Tab. 2 - Linear shrinkage after firing of several mixtures



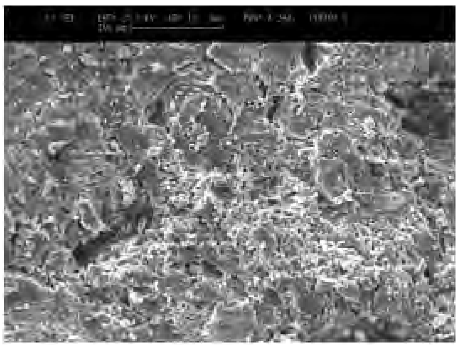


Fig. 5a - SEM image of sample obtained with clay and chamotte (10%)
Fig. 5b - SEM image of sample obtained with clay and sand (10%)

MIXTURE (%Wt)	X = Chamotte		X = Sand	
	Water adsorption (%WA)	Group	Water adsorption (%WA)	Group
95% Clay ; 5% X	9.15	BIIb	9.80	BIIb
90% Clay ; 10% X	9.24	BIIb	10.25	BIII
85% Clay ; 15% X	9.69	BIIb	10.31	BIII
80% Clay ; 10% Feldspar; 10% X	12.25	BIII	11.99	BIII
85% Clay ; 5% Feldspar; 10% X	11.69	BIII	10.19	BIII

Tab. 3 - Water adsorption and group of tiles for different mixtures

MIXTURE (%Wt)	X = Chamotte	X = Sand
	Bending strength (N/mm2)	Bending strength (N/mm2)
95% Clay ; 5% X	17.84	16.89
90% Clay ; 10% X	16.95	16.35
85% Clay ; 15% X	16.09	16.18
80% Clay ; 10% Feldspar; 10% X	15.49	13.34
85% Clay ; 5% Feldspar; 10% X	14.93	14.25

Tab. 4 - Bending Strength of different mixtures

The graphs in figure 3 and in figure 4 show the ceramic waste.

Figure 3 shows how the ceramic waste is predominantly made up of quartz, so this material can be used as inert. Figure 4 shows the DSC curve. At the temperature of 100°C there is only one exothermic peak. This analysis has determined that the ceramic waste becomes inert at 1080°C below. This result shows that it can be used instead of sand in the ceramic mixture. The use of ceramic waste allows to economize on raw materials. Moreover, it does not necessitate chemical or thermal pretreatment because it is made up of inert materials. The first test has been the shrinkage of the raw tile at the end of drying process. Shaped to a pressure of 300 bar, the tiles which have two different inert components, were put into a thermoventilated oven at the temperature of 100°C for 24 hours. Table 1 shows the ten mixtures analysed (5 made up of chamotte and 5 made up of sand) and their shrinkage after the drying process.

In this phase there are no particular differences among the mixtures obtained with ceramic waste and the mixtures with sand. Table 1 shows that any mixture does not exceed the shrinkage of 1%. The shrinkage phenomena of all tiles decrease in the two dimensions when the inert material increases. Indeed, in both cases, the properties of the raw material are very good. The mixtures of feldspar show interesting results: the shrinkages recorded are lower than shrinkages of clay mixtures.

Table 2 shows the linear shrinkage after firing. The firing temperature has been of 1080°C in a kiln for 60 minutes.

According to the table above, we can observe that the ceramic waste causes a greater decrease of shrinkage than mixtures made with sand in both dimensions.

The decrease of clay and the increase of inert cause the shrinkage reduction in the product after the firing in both dimensions.

SEM images of samples having 90% of clay and 10% of chamotte (figure 5a), and 90% of clay and 10% of sand (figure 5b) are the results after the firing process. For their mechanical and aesthetic qualities, these mixtures are considered the best, according to their results.The SEM images show that the tile of chamotte has a great compactness because, the number of pores examined under the microscope are lower than tile of sand. So, during the firing phase, the chamotte alloys with clay, instead of the sand remains inert. In fact figure 5b shows that some grains of sand are immersed in the ceramic matrix.

Table 3 follows the UNI-EN 99 rule. This rule is important to determine the group where all tiles belong to.

Table 3 shows that considering the same quantity of clay, the mixtures with ceramic waste have a lower absorption of water than the mixtures with sand.

When the inert is the waste (chamotte), the mixtures of the group BIIb are three, instead, when the inert is the sand, the mixture is only one.

In both cases the feldspar tiles record values of water absorption >10%. Table 4 shows the results after bending strength tests.

The results of bending strength confirm the data shown in table 3. In fact, the tiles of ceramic waste record greater values than the tiles of sand.

Similar data are obtained when the feldspar is in the mixture. Using indifferently ceramic waste or sand, the results show that the first three mixtures have values that exceed the limit of the rule (16 N/mm^2). Moreover, we can observe that the introduction of inert (chamotte or sand) in amount >15% causes a mechanical deterioration of the product.
The mixtures that do not exceed the value of the rule should be used like coating tiles.
Table 5 shows the data of deep abrasion (UNI-EN 102).
Table 5 shows how the volume of the abraded material has a little increase when the inert percentage increases.
It is clear that the tiles of ceramic waste record a lower volume of abraded material than the volume of sand tiles. We can observe this result in table 4. The presence of the waste causes a little improvement.
The last test is to determine the chemical resistance of the tiles (UNI-EN 106). The samples (five in every mixture) are immersed in test solution and we can observe the results after 28 days.
The solution used is made up of chemical products of domestic use. At the end of the test few tiles have caused problems. Tiles with elevated percentage of clay show a naked eye decays. The most frequent visible change on the surface is the presence of a whitish halo which grows thin in the slope.
There have been traces of whitish halo on cut and not cut edges. The most sensitive mixtures have a lot of clay. The presence of two different inert does not have changed the results at the end of test.

5.0 Conclusions

At the end of the tests we can conclude that the use of waste (chamotte) in the initial mixture causes an improvement on mechanical and dimensional characteristics, as well as on the porosity of finished products.
In fact the study shows how the inert improves its qualities with chamotte and not with sand.
Some results of table 3 show that the presence of chamotte in the mixture causes a decrease of porosity and then a slipping of the group of belongings (from BIII to BIIb).
These results show two important aspects: first, the use of chamotte is inexpensive and ecological and then its use allows the reutilization of an industrial product destinated to become a waste materials.

MIXTURE (%Wt)	X = Chamotte		X = Sand	
	Length trace (mm)	Abraded material volume (mm3)	Length trace (mm)	Abraded material volume (mm3)
95% Clay ; 5% X	30.03	228	34.02	330
90% Clay ; 10% X	30.65	242	36.62	412
85% Clay ; 15% X	32.90	296	38.93	490
80% Clay ; 10% Feldspar; 10% X	37.22	430	38.82	487
85% Clay ; 5% Feldspar; 10% X	29.77	220	34.30	338

Tab. 5 - Abraded material volume of different mixtures

Notes

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Fig.1 - Paradisi Terrestris

A. Guzzon [1]

URBAN UTOPIA IN THE NINETEENTH CENTURY AND NEW TOWNS IN ITALY

The town cannot be considered as something separate from society and its transformations, for this reason the historical theory explained in this study, aims to connect architecture with the town and its population; this is characterized by endless struggle between chaos and reason, between organised and spontaneous settlements.
The first "urban Utopia" is Earthly Paradise, where architecture expresses itself in the archetype of the "enclosure", considered as a place to be protected against the chaos of nature (Fig. 1)
Until populations became masters of their destiny, the historic establishment of towns and the formal patterns that were sometimes connected to them were regularly referred to as geometric unitary models: from the first terramara of the Bronze Age to the Roman fortified castrum, to the Greek town that recalled natural elements and to the geometric plan of the Renaissance ideal town.
The rediscovered scientific rationality of the ancient town, as a result of the archaeological studies[2] (Ercolano 1711, Pompei 1748), led to the rational control of planning, which became systematic, and aesthetic principles became important Classical rules were still followed but they were expressed according to the scientific precision of Neo-Classicism and then of Neo-Gothic Viollet le Duc), Neo-Byzantine, Neo-Arab, Neo-Indian (John Nash) Neo-renaissance revivals.
With the Industrial Revolution, buildings grew in an uncontrolled manner and the harsh reality of the industrial town appeared in all its brutality. A critical awareness of the industrial town developed in different ways, but not through architecture, and both conservatives and liberals, aristocrats and democrats completely refused to accept it.
Some "utopian socialists", who were neither architects nor engineers, became involved in trying to resolve the problems posed by this new reality (Fig. 2).
The first was Robert Owen (1771-1858)[3] with New Harmony (Fig.3). He was a shop assistant, then a successful business man, and in the end a politician.
In 1799 Owen succeeded in buying the spinning-mills of New Lanark in Scotland together with other partners and he transformed them into an exemplary factory. He brought in modern machines, moderate working hours, good wages and near the factory he built

good housing, a primary school and the first day-nursery in England. Notwithstanding all these investments he was able to gain very high profits.
Charles Fourier, the theorist of the Falansterio, (1772-1837) belonged to the same period as Owen. He was a simple French employer from Besancon and without Owen's means and personal intelligence.
In opposition to the town of this era (half way between barbarity and civilisation) –considered by Fourier as shapeless- the proposed town was to be built according to a concentric plan: in the middle the commercial and administrative centres, around them the industrial town and then the rural one.
Although the Utopians initially had some success, they had little luck: in the second half of the nineteenth century there was a definitive acceptance of the urban conflicts caused by increasing industrialisation and a pragmatic attempt to solve them through technical and planning devices, the aim of which was to improve social and hygienic condition.
It was the time of significant interventions in most important European capitals such as London (1848-1865), Vienna (the interventions on the ring in 1859-1872), Bruxelles, Barcellona. Florence, etc., carried out according to the example of the Paris of Hausmann, but with their own rules.
A proliferation of theoretic and geometric schemes followed but these were unsuitable to the assimilation of metropolitan complexity, for example: the linear town for Madrid by Soria Y Mata (1882), the ring-town for the Wagnerian Vienna, the idea of developing London through satellite towns (Howard 1898).
Another way to resolve the situation was offered by F.Lloyd Wrights with Broadacre City, a settlement of 10 square kilometres for 1400 families including small farms, small non-polluting factories, decentralised schools, monorails, roads differentiated according to traffic, typological different cheap houses. Every family should have an
acre of land. The town should be "governed" by the architect "in a system that could be called architectocracy".
The Italian experiences adopted the solution of building "Minor towns" with different productive functions according to the aim for which they were built for instance: industrial centres, artistic centres such as Sabaudia by G. Cancelotti, E. Montuori, L. Piccinato Scalpelli or Littoria by Frazzotti in 1932. They grew also for propaganda purposes. The operating scheme of Sabaudia contemplated the direct link of the town to Littoria and to Rome which was the seat of the farm O.N.C., the owner of the lands in Sabaudia. Therefore, in comparison to other foreign experience, extra -urban villages here were linked to the town in a much more effective way.
In Italy there was a great interest in forms considered as alternatives to big towns and big industry, slogans about the healthiness and morality of rural life were created, but at the same time without underestimating the opportunities offered by big cities.
A hitherto largely unknown known chapter of the Italian urban and architectonic history is that of the inner migrations of the twentieth century that took place with the aim of reclaiming those parts of the national territory afflicted by malaria and of conquering new lands and turning them over to agriculture.
It was necessary to solve the social emergency of many day labourers who suddenly had

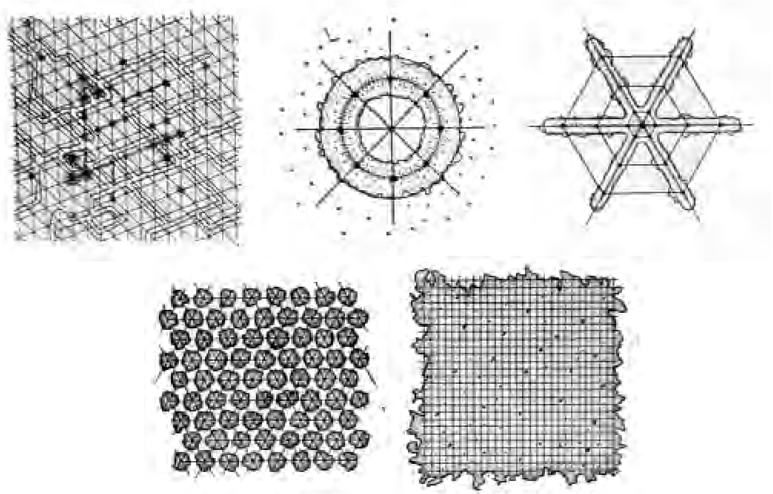


Fig.2 - Urban type settlements

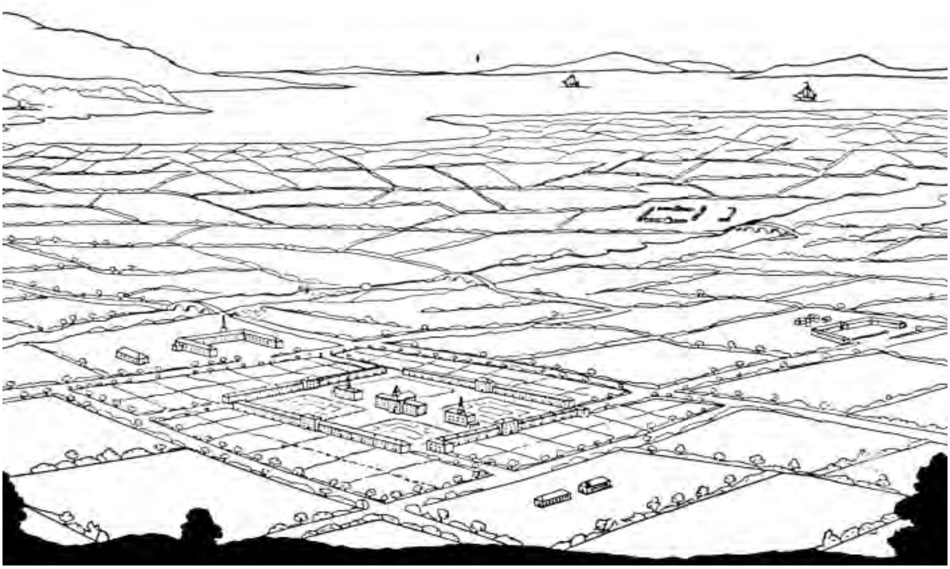


Fig.3 - Robert Owen, New Harmony (1817), rural city from 500 to 3000 inhabitants

Fig 4 - Sabaudia, italian New town (archh.G.Cancellotti, E. Montuori, C. Piccinato,1934)

no work after the end of the land reclamation schemes in Ferrara. Lots of other unemployed persons from Forlì, Bologna, Ravenna, Modena, Reggio Emilia, Rovigo, Padova, Treviso joined them to embark on the enterprise of land reclamation in the Agro Pontino. The outcome was the reclamation of more than 6.500 hectares land and the foundation of about 3.000 new farms with their farm-houses. A new concept regarding colonisation was conceived and besides the activity of land reclamation there was a frantic building trend: villages, service centres and from 1932 to 1938 new towns such as Littoria in 1932, Sabaudia in 1934 (Fig. 4), Pontinia e Guidonia in 1935, Aprilia in 1936 e Pomezia in 1938.

From an urban and architectonic point of view, the new towns went back to the ancient pattern of the Roman military settlement. The map of the town was right-angled, usually with four squares and in the town-centre a rectangular square sometimes characterised by arcades.

The period in which this trend developed was from 1929 to 1936. In 1929 a first plan of the hydraulic intervention was carried out by the Land Reclamation Institutions, the aim of which was the reclamation of marshes. In 1931 the complete land conversion of the

area started in conformity with the prescribing rules of the Integral Reclamation, supervised by the National Institute for Fighters. In 1939 Pomezia was inaugurated and the "reclamation" of the Agro Pontino was regarded as technically complete.
The typical candidates for this "promised land" were ex-tenants from Emilia Romagna, Venetia and Lombardy. The immigrants from Emilia Romagna mostly came from Ferrara and its Province and especially from the southern part of this area from November 1933 to February 1935.
These farmers were chosen as they were accustomed to the hard work in the country and had great experience with reclamation gained in their own native land.
When the house and the farm were ready, the assigned families received a letter or a telegram from Rome in which they found the departure day and time of the train from the railway station of Ferrara.
The reclamation of the countryside in the Agro Pontino was an event based on a new concept of land reclamation and colonisation. This pattern was exported to Africa by the member of the quadrumvirate Italo Balbo from Ferrara, Minister of Agriculture from 1929 to 1933, when he became Governor of Libya and opened doors to new farmers. But the attempt failed because of technical mistakes and war events. These settlements testify to how they succeeded in conjugating land reclamation with the social and economic development through the foundation of modern and functional towns.
To sum up we can say that the industrial society was born as an urban society and that it tried to give itself a form, but because of the subsequent development of metropolis together with the creation of urban aggregates it lost its identity. Today we need experts if we want to monitor its developments ,at least in a partial way. In fact, from the post-war period there has been a renunciation of research into form and a tacit acceptance of interventions executed in piecemeal style.

Notes

1. University of Ferrara, Civicarch
2. J.J.Winckelman, Storia dell'Arte Antica, 1764
3. Leonardo Benevolo, Storia dell'Architettura Moderna, ed. Laterza - Bari

Fig.1 - Aerial view of the historical centre: in white colour the Vittorio Emanuele main street.

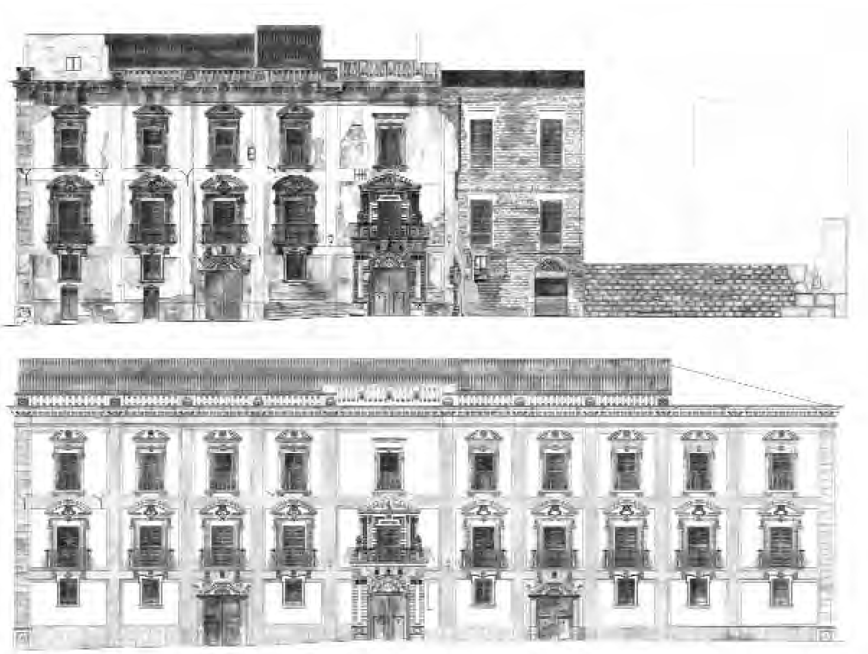


Fig.2 - Actual survey and philological reconstruction proposal of Ugo delle Favare palace, in one of the squares along the Vittorio Emanuele main street.

G. Fatta, T. Campisi, M. Li Castri, C. Vinci

THE RE-QUALIFICATION OF ARCHITECTURAL FAÇADES ALONG THE *VITTORIO EMANUELE* MAIN STREET IN PALERMO

1.0 The cultural and urban context

In the last decades some local communities had been in evident disagreement with the Italian academy, strongly reluctant to accept that the historical environment of our cities is to safeguard, to preserve, to mend, rather than to become a place of capricious and glimmering experimentations. Through urban plans and practice codes, they have sensitized designers and operators about the necessity to intervene on historical built, keeping in mind the typical features of the environment, defined by materials, constructive techniques and lexical schemes that characterize the local architecture. An example of a certain interest is given by the Executive Plan of Palermo Historical Centre (PPE), that privileges the history and the maintenance of the environment, founding solutions that allow historical building continuity, cancelled by tragic happenings.

In a sufficiently homogeneous context about the quality of the architectures and, unfortunately, about their decay, a joined initiative between the Municipality and the University of Palermo has promoted a study finalized to the restoration of the architectural fronts that lean out on the Vittorio Emanuele main street. Formerly via Marmorea, Cassaro, Toledo street, from the last post war period this real city "founding axis" suffers from the war damages and the progressive abandonment of the Historical Centre due to senseless town planning choices; it appears strongly degraded in its physical constitution, also for its destination as street of communication with an intense car traffic.

The re qualification of the constitutive material and of the aspect of the architectural fronts is inserted in the furrow of the application experiences of the PPE, that postulates the maintenance of the existing architecture and the restoration of the forma urbis of the pre-modern city, supposing the whole urban body of the historical centre is to be regarded as a monumental unicum, ranging from the aulic architecture to the so-called one "minor buildings".

This unitary interpretation of the Vittorio Emanuele main street, as homogeneous "monumental context" has to have a reckoning with the material reality, outcome of a millenary process of adaptation and transformation of the same mountain-sea stratified course; it is marked by changes of the coast line and the systems of defence of the city, by rectifications and partial widening, by prolongations and significant altimetric variations of the monumental axis, by cuts

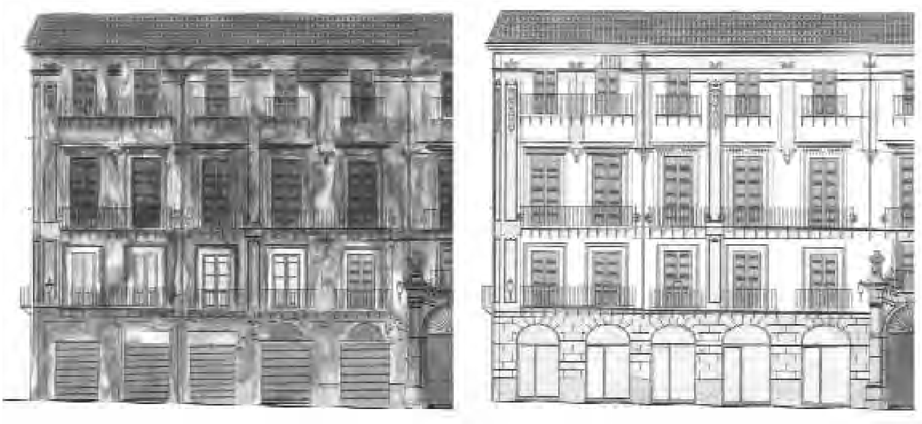


Fig.3 - Actual survey and reconstruction proposal of a part of Amari palace.

for the constitution of transversal streets, above all Maqueda street intersection which individualizes the city barycentre.

Since its origins the road was a privileged place of performance and relationship between civil power (the Royal Palace and the Pretorio Palace) and religious power (Archbishop Palace and Cathedral), merchant axis eminently also for the direct connection with the commercial port of the Cala. The architectural fronts, interposed with narrow alleys that mark weak caesuras in the continuity of architectural solid parts, lean out in compact sequence on this narrow and long axis of over than 2,5 kilometres, interrupted by rare open spaces and orthogonal roads. In the actual facies the architectures are the results of building interventions stratified in time on an ancient setting up: we can find interventions of union and reconfiguration, favoured by norms thought to blend small buildings and stores into an aulic architecture, immediately recognizable through the analysis of the plants and the different building thickness of the ground floors. It has primarily determined an architecture characterized by the noble mansions typologies, enriched with decorative apparatus where today the Baroque and the nineteenth-century neoclassic lexicon prevail, concealing centuries of history to rediscover.

Up to the whole nineteenth-century, buildings and their façades had been object of considerable renewals dictated by new owners' auto-celebration demands, but much more by specific prescriptions of mayors of a city which aspired to measure itself with the greater ones of the new Unitary State. The modification of ground floors with a commercial purpose are of the same period, with the change of the narrow shops with the unpredictable openings on road, in contrast with fronts about form and position, for the nimble and opened ground floors, healthy and of a noble and grandiose aspect as it suits to a great city. (Salemi E. 1886.)

The last definitive transformations suffered by the fronts of the Vittorio Emanuele main street go back to the tragic war events that created partial collapses and empty spaces in the city, following often incongruous reconstructions with extraneous language to the environment. The urban development of the second post war Palermo is a complex history, also because of the wide abandonment of the historical centre, that made it a sort of inner suburb, and because

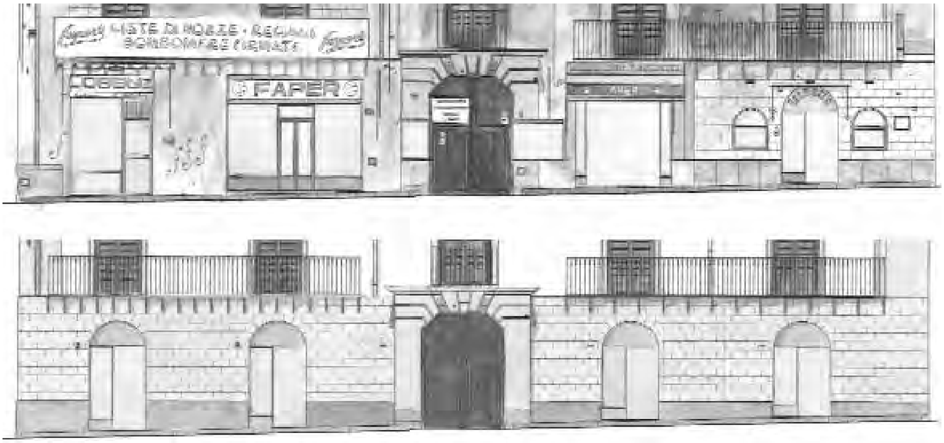


Fig.4 - Actual survey and reconfiguration proposal of ground floor openings of Imperatore palace.

of the deficiency of general interest for the ancient part of the city; no one has produced any concrete action for limiting the obsolescence of the ordinary parts and the tampering of the monumental ones, or for regulating in a suitable way the transit of light and heavy vehicles, poisonous for the citizens and destructive for the architectures.

2.0 The methodology of study and the results

The direct analysis of the architectural fronts on about sixty of the more meaningful civil buildings on the Vittorio Emanuele main street is founded on a cognitive trial that starts from the material reality, from what stays, in some cases even from the rubbles, from the elements that testify constructive practices, also “minor” or “poor” and therefore in the most greater part of the cases non encoded; these ones are recovered to the memory and the erecting yard through this study that uses some historical investigations, geometric and material surveys, some critical deconstruction of technical elements or its parts and finally of the survey of the failure and the decay as instruments for the analytical knowledge.

The results of the critical-historical research had shown a lot of the facts happened for reaching the actual facies, also allowing a deeper understanding of the founded damages in relationship with the facts that have interested the static spatial and constructive organization of the building: as simple examples of events that have engraved on the generality of the buildings, we can quote the reconfiguration of the altimetric profile of the middle nineteenth-century road plan and the uniformity according to new rules of the projections and the constructive ways of the balconies. Many elements had been important subjects for the search as the recognizable medieval scanning punctually revealed in the surrounding structural and road web, the following post sixteenth-century unions, the earthquakes, the completions, the redraw of the fronts in a monumental way and the nineteenth-century interventions of hygiene and decorum, the war events that have left deep traces, since Garibaldi period, finally the actual changes of destination of use dictated by the actual demands of commerce and economy: this has contributed to the definition of the actual figurative-constructive lexicon. The intervention hypothesis circumscribed only to the fronts so overcomes the apparent narrowness of ambit and it finds, therefore, justification in the fact that for a long time the fronts of the Vittorio Emanuele main street were been treated as scene architectures that they never find checking, if not for little parts, in the third dimension of the side fronts. This was made possible because of the reduced dimensions of the alleys that meet on the main street which prevents a visual continuity between principal fronts and same side front. Just for their nature of architectural apparatus, the fronts on the Cassaro street have always been object of readjustment and adaptation at the taste of the time, with overlaps that privileged plaster and stucco as materials functional of rapid and economic reconfiguration interventions.

The geometric survey had allowed to deepen the grammar of the fronts language, the variations beginning from every common base present in the local tradition, the asymmetries imputable to previous unions and following reconfigurations, disguised through shrewdness and real design artifices; besides the survey furnished elements to appraise assonances and recurrent elements in the composition of the building fronts, contributing to the definition of a repertoire of schemes, forms and decorative and symbolic motives useful for those buildings, or for parts of them, in which the lack of objective documentation has given an imprint more typological than philological to the proposal of restoration.

The survey of the constitutive subject of the different parts of fronts has been realized also through the macroscopic observation of withdrawn stratigraphic wedges where a detachment was already present, as well as cleaning with specific substances finalized to the recognition of the shades of colour and the treatments of the preceding layers; it allowed to address in project phase the more suitable methodologies of intervention and furnished addressing lines for the solution of the debated problem of the colour to choose. Thematic identification tables of the natural and artificial stones used in the fronts were drawn, with the purpose to recognize the constitutive materials, their recurrence and their different use.

We had concretized this study in design proposals which as a whole assume the sense of an intervention code since the material-constructive-environmental homogeneity of the analyzed context allowed the individualization of some recurrent critical elements (balconies, projections, decorative elements, mouldings, ashlars,…) on which is often possible to intervene according to codified procedures. The delimitation of the areas interested by failure and decay confirmed how cases and locations correspond to recurrences dictated by the geometries, the exposure to the polluting external agents by the techniques and the materials habitually used. Moreover, we verified how road geometries and its development determined a “canyon effect” that brings to the acceleration of the wind phenomena, so to create, with the strong solar exposure, the formation of biological incrustations and the evaporative and erosive actions.

A particular importance assumes the decay caused by people, produced by vandal actions, but even more by apposition of technological installations, sign-boards and shop-windows along the fronts or, worse, the widening of the exterior openings at the ground floors with the purpose to widen the commercial exposure areas. In some cases the excessive reduction of the wall breadth has determined dangerous sub-vertical fissures which attest the extreme failure of the residual masonries.

With the decisive contribution of the local history knowledge, the study proposes initially the

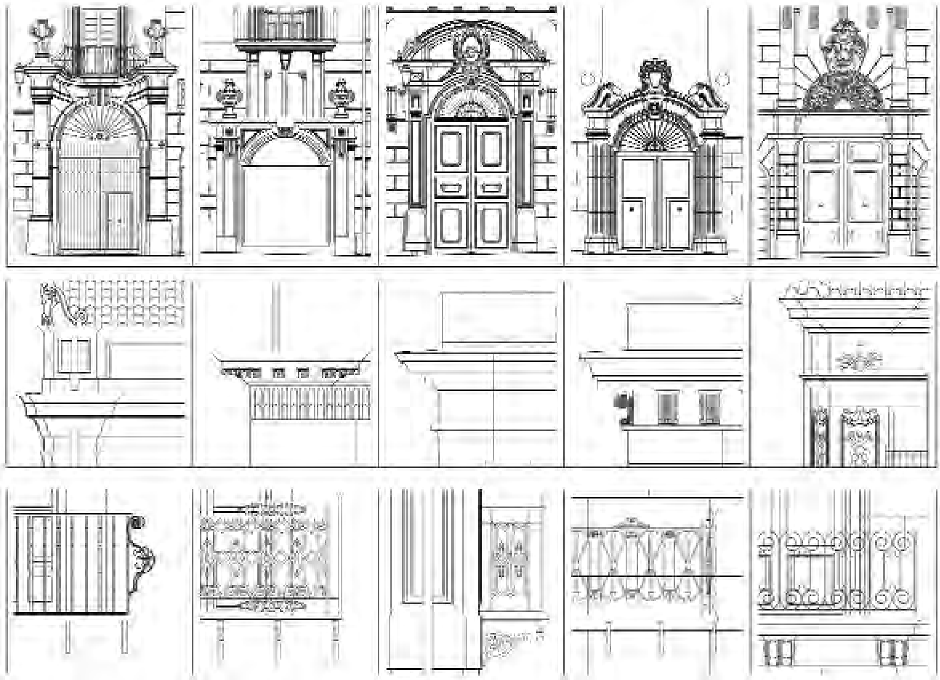


Fig. 5 - Geometrical survey of typical architectural and decorative elements.

restoration of the volumes through partial reconstructions and demolitions of incongruous additions, and subsequently the partial or, in some cases, total remaking of decorative apparatus, achieving interpretations and typological solutions in those cases (a few) in which iconographical or documentary support missed. This results concordant with an unitary interpretation of the main street in which every not resolved element constitutes an empty space of the fronts that is possible and opportune to fill.

The closer meeting with the architectural fronts and its characterizing lexicon, in the completion of the empty urban spaces had not been bridled by rigid philological interpretations, but it has allowed in many cases, with a particular reference to ground floors, to propose solutions that, coherently with the typologies deduced by the local tradition, could be suitable to modern demands of commerce without prejudice for the harmony of the façade: the building re qualification was not able indeed to set aside the economic and social appeals of a commercial context.

The complexity of the plastered and stucco backgrounds with inserts and portions treated in a plastic way, has imposed a verification of the shades of colour and general solutions selected through watercolour drawings, to effectively make the disuniformity of the surfaces and to rediscover a coloured city where white plaster and yellow-ochre of typical local stones (calcareniti conchiliari) are near amazing reds, greens and blues.

Figg. 1, 2 - Urban tissues in Madonie's area

Fig. 3 - Dwellings aggregation along a leaning road

G. Fatta, S. Lo Piccolo

THE TRADITIONAL ARCHITECTURE IN MOUNTAIN AREA OF WESTERN SICILY

1.0 Introduction

If we observe architecture with a careful eye, it will be an important key to understand and interpret the society that choices, creates and lives it; it constitutes a natural result of intersections among different and inextricable components: specificities inborn in places, histories that left a deep sign, cultures grown in an original way even if in continuous relationship with the surrounding universe that, despite hegemonic attempts, never could submit or wipe out local builders' expressions.

Many mountain and marginal areas of Sicily also express their insularity in the traditional ordinary buildings, not certainly with a specific intent, and therefore it's more interesting to investigate because it represents an original demonstration strongly tied up to the environment in which it develops. Where dependence from greater urban centres was attenuate, Sicilian constructive culture has gradually evolved, enriching itself with homogeneous technological and typological solutions, characterized by formal, constructive and typological base-models, that in time were adjusted to environment and settlement context.

If "art rules" derived from a technical culture transmitted from a generation to the other one, gradually and in a balanced way evolved, fruit of experiences originated by the relationship between men and environment, that now we would call as "sustainable", the abandonment of these not writings rules introduces elements that are able to limit the compatibility toward a pre-existing building culture, in contrast also with a specific architectural language and with settling and environmental conditions.

The vast mountain territory of Madonie, located on the dorsal that races along the Tyrrhenian sea, had diffusedly been urbanized since ancient times; the distance from cities and industrial agglomerations, associated with difficult road connections, has not only allowed the episodic permanence of some formal technological and materical values, founded on a deep-seated local tradition and on architectural characters consolidated by "art rules". The landscape environmental and architectural importance of this area has conducted to a recent constitution of the Regional Park that involved fifteen urban centres dense of history and culture, sufficiently homogeneous for their aggregative architectural and constructive characters, although with difference of sites, orography, histories and local situations.

The strong modifications and transformations produced in the last post war period by architectures of importation and by a kind of housebuilding - that we could define “of quantity”, imposed to the delicate historical urban tissues - hurt, but didn't hide, unitary signs characterizing historical centres making recognizable the existence of a real typical and regional architecture, even if with perceivable variations.

Together with interventions objectively and intentionally extraneous to local history and language, a careful reading individuates in ingenuousness and approximation of solutions a wish to take back the place code, from natural and artificial stone to wall structure in view, from opening apparatus to balconies. It’s necessary a guide that channels the pulsions in a strong cultural line, in existence and testified by these interventions, even if in the unacceptability of results. It contributes to give strength to whom holds necessary to recover and exploit the peculiarities of every regional architecture, of typical characters found again through typological approaches: the last ones permit to control the modifications, allow adjustments for a greater comfort, maintaining specificities without resorting to transformations that cancel the values consolidated by an ancient building culture.

2.0 Traditional buildings conformation, aggregation systems and typological models

The particular orographic conformation of sites and climatic conditions have surely influenced the aggregation modalities of the single housing unities and for every type of association, spontaneous or reasoned; traditional buildings often represents an unitary complex constituted by residential cells of medium/high density, inside compact blocks, separated by tortuous little streets, stairways, arcs, widening and squares.

It’s possible to find a vast range of aggregations related to characteristics of the natural environment and the historical development, but we could also recognize repeated features, as compactness of volumes and architectures or serial repetition of typological and constructive characters in residential cells. Although remarkable changes of building portions sometimes make difficult to individuate original architecture, through the reading of surviving traces and parts it’s still possible to retrace the constructive lexicon and the primitive typological-functional matrix, true specimen of building patrimony that we define as “minor” but representative of little mountain centres, even more than noble buildings.

It is interesting to signal the relationships existing between the development axis of building blocks and the position of site, the orientations imposed to buildings to exploit the more favourable environmental conditions in the best way, limiting climatic disadvantages (cold, snow, ice, …); the ordinary building grows on little roads, alleys and courtyards, while noble mansions and specialist buildings are located in squares and main roads.

The investigated study cases, meaningful of a diffused constructive practice, show how much ordinary housebuilding answers to residential economic necessities, with simple

reiterated geometric forms. Different aggregative modalities are strongly connected with the position of ground and adjacent roads: when the linear development of block follows the road with a maximum incline, the double-body building is divided in lodgings having an only overlook on road, with a maximum of two elevations in the portion that stays down; contrarily, in correspondence of level roads in zones with strong incline, blocks are often constituted by single body, with double outlook and road entrances on different levels, with an accented vertical development of building fronts.
Nevertheless casual and not ordinate aggregations are diffused, determining a various planimetric-altimetric configuration (varying thickness of buildings, different distributive and planimetric geometries with alternate volumes) often articulated by the presence of

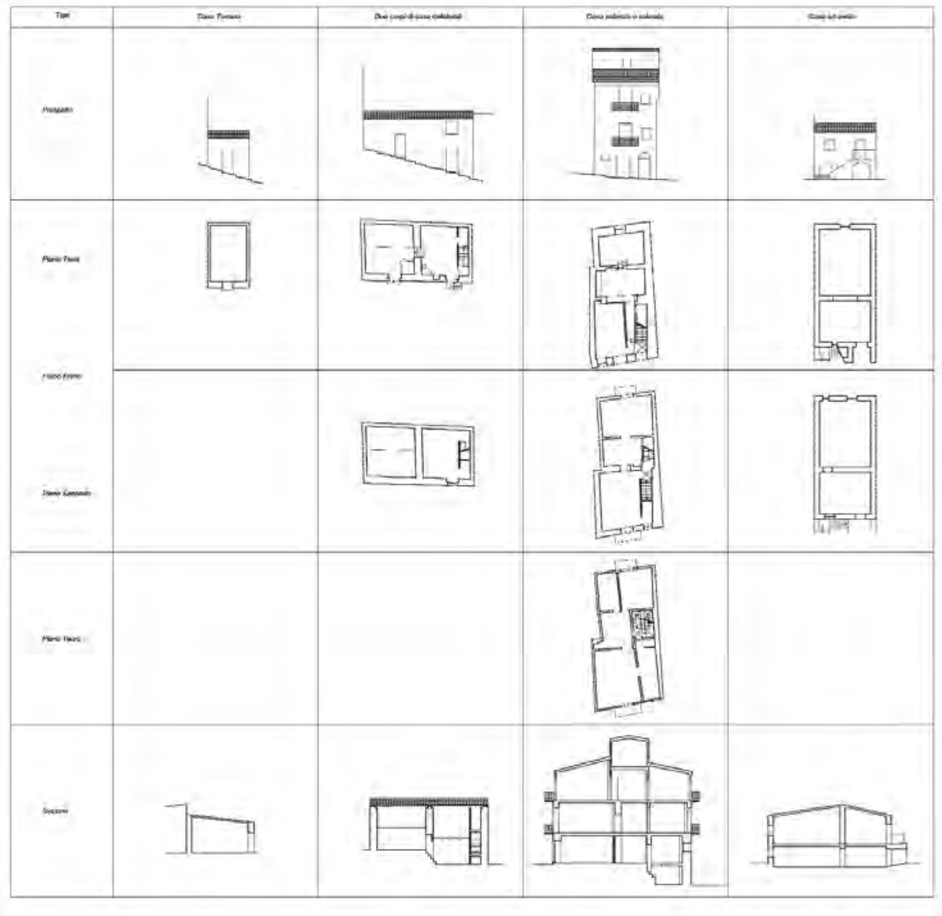


Fig. 4 - Abacus of some of the most frequent building typologies

"empty" spaces that reduce the density of historical urban tissue, like covered passages, courtyards, alleys and widening.
The vast consulted bibliography is very useful for retracing notices, associated with frequent visits and also with the information furnished by local builders about the terminology commonly used for describe building typology, functional organization, constructive traditional modalities, partially no more existent. We mention as example the progressive disappearance of entrances through external staircases juxtaposed to principal building, side or frontal with landing at floor level, widening roads for the passage of cars, and not only for horses and carts.
Both the house having only an elevation (terrana), and with two floors (solerata) are repeated and diffused on the whole mountain territory of Madonie; they individualize base-housing cells, producing articulated variations determined by new demands and live models with their spatial evolution (volumetric growth, union and fusion, doubling in façade, etc).
The more frequent residential base-cell at ground floor is wide 5mt and large 6-7mt with only an outlook on road having function of entrance, illumination and airing; for a long time it results an housing space and also a deposit and stable for animals. The house called "terrana" naturally evolves in the "solerata" one, obtained through the addiction of a wooden floor placed close to the leading wall, where it's possible to go by a ladder.
The necessity to make autonomous the housing spaces, resolving also the correlated hygienic-sanitary problems, it admits two or more base-cells with the overlap or juxtaposition of two near building. In the dwellings obtained by fusion of two near unities a part is destined to store, the other one to residence with kitchen at the ground floor, consenting possible increase for a bedroom on the floor above; the aggregation in vertical sense on three levels proposes a not residential zone at ground floor, while kitchen is located at the last elevation, and bedroom at the middle one. We underline how the last solution generally enriches architectural front of elements like balconies, mouldings and portals.
Further variations are represented by typological and formal differences that intervene among head-houses, angle-houses and inter-closed ones: for these ones, even if similar planimetric solution of rooms and spaces are maintained, the configuration of architectural fronts appears different, in relationship to variations of entrances position, location of external staircases, presence of walls blind or with openings.

3.0 Material and constructive characters of traditional buildings

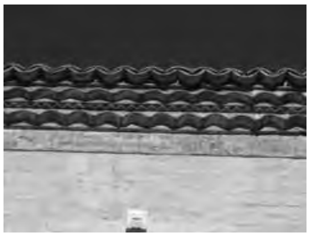
The ordinary architecture of Madonie, in all its aspects, is conditioned by constructive materials and techniques used, elements that have a strong dependence with the immediately available local resources, with narrowness of available means and difficulty of connections and transports. It competes to define this typical area, often determining original formal results.
Except rare cases, masonry is constituted by compact limestone extracted in local numerous caves, having dimensions required by common use, with decreasing sizes from ground floor to superior levels: external walls represent the best quality examples for


Figg. 5, 6
Entrance systems
with external staircase



Figg. 7, 8, 9 - Stone and cast-iron brackets and balcony railing





Figg. 10, 11, 12 - Different types of concluding cornices

Fig. 13 - Different types of stone portals

constructive realization, with squared ashlars or, more often, roughly squared ashlars having a thickness of 80-70cm in correspondence of base and varying dimensions of 30-45 cm at superior levels. It's preferred the most compact and resistant stone variety for the construction of portals, platbands, jambs and windowsills, frontispieces, mouldings, shelves and trampling of balconies.
The structure more frequently used is composed by shapeless stones of various sizes, with rare interposed transversal ashlars (diatoni) thick as the wall; we always notice a constructive attention in correspondence of greatest constructive brittleness or static importance, like angular portions, where well-squared ashlars of greater dimensions, put in an alternation way, create an useful engaging. We also find masonries edged with the same compact stone, and still using squared ashlars interspersed with nucleuses of shapeless stones and mortar, filled up through stone or brick fragments in the joints.
The tile has a large use above all in some limited areas where are furnaces and their productive tradition, whose use is limited to the light raisings realization, or unloading arcs and finishing and installation elements, like mouldings, coverage mantles and drain pipes.
Wood constitutes the principal material used for horizontal structures, floors or coverage having broad-leaved main structure with an irregular course; for the filling of structural fields, the mats of marshy reeds presenting a big diameter are frequently used, instead of expensive boarding. The direct investigation has shown other technical constructive modalities for the realization of wooden floors, specific of Madonie area, which locally use plaster and cork: structural fields of floor, delimited by the main wooden structural frame, were filled with a mixture of plaster paste in which small plaster pieces coming from demolitions were drowned, or just peeled cork discards. The problem connected by the scarce adherence between wood and plaster was resolved by incisions created with axe and nails positioned along the side faces of wooden beams, especially in the case of notable span; the expansive effect of plaster allowed to get a form of pretension of principal wooden structure improving the static behaviour of the whole system . Cork, easily available in wooden areas, was used as material to lighten the structural systems (vaults, floor structural fields), also favouring a good thermo-acoustic isolation.
The coverage, having simple or double frame, present the filling of structural fields with mats of whole reeds tied up among them, or with wooden partition or brick tiles, with an overhanging mantle of curved tiles (Sicilian coppi).
Meteoric waters are rarely picked up, but they were usually moved away directly: therefore we notice a particular attention in the realization of mouldings, formed in the "cappuccina" constructive way, using many projecting layers and staggered curved tiles, overlapped in more orders and posed on particular plan tiles; it was often used to protect the entrances from meteoric water with a gutter connected to a roof tile with function of spout.
We quote portals and balconies among completion and embellishment elements, having a great effect in façade: the first ones are generally formed by jambs of squared ashlars connected with a platband or an arch: in correspondence of jambs often an ashlar having function of engaging was interposed to the adjacent masonry. There are many types of archivolts, from the most common constructive solutions that use natural stone, with prominent and carved keystone, to those that used instead heap of stones and header

Figg. 14, 15 - Natural wooden beam floor and iron frame with plaster and cork.

bricks, or two big and arched ashlars of natural stone that present a mortar joint in correspondence of the key; it is rare to find an arched ashlar of natural stone to cover a distance of 1,00-1,20mt.

Speaking about the balconies, we mention shelves realized using local compact stone, conformed according to complexes and captivating designs; if the shelves and railings are realized with iron and cast iron, they will represent models imported from the great cities, alternating usual draws, brought by the western Sicily constructive tradition.

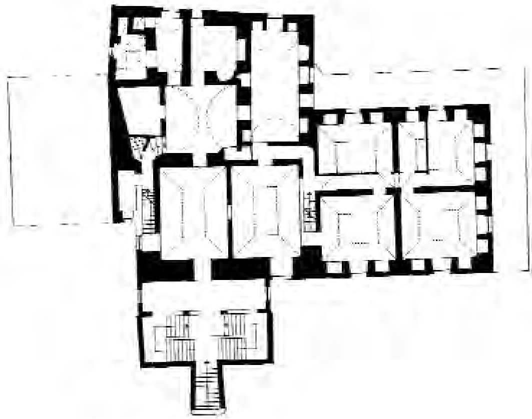
Conclusions

This study conducted on the traditional buildings of Madonie area, still in a close examination phase and further development, appears useful for a recognition of the "art rules" employed in the ancient building yard; in a lot of cases it is evident how the simplicity of constructive techniques has allowed that poor architectures, simple and economic in their maintenance interventions, could reach us after centuries; they still are valid and actual, capable to suggest guidelines for a cultured and aware project of recovery.

The analysis of concrete cases, translated in drawings and graphics, abacuses and analytical reports can constitute an essential practice code useful to the town Municipalities, to planners and operators of building sector for the maintenance of traditional patrimony of regional architecture, rather than make it anonymous and homogenized.

Notes

1. Elementi costruttivi in gesso, P. Imbornone, ed D.Flaccovio Editore, Palermo 1992



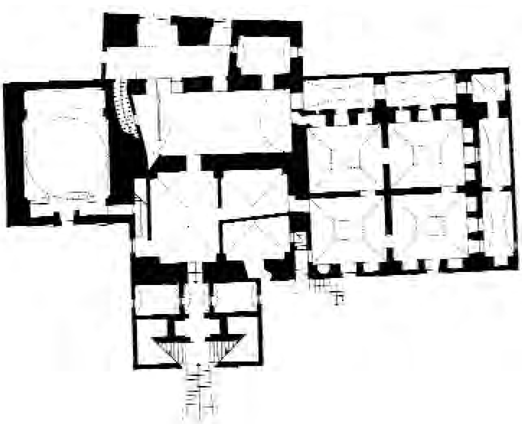


Fig.1
Spina Grande farm in Monopoli (Ba)
On the left: ground floor plan
Centre: first floor plan

F. Leccisi [1]

FARMS DEVELOPMENT IN THE SALENTO AREA

Southern Italy and Puglia region history is based on characteristic buildings that are very different from the ones in Umbria, Lazio regions or from the farms located in the padania plain and in Alto Adige. In the Salento area a farm is a place influencing the territory transformation. The farmer was a minor entrepreneur as well as the trusty man or a paid worker of some rich owner, or of a church body. In fact, when southern Italy was vexed by brigandage during the 19th century, farms were entirely walled up and isolated because there bandits could easily get food, as well as horses and transportation means; not only that, farms were also perfect recruitment bases. The farm is a zoo-technical micro firm carrying out several different activities and it constitutes the most modern and rational work organization as well as a medium and large scale way of transferring land properties. It's a self-sufficient unit included in a larger productive fabric. Each farm relates with other farms, yet it is an end in itself. In the northern Salento area, where large estates are unusual, farms are the backbone of bourgeoisie which already represented the middle class during the Argons dynasty. It stayed in between the Kingdom Barons -conspiring for the dynasty fall- and the venetian and genoese merchants with whom barons were piling up debts. As a result the merchants bought these large estates, as the Imperiali family in Francavilla Fontana. The farm chief was called *massaro* , i.e. a tenant-farmer who would take over the land from the owner, generally a nobleman or some other notable: chemists, doctors, magistrates, civilians, economically self-sufficient people, single priests, religious orders. The farmer hired the workers who were living in the farm for the duration of their contract. In some of the southern Salento areas, most of the times it was not necessary for the farmer and the workers to live in the farm all the time; in fact, normally they preferred to live in the urban areas. This explains the simple architectural structure of the farms made of just a few rural premises. Agrarian agreements usually were of a colony type with an established rent; the duration of the contract was based on the farming cycle to be completed. Sometimes, it could last for years and the workers would get half of the profits. Sometimes extras were due to the owner such as cheese, ricotta-cheese, lambs, gurnards and so on. As showed by the estimate and census of the ounce cadastral in 1700, farmers were wealthier than carpenters, shoe-makers, weavers, rope makers, *fiscolo* (vegetable fabric used in olives pressing) weavers. The farm owner checked on the farmer's profits, sometimes inventing rules at his own behalf about goods and cattle allocation. At the end of the 19th century, sheep to be assigned were conveyed into a narrow yard and they had to pass under a stick that was kept 50 cm high from the ground. The older and sick ones, passing under the stick were given to the farmer, while the younger and healthier ones jumping over the stick were given to the owner. The farmer would go to the village to buy a few items such as the salt, the only good he couldn't make. City artisans would go to the farm to work on items to be used in the farm or by the family. Tailors or shoe-makers went there to make shoes out of the leather from the slaughtered cattle. The *pignatari* (kitchenware-makers) would sell dishes and kitchenware; in the farms on the coasts, farmers would use clay from the farm fields. In other words, lots of people living nearby the village were referring to the farm. When speaking of a farm, we think of a building, yet up until the 18th century a farm could be any piece of land, a cattle or some horses or sometimes just a business. The idea of a farm was not necessarily linked to a building. Studying farm buildings we can recognize the owner's and farmer's houses and the working areas (stables, barns, garden, snow-cellar, millstone, dung-pit, chapel and so on). According to the size of these premises, it is possible to determine weather it was a field farm -i.e. exclusively for cereal cultures- a sheep or cattle breeding, or one specialized in oil culture as the ones located on the adriatic coast of northern Salento. When oil was the main culture, the farm had underground premises called *trappeti*. They were large hypogeal caves set up to work on olives and oil storing. In case of a farm dealing mainly with cereal cultures, the front space of the main building had grains ditches excavated in the rocks or large storages made out of thick walls or of barrel vaults on the second floor. All farms show reinforcement structures, especially in those areas where the farm was more exposed to dangers. Farms would defend their territory through high and scarp walls, drains, arrow defence windows, wolves barriers, retractable stairs, rudimentary munitions storages. Nevertheless, the most efficient way of defence was solidarity with neighbour farmers who would alert if pirates or robbers showed up. Farms near the coast show more evident reinforced structures than those in the in-land. Farms on the coast were threatened by pirates incursions when the Byzantine authority started to fade in the Mediterranean area and then again during and up until the end of the 19th century. In-land farms had to deal especially with horse robberies and/or cheese stealing by gangs of cattle thieves. Apart from structural differences, also the type of production patterns employed distinguished one farm from another. There were several kind of workers within a farm, and the farmer –who identified himself with his territory- was the main expert about agriculture and zoo-techniques and he was the intermediary between the owner and the peasants working in the fields. They were the labourers, the diggers *bracciali* who lived and worked thanks to their arm strength and the plough-men –*valani*[2]- or those taking care of the cattle -who included mare-boys, shepherds, sappers and draggers. They all obeyed their farmer, who –up until the 17th century- was still a salary worker. With the arising of sharecropping and socida contracts, the farmer replaced the land-owner. The northern Salento richness was the result of several causes. Besides the ground fertility and the strong economical bases, such as rational woods exploitation, specialized zoo-techniques and large scale productions, the farmers middle role was essential. They had to reside in the countryside, so they didn't experience the Communes oppressions as the artisans who were staying at the village and lived on agriculture reserves. Therefore, the farm stands out as an aggregation nucleus and a social pattern; he turns into a financial company and a patrimony entity. He also highlights the tough relation between men and the land, which involves the unsteady and unforeseeable ambiguities linked to the recurring and feared up-and-downs constantly taking place. In mediaeval Salento, peasants concentrated in small villages so they were able to recruit labourers on the square markets; such fact influenced a lot the farms structure. As a matter of fact, they show a very simple and essential plan: the farmer's house and some rural premises for dairy. Patterns reflect the socio-financial condition, the type of cultures and the way soil was used. In southern Salento, starting from 1500 and for a few years, there will be more and more farming-towers developing stock-raising and cereal-cultures. The structures show a tower hosting the farmer's house; the sleeping area is on the second floor; a ladder brings down to the ground floor; next to it there is a one-storey building for the animals or for common services. The whole building is surrounded by dry-walls, no more than 3 meters high, showing wolves-defence stones to prevent wild beasts climbing. Inside such a secured yard, with just one opening on the outside, the farming activities developed. The *trisciolo* is a space surrounded by short dry-walls for the cattle to rest when coming back from grazing. Furthermore, there is also a small garden with fruit trees, a well or a water tank, piles for the laundry, a drinking trough, a sheep roofing and a barn. With times, some farms counted more building structures and/or more towers, yet they maintained the farm-tower characteristics, i.e. a two-storeys building in the middle of a fenced yard. As a passive defence system, these buildings had a retractable ladder, preventing potential intruders who entered the ground floor from accessing the second floor; from there the farmer could go up to the terrace and alert the neighbours or the *cavallari* (horse-men guardians), who were in charge to control and defend the territory by going back and forth between the towers on the coast and the villages. The fenced structures, improving the economy, evolves into closed-in courts wherein lots of activities take place and they involve the farmer and his permanent workers. The tower is not any longer in the middle of the courtyard, but on a side. On the ground floor there is a carriage room connecting the inside with the outside of the structure and it is protected by a trapdoor or machicolation. There is an external stair leading to the second floor starting either from the carriage room or from the courtyard. The farmer's house is secured through a trap door over standing the entrance door or the drawbridge door. The tower is still the farmer's house, yet it could also be the owner' seasonal house, therefore it acquires some typical city building features. Some devices improving passive defence are typical of the military constructions characterizing coast towers buildings from the 16th century. As a result, in the bulwark there will be simple or double trap-doors, corresponding to the lower level openings, through which, if necessary, rocks or boiling oil could be poured down. Generally, first and second floor are connected through an external stair, as in Spina Grande farm (fig. 1). Between 16th and 18th century, the Salento farms become more and more important for the Kingdom economy, reaching their climax at the beginning of the 17th century; in fact, they get rid of the self-consuming system and open up to new production systems to supply the city of Naples, whose demographic growing was the highest in Europe. Climate changes affected Europe with a long cycle of very low temperature during the 17th century. There were two serious droughts at the end of the 20s and 40s that brought agriculture to its knees starting a long term crisis for Southern Italy territories that would become irreversible for all of the 17th century and a long part of the 18th. Between the 16th and 17th century continuous changes of land owners became customary: some estates got sold three times in 80 years. In Grecia Salentina, in the same period, there was a deep change in the land-estate activities. During the firs half of the 17th century there were lots of mulberry-trees, fig-trees and vines. There were lots of fruit trees in the gardens behind the houses as well as in the open countryside, yet of small size. Around the middle of the 18th century, sowable lands took over and only a few olive trees were left in the lands. Restoration of land estates allowed land nobles to face the financial crisis at small land owners' expenses, who had poor agricultural systems. The more fractionate was the land in the Grecia Salentina area, the more serious was the crisis. The land suffered from the traditional soil exploitation systems. Speculations were encouraged by good earnings and the market positive trends. Profits had increased thanks to the construction of new roads, as the Lecce - Otranto one, allowing better connections among countryside, cities and seaports; but, above all, there was the establishment of feudal structures imposing remuneration in kind. At the end of the 18th century, the dropping in value of several feuds caused a crisis in oil exports, that was replaced by the Spanish oil; in fact, the quality of the oil got worse due to the inefficiency both in collecting and manufacturing that wasto be linked to the outrages costs of the *trappeti* and the fencing systems [3]. In other areas, vines were replaced by olive trees, yet in Grecia Salentina they did not do well because of the type of soil. Growing of cereals went along with sheep farming which affected the landscape as well, in fact it was characterized by modest farms with small pieces of lands and elementary buildings with simple architectural lines; these structures counted a few rural buildings and a tower house with a spooler ceiling, surrounded by dry-walls. In the Grecia Salentina, the modest structures reflected unchanged mediaeval financial condition and cultural techniques. In northern Salento, chapels within the farms testify peasants were permanently living in the country, differently from what happened in Martano, Zollino and Castrignano dei Greci. In the Grecia Salentina the landscape was characterized by spotted and grazing lands, yet there were, -though rare- some green and luxuriant vegetation made of olive trees and vines, vegetable gardens and fruit trees [4], generally protected by walls. Property fragmentation is striking in a territory characterized by surfacing stones and rocks and outlined by short dry walls defining that particular geometrical shape which is typical of the Salento area. When social turmoil ceased and new cultures were started such as vines, fruit trees and vegetable gardens, living in a farm became welcome again. The farm was not only a centre of agricultural production and


Fig. 2 - Salmenta farm resort in Porto Cesareo (Le); Fig. 3 - Cardigliano farm resort in Specchia (Le)


Fig. 4 - Torre Coccaro farm resort in Savelletri area in Fasano (Br); Fig.5 - S. Domenico farm resort in Savelletri area in Fasano (Br)

Fig. 6 - Carestia farm in Ostuni (Br)

manufacturing, it was also the owner' seasonal residence. They became villa-farms, as the Persia Grande in Martano, and they characterized a territory. These farms adopted typical city constructions features. In many farms a dovecot was built, with a square or round base called *palumbaru* for pigeons farming. Towers allowed to farm more than 1000 pigeons couples, that would nest 5 or 6 times in a year, between march and september. Such farming, ruled by strict regulations had a real financial value represented by the precious meat and guano that could be used in various ways: in leathers tanning and as fertilizer. The trapdoor, set up right above the entrance top, was a defence element of the tower and it originally represented the only architectural component of the farm. In the internal walls thickness of the Grecia Salentina small *tirade*, were excavated, i.e. some particular niches used for storing. Around the end of the 19th century, a new agricultural re-qualifying process began. New farms were built based on new buildings schemes: the lodge-farm, which developed during the following century. Around the middle of the 20th century, after a strong industrialization and an infrastructural process taking place in Italy, farming went on crisis again in the Salento area and many small and medium farms were abandoned due to the lack of workers migrating from countryside. Around the end of the century, thanks to a general rediscovery of Puglia traditional values, its countryside and its rural buildings, many farms in northern Salento -closer to cities and with better connections with the main roads- were bought and remodelled to become vacation homes for weekends or holidays, or they were turned into farm holiday resorts with the aim to re-evaluate local products. More services were introduced -so far totally odd for the folk wisdom-such as swimming-pools, mini-golf courses, bars, restaurants, riding schools. Haylofts and *trappeti* became restaurants or meeting rooms. To host tourists –coming mainly during the summer time - buildings were remodelled and enlarged. Sometimes these interventions were excessive as for the "Salmenta" farm resort in Porto Cesareo (fig. 2) and the Cardigliano farm resort in Specchia (fig. 3). Yet, generally these changes were carried out respecting the building tradition of the area as in the cases of "Il Frantoio" farm in Ostuni (Br), "Torre Cuccaro" farm in Fasano (Br) (fig. 4), "Serine" farm in Castrignano del Capo (Le), "Fabrizio" farm in Otranto (Le). For example the "San Domenico" farm in Savelletri (Br), after an accurate remodelling has turned into a very refined resort with a swimming-pool, mini-golf course and a SPA centre for thalassic-therapy (fig. 5). In this case, some plumbing works were done for the golf courses watering system and for the beauty centre services, with the most updated appliances. The sea water used in this centre is taken directly from the underground layer, it is filtered and purified, heated up and conveyed in the beauty-farm plumbing system. Tourist activities, quite common in the area, are not coordinated, therefore services are generally cheap, yet they are not qualified and in any case the quality/price relation is not excellent[5]. In this contest, farming is marginal and pretty much old-fashioned while vegetables are grown to be used exclusively by the resort. Innovative and quality farming is also taking up: D.O.P (Certificate of Protection) for oils, D.O.C. (Certificate of Origin) for wines[6] and certified biological cultures for some agricultural productions or innovative products; in this way the farm re-gains –at least partially- its financial business role involving the land. New services are set up such as sheds where agrarian products undergo innovative production cycles. While products are not necessarily Italian -they may come from Northern Africa- there are equipments for wastes treatment, aeolian and photovoltaic systems for energy production, loading and unloading platforms, laboratories for researches and production controls, storing plants for fresh and frozen products, a proper internal transportation system to meet logistic requirements of modern means, therefore introducing non-stop production cycles to replace the traditional seasonal cycles. Some of the farms in northern Salento started strict modernization processes of production plants and they created highly qualified industrial units adopting forefront technologies for transformation and storing of local agro-industrial products. A good example is represented in the Ostuni area by the Carestia farm (fig. 6), where an industrial shed hosts a plant that converts local vegetables into cooked and ready-to-be-used food, as requested by an increasing number of consumers[7]. Summing up, during these last twenty years, farms in the Salento area underwent fast changes due to an increased potential demand for high quality agro-industrial products, updated rural productions and a new tourists interest for the rural areas traditions.

Notes

1. Buildings Production Professor, Università degli Studi di Napoli Federico II
2. *Gualanus* in medieval documents is the person in charge of oxes yet including the ploughman
3. Tocci G. Land and Reforms in modern Southern Italy, Published by Patron, 1971, p. 65.
4. Dominican Alessandro Tommaso Arcudi in 1973 in the S. Pietro in Galatina Report.
5. The 17th century farm Torre Coccaro in Savelletri – Fasano (Br) is an exception; it belongs to the Small Luxury of the World chain, which actually is the best luxury hotels brand for 2007, according to the survey carried out by the Luxury Institute on “Luxury Brand Status Inde TM 2007” on luxury hotels and resorts and it includes 400 luxury hotels from different owners in more than 65 countries in the world.
6. Presently, in the Salento area 3 D.O.P. type of oils are produced (Collina di Brindisi, Terra d’Otranto, Terre Tarantine) and 13 D.O.C. wine brands (Primitivo di Manduria, Ostuni, Aleatico di Puglia, Alezio, Galatina, Martina Franca, Nardò, Salice Talentino, Squinzano, Alezio, Copertino, Leveranno, Matino)
7. The Carestia Farm, in Ostuni, produces special fresh vegetables skewers ready-to-use which -through the cold chain- can be distributed and have an updated shelf-life. This innovative product won the 1st prize of “TAVOLA D’ORO 2006” in Belgium and, more recently, it was chosen among 215 products at the Milan International Fair “TUTTO FOOD” on 5-8 May 2007, as the product to be displayed in a special innovative products display-case.

Fig.3 - North-West façade view

Fig.4 - East façade

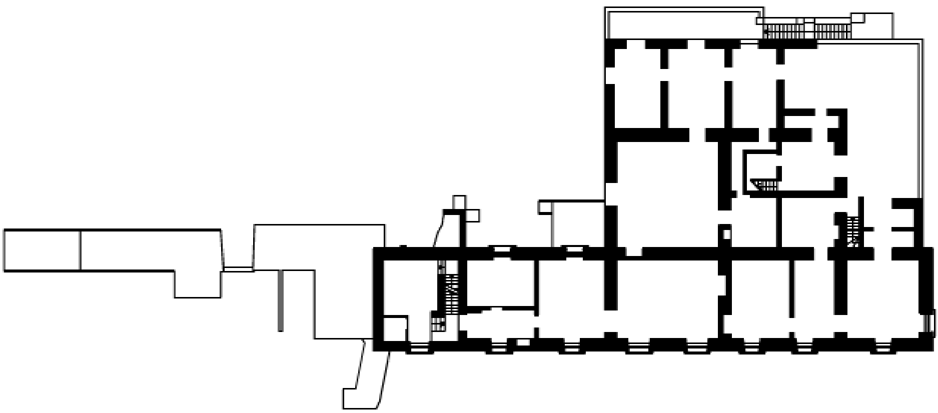


Fig.2 - First floor

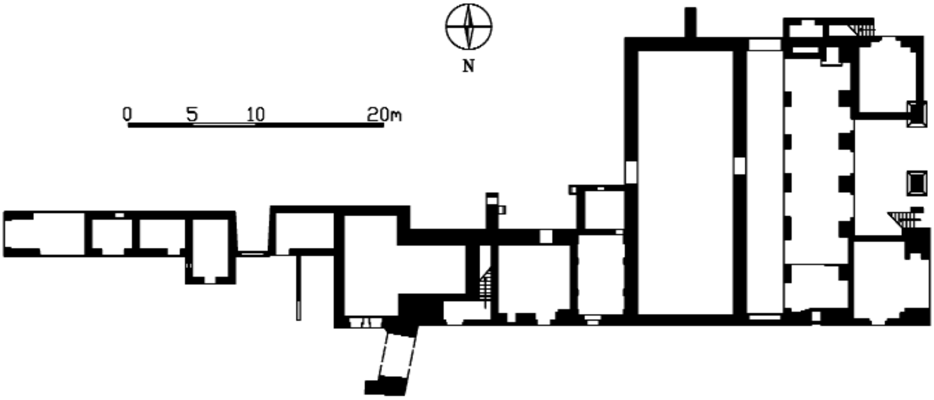


Fig.1 - Ground floor

F. Leccisi [1], M. Varchetta [2], P. Fiengo [3]

PROPOSAL OF RESTORATION AND NEW FUNCTION OF THE MASSERIA DONNA CHIARA IN TORRE DEL GRECO (NA)

1.0 Introduction

To describe in this occasion the minor architecture (rural or peasant) does not mean confront two cultures, a main one and a subordinate one, one of the city and one peasant, but to make light on an artistic and historical patrimony that concurs to characterize and to know a civilization that has been developed spontaneously, answering to criteria of priority more than aesthetics, reaching remarkable levels of realization.
Y. Lacoste[4] famous geographer, has written, on the paradigmatic opposition center-periphery, that this last term must be meant like an "allegory at the same time of space and politics". But the value of such elements and the system in which the complementary duo center-periphery are inserted are a crucial problem not only for the geographers, but also for the art students in general. Beside the Italy of villas, of convents, of mansions, of cathedrals, of theatres and of the palaces there exists the one of peasant houses, of the so-called minor architecture object of attention on several sides, especially since the studies on the protection of the environment have became numerous, attention to its problems and its planning. In 1936 Roberto Pane[5] within his personal distinction between "peasant architect" and "rationalist architect" already asserted the concept of the "inner logic" of the art that is very far from every "common logic": the error in confusing the problems of the technique with the problem of the art is coarse. The peasant architecture fascinate for its character of necessity: it is a product of nature, its realization is "normal", rises nearly as a fruit of the earth on which it is constructed, its characteristics are the approximation and the nonexistence of constant outlines of design.
Approaching the study of such constructions the first problem that stands out regards their origin; the one of their conservation is consequent. Various different opinions exist on the historical origin of the peasant house, we will examine them together with the objections that can be moved to such derivations and we will propose one hypothesis that looks in our opinion reasonable. The suggestions on the conservation will move from the convincement that today our relationships with the past are entrusted to the critical and historical thought "rather than to the immediacy of one Tradition" [6].

One of the aspects of this reflection is the possibility to live again some experiences, starting from the material testimonies of the past, and therefore the conservation of these testimonies becomes necessary for us. When we use the word "art" we are influenced by its use in the modern sense as a field separated from life. On the one side we have the artist: a specialized profession, on the other the amateur as the art consumer. However this separation is a modern phenomenon completely nonexistent in the past. "We are a culture of consumers"[7]: we passively absorb the cinema, the leisure, the information reports without active and fecund participation, without neither a common unifying experience, nor a meaningful achievement of convincing answers towards life. With that we don't want to propose at all a "romantic" and antihistorical return to the past, since it is our conviction that "to model and to channel the human energy within a given society for the continued evolution of this society" is function of the social character; we want rather to state the importance for each individual to know his own history.

2.0 Analysis of the building

The constructive tradition of the architectures in stone in Campania, like in all the Mediterranean area, is characterized by insufficient resources of materials and by very limited techniques and energies. The materials and the techniques have been used to the limit of their possibilities. The precise and punctual knowledge of the relations and the characteristics has concurred to solve the problems generated by the loads, the fatigue of time and has involved a high executive level.

The construction in local stone is representative of a culture tied to particular environmental conditions, to the climate, the microclimate, orography, the geology and morphology of the land, the possibility of employment of easily found materials in native places and to their constructive ability.

The recovery of the constructions of ancient system presupposes the correct use of the materials as well as the careful analyses of the local constructive traditions and the modifications put into effect in time. "The masseria" term that designates the complexes organisms of rural buildings, generally articulated on a "court" organization system, that were widely present in the south as a result of the reorganization of the fields, between the XIth and XIIth century, under the pressure of the rearrangement of the productive apparatus promoted by the Benedictine and Cistercensis abbeys Also being residential models intimately bound to a late-feudal legacies "latifondo" (very extended land proprieties) system, the "masserie" were developed as a result of the abolition of the servitude of the "gleba" (land) and to the introduction of the "emphyteutic" contract and copied from the convent organizations the communitarian system type. They are rural colonies with a nucleus of collectives services around which the houses of the "workers" are located, spread in plots differently cultivated. From the National road (anciently called "of the two Towers", because it connected the town of Torre del Greco to the town of Torre Annunziata, far away from the inhabited center, along tree-lined avenue, that crosses the fields in direction of the sea, analogous to the

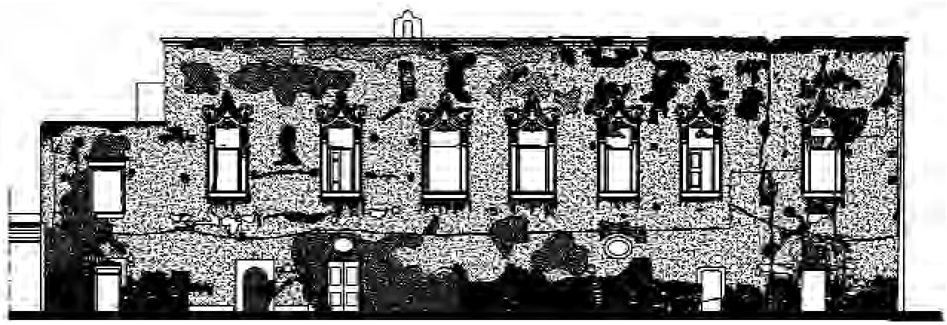


Fig. 5 - North façade

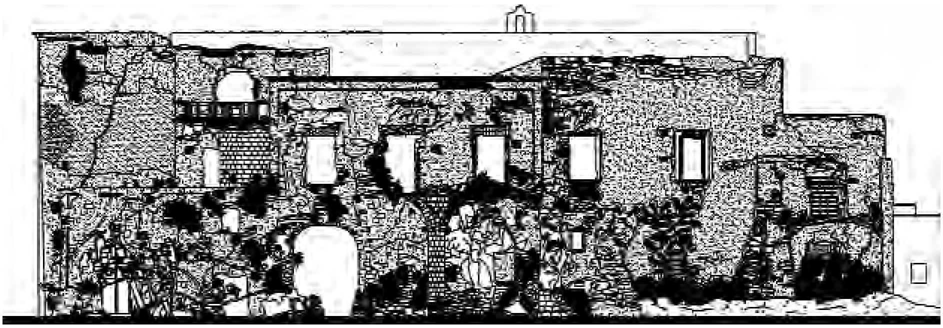


Fig. 6 - South façade

Fig. 7 - First floor inside view

other buildings of the zone, leads to the Masseria of "Donna Chiara" (see fig. 1), currently a ruin partially used only on the ground floor. The building takes its name from Donna Chiara Invitti, daughter of the merchant Don Carlo Invitti, that in the beginning of the 1700's married don Flavio Gurgo of the R. Consiglio of S. Chiara of Napoli and duke of Castelminardo.
The masseria is located near the station of the Circumvesuviana and is provided of hectares of land. The building, of lengthened rectangular plan, develops with two floors above ground and shows the main facade of simple, but refined architecture, with seven majestic windows that have nice stucco frames. The dimension is of approximately 685 mq, the constructed volume is equal to approximately 1.200 mc.
The ground floor, that has a basement level in the east side, was used for the production of wine from grapes, present in the area until the first half of the past century, the upper floors, with some rooms decorated with "affresco", were the lodgings of the owners. The modifications brought in time, with extensions and transformations, have completely changed the original configuration of the building. The complex today appears like a large abandoned ruin.
On the north side is located the vestibule, entrance of the masseria, still practicable, from which it is possible to access the stairs, whose steps, blunt and partially eroded, are covered by fragments of outside material. The vestibule, as all the other rooms, is in a state of abandonment: in fact various stains have formed on the walls and the plaster has suffered chromatic alterations because of the presence of humidity everywhere in the air. In adjacency to such entrance there is another space that develops for all the depth of the building. Since there aren't windows the space is exposed to the action of atmospheric agents and deterioration, with carcasses of animals and refusals of every type.
The phenomena of alteration and deterioration are legacies in great part to the presence of humidity, with stains and surface coating from humid cycles of mosses and lichens of mostly yellow, orange, blue/green coloration, and dark spots due to the infiltrations. Spots of organic nature and superficial efflorescence are visible. The state of deterioration moreover is characterized by the separation of the superficial layer of plaster for the crystallization of the salts in the surface pores.
The south zone of the building can't be entered, with remarkable amounts of organic material on the original floor that prevents the access to the different rooms. It was, therefore, possible to analyze the place from the outside, a rectangular porch covered with two sail vaults, with masonries in tuff and shards of vesuvian stone. On the north wall the deterioration is characterized by efflorescence, percolation of meteoric waters and ascendant capillary humidity. In the north west corner there is a wide passing subvertical crack along all the height of the wall. The room on the ground floor, that is in better conditions, is the rectangular chapel of the masseria, covered by a barrel vault, currently used as warehouse for the flowers.
The plaster of the masonries, in shards of vesuvian stone, and of the ceiling is still present, the pavement is in rectangular "riggiole" (tiles). The plaster, covered by a biological patina, has suffered in more points detachment. In the room cases of bottles and

flowers bundles without solution of continuity, with dried petals that cover nearly completely the paving. At the height of the abutment of the vault five wooden beams are fixed in the masonry in order to support the agricultural products. The first floor is constituted of five great rooms, characterized by a remarkable inner height of approximately six meters. By the staircase, a wide corridor, illuminated by seven openings that characterize the north prospect, that connects the rooms, that are south facing towards the sea. The ceiling of the first floor was originally realized with a wooden floor girder, now replaced, in some rooms, with steel beams and hollow bricks. A room is covered with a pavilion vault. The apparatus of the vault is constituted tuff bricks on edge with shifted joints, tied with aerial lime mortar lime and covered by a light finishing layer. The phenomena of alteration and deterioration are mostly caused by the presence of humidity originated by waterproofing defects. In adjacency there is a rectangular room, lacking in cover and fixtures, with the floor covered by vegetation and inorganic detritus.

3.0 Proposal of reuse

The recovery and valorization proposal of the complex of Donna Chiara is a design operation of remarkable intricacy. The complexity and the interest of the operation derive from its taking in consideration the historical and architectonic values of a monumental building, with the naturalistic definition of an immense agricultural area marked by deterioration. The plan is inspired to the will to allot the complex to the nature, culture and art resources of Torre del Greco. The suggestions derive by the acknowledgment of aesthetic, historic, cultural, social values, that the complex expresses. Its formal and structural nature, the evolutionary history, the typological aspects and the volumetric characters concur to imagine a modification that could answer positively to the needs of social use of the good. The proposed recovery and reuse operation of this unity, constituted by the combine architecture and landscape is an example of active conservation, that together to the restoration operations on the single architectonic objects, proposes a new function answering to the possibilities of the building and the requirements of the collectivity, picking directly from the existing structures the elements for the design completions and adaptations[8]. The study of the access points and the paths has extended the proposal also outside the borders of the area currently annexed to the masseria. The state of the vegetation is not very good; the thickening of some already present plant types, the creation of roses bushes, the substitution of all the sick trees and in some cases moving the plants for a more homogenous distribution is planned. Regarding the more eminently architectonic part the proposal proposes the realization of an eno-gastronomic center. On the ground floor it proposes the information point, the wine and food tasting area with the shop of native produce, the lodging of the manager, the wine cellar, the chapel given back to its original destination, the warehouse and the technological units , while on the first floor it proposes a restaurant and the kitchen with the necessary services, also in accordance of the norms for the elimination of the architectural features that denies accesses to the handicapped. The

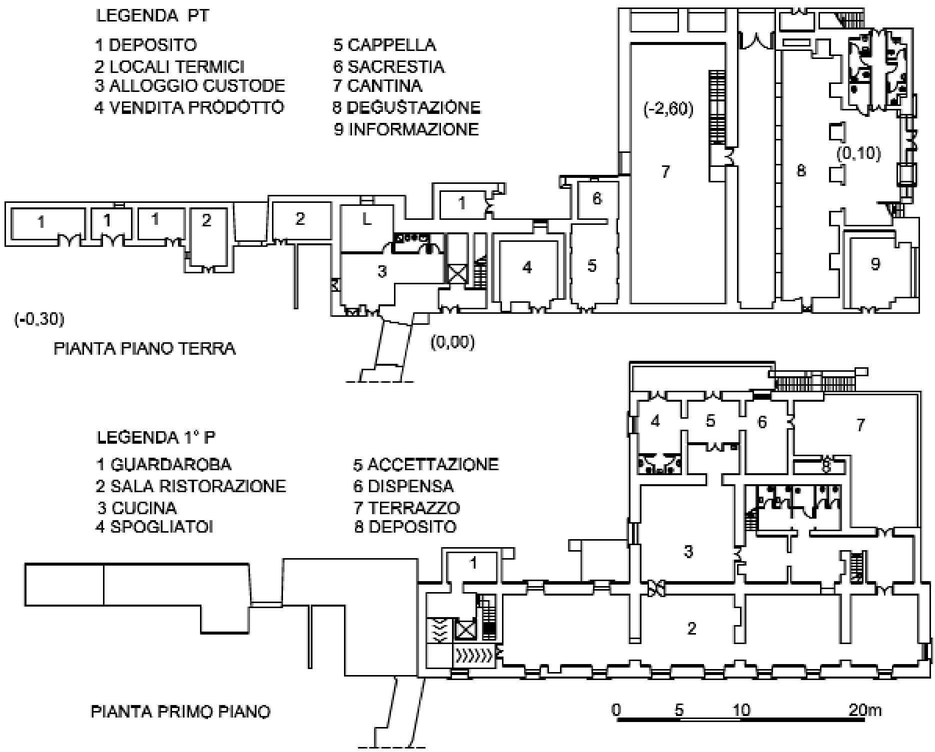


Fig. 8 - Proposal of reuse

Fig. 9 - Restauration façades proposal

disintegrating action of the atmospheric agents, the lack of maintenance operations, the natural aging of the materials requires a careful restoration of the structures and of finishes of several parts of the building and of all the elements of the complex in coherence with the proposals of the plan of typological and structural rehabilitation towards a process of functional revitalization. the original constructive system is maintained, with small modifications in order to guarantee performances, functionality and security. The structural restoration exalts the original configuration, putting in evidence the constructive stratifications8. The project is extremely articulated since the building elements have varied constructive technologies: tuff, stone, filled walls , iron, concrete. Preliminarily it will be necessary to proceed to the consolidation of masonries, affixing chains in order to contrast the push of the vaults and after, with operations of substitution of portions of masonry, and the filling the existing cracks. In the north corner the realization of underfoundations with drilled micro piles is proposed. Concluding the reuse proposal of the masseria of Donna Chiara is a synthesis between conservation, valorization and renovation that can be considered emblematic in the field of the integrated restoration operations.

Notes

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2. Dphil of Restauro e Conservazione at the University of Naples Federico II, faculty of Engineering.
3. Dphil of Restauro e Conservazione at the II University of Naples SUN, faculty of Architecture, Aversa.
4. Lacoste, Y. Gèografhie du sons-dèvelopement, Paris, 1976.
5. Pane, R. Architettura Rurale Campana, Firenze, 1936.
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Fig. 1 - Gimenells, Spain (Alejandro de la Sota)

J. F. Lejeune

1939-1965: RECONSTRUCTION AND COLONIZATION IN SPAIN

THE MODERNIZATION OF THE MEDITERRANEAN VERNACULAR

1.0

> "I started working at the National Institute of Colonization, where the job was to create towns and villages… I went all over a large number of hamlets and small towns, but I neither drew nor made photographs… It is only at my return in the office that I took paper and started recording my visits… In this manner I am sure that I drew and invented quite a lot…."[1]

Between the Caudillo's uprising of July 1936 and the fall of Madrid in 1939, combatants of both sides of the Civil War and their international allies totally destroyed one hundred and ninety-two villages, towns, and cities. The periphery of the capital and the larger circle of Republican resistance that included the small town of Brunete and the historic center of Toledo lay in ruins. In the North, the symbols of devastation were Guernica, Oviedo, and a large section of Bilbao and its iron belt. In the East, destruction followed the front line of Aragón with Huesca, Belchite and Teruel, and the battle line at the Ebro River with Lérida and Tortosa. The South was hard hit as well, particularly Almería, Guadix and other towns between Córdoba and Granada.

The task of reconstruction was entrusted to the Department General of Devastated Regions, created within the Ministry of the Interior well before the end of the war, on March 25, 1938. On June 14, 1940, in the Palacio de Bibliotecas y Museos in Madrid, General Franco (1892-1975) inaugurated the first exhibition of the Reconstruction of Spain. At its heart were the plans, models and first photographs of a dozen of towns and villages in the initial stage of reconstruction: among them, the heroic centers of Republican resistance and Falangist victories, Guernica, Toledo, Brunete, Nules and Belchite. It was "the first attempt of the postwar era to coalesce the concept of New Spain into an architectonic language, and to make this language popular in its most didactic meaning."[2]

Under the direction of José Moreno Torres and later of Gonzalo Cárdenas, the Department implemented the ambitious program of reconstruction that was eventually completed according to schedule in the early 1950s. A large staff of architects, engineers, and other professionals (reaching more than two hundred in 1945) was assembled to design, control and direct the process. Planned in Madrid, but subdivided among thirty regional offices, the program included the reconstruction of devastated cities and towns, the construction of new towns to replace destroyed settlements, and a vast enterprise of restoration of civic and religious public buildings. It had its own periodical, *Reconstrucción*, which in spite of its propagandistic overtones provided a well-documented review of the operation.[3]

Although the most urgent needs were in rebuilding the large cities and their industrial peripheries, the reconstruction initially focused on the rural "front." The main rationale was the State's economic policy to bolster new agrarian development in order to allow the necessary reorganization of private capital, at that time without opportunities for rapid investment. The implicit objective was to stabilize the impoverished rural population away from the big cities and thus prevent rural flight, excessive urban expansion, and potentially explosive socio-economic conditions.[4] The *Instituto Nacional de Colonización* (National Institute of Colonization or I.N.C.) was created in 1939 to strengthen that strategy and implement a pro-active policy of rural settlement linked to the post-war program of drainage and irrigation in depressed agricultural areas around the country. Altogether these priorities adjusted to the demands of the oligarchy, the primary supporter of Franco, whose immediate goal was to recuperate the land lost in the Republican agrarian reform; likewise, they were fueled by the low cost of labor in the countryside, and the international embargo on exportation.[5] Propaganda was also instrumental in this policy: the schematic—and at times simplistic—prewar partition of the country between the Republican industrial cities and the Falangist small towns remained in the memory of the victors. Thus the New Spain not only thanked the "agrarian man" but also took pains at presenting him as the model of the New Spaniard, long-suffering and reserved, anchored in the old tradition of individual courage in the face of adversity and exacting daily labor:

> "Nowadays survive in Spain many towns and villages whose laments, curses, and tears tell us of a past of squalor and poverty. Spain used to live at the expense of its villages. At the best they served as the scenography of a picturesque drama, glimpsed through the window of a train or of an automobile… It is the war itself that eventually brought the city dwellers nearer to the countryside."[6]

2.0 Debate upon the Vernacular Tradition

Reconstruction was the central theme of the First National Assembly of Architects held on June 26-29, 1939, in the Teatro Español of Madrid under the presidency of Pedro Muguruza Otaño (1893-1952). Muguruza gave confidence to his colleagues and rallied them to the task of reconstructing towns and cities, as well as solving the problems of housing for the poorest classes in the country.[7] The premises were clearly stated:

> "It is absolutely indispensable to think that one critical element {to achieve the goal of eliminating the condition of poor housing} is to get rid of the purely material concept of making the housing unit a "machine for living." This idea cannot but annihilate or negate the concept of place. By extension, the dwelling unit must be considered as the primary cell of the living organism that is the city. Thus we need to dissolve the inorganic groupings that surround the city and in part make it what it is; they asphyxiate it, make it a purely material environment where the city loses its essential meaning: to be a living body whose various organs provide vitality to the whole…."[8]

Muguruza's attacks against Internationalism and the avant-garde during the Republican period have mostly been analyzed as reactionary statements by a conservative and pro-regime architect. Yet, in recent years, historians like Carlos Sambricio have started to dismantle the comfortable myth of an epistemological rupture between the Republican period and Franco's regime.[9] Sambricio has put into question the so-called "Bohigas' axiom" that the architecture of the 1930s had been marked by an orthodox avant-garde, which was culturally monolithic, formally coherent, and "politically correct."[10] Thus he argued that "the different architectural options proposed at the beginning of the 1940s were the fruitful outcome of heterogeneous ideas, whose gestation can be traced back to the decade preceding the Civil War."[11]

From the end of the World War I onwards the study of popular architecture was seen as the basis for a new architecture of low-cost houses—for instance, the workers' houses in the garden cities. This was important in order to respond to the increasing migratory flux from the countryside toward the cities. The specialists of popular architecture oriented their reflection toward normalization and a new classification of the vernacular production in order to conserve the brick-based systems of production and to adopt solutions confirmed by tradition and the availability of abundant and qualified manpower. Spanish historians usually agree that the years 1925-1930 marked the genuine renewal in the architectural debate. Against the defenders of a nostalgic-monumental architecture connected to history (exemplified by the works of Antonio Palacios and Leonardo Rucabado), the proponents of change adopted two superimposed axes of reform. T, the modernist schemes inspired by the European avant-garde, a direction represented by Josep Lluis Sert (1902-1983) and the GATCPAC; on the other hand, a deliberate return, not to the past, but to the essence of tradition. Rejecting the regionalist mask Fernando García Mercadal, Josep Lluís Sert, and the architects of GATCPAC saw in the emulation of rural vernacular esthetics and tectonics (Ibiza in particular) the means to "mediterraneanize" the modern.[12]

It is useful here to parallel Muguruza's declaration quoted above with José Luis Sert's statements that followed the CIAM IV held on the Patris ship from Marseilles to Athens in 1933. At that time, Le Corbusier and Sert embarked on a quest for the vernacular roots of the modern movement. Not unlike Abbé Laugier who wanted to return to the pure sources of classicism and "re-vernacularize" its practice, they attempted to substantiate the myth of the origin beyond the machine and other technological analogies. The rediscovered abstract purity of the Mediterranean vernacular in Ibiza and Andalucia paralleled the Italian rediscovery of Capri and the southern coasts by Piacentini, Marinetti and the rationalists of Gruppo 7. In 1934, the so-called monolithic image of the avant-garde was already shattered and Sert wrote at that time:

> "Every country has a timeless architecture which is generally termed vernacular, not in the sense as understood in architecture schools, which means regional, but rather vernacular of the lowest class, classified according to the economic means at their disposal…. The pure functionalism of the "machine à habiter" is dead, but it will kill, before its demise, the old styles and teachings at the schools of architecture. Architects and theorists, above all Germanic, carried functionalist experiments to absurd extremes."[13]

Likewise, the 1939 speech by conservative architect Luis Gutiérrez Soto's (1900-1977) reflected a functionalist attitude, devoid of any international "rigidity" or formalism, and anchored in a serious understanding of working-class life in poor families. For Soto, styles were to be used

Figg. 2,3 - Gimenells, Spain (Alejandro de la Sota)

as pure instruments of design in order to wrap up the logical structure of the architecture. To the excessive decomposition of functions advocated by the Bauhaus, he opposed simple arrangements inspired by tradition:

> "In the minimum dwelling unit, only one zone living room is admissible; it must support multiple functions: eating, working, playing, family reunions, etc. A detailed analysis of life, furniture, and other needs for space demonstrates that the minimum dwelling does not depend on size and dimensions of rooms, but on a good organization of space."[14]

3.0 The Escorial as model of Spanish Identity

As a branch of the Ministry of the Interior, the Department of Devastated Regions was under political pressure to act quickly and adopt the most efficient methods of planning and construction. Spain was destroyed, and its productive system was in shambles. Recovery was made difficult by the destruction of the Civil War (especially of the railway system and communications in general), by a loss of skilled labor, and by the restriction of imports on capital goods imposed by the World War and its aftermath. These difficulties were increased by the misguided policies of autarky, particularly the state control of prices and industrial development within a protected national economy cut off from the international market. Thus, in the short term, there were few architectural options possible. The return to tradition and to the vernacular forms of building—the reassuring "style of the devastated regions"—was, first of all, a pragmatic solution imposed by the economic shortages and technical obstacles endemic in the country.[15] However, the architects benefited from a high degree of autonomy to improve the miserable conditions of housing, particularly in rural areas.[16] This often included total reconstruction if deemed necessary. An order issued in 1938 forbade anyone to rebuild without prior authorization to be granted in accordance with the approved town-planning scheme of reconstruction or restoration:

"It was seen at once that, since destruction was—alas—an accomplished fact, it should at least be turned to advantage in better planning to raise modern, healthy and cheerful towns and villages that should, nevertheless, retain their local character and their traditional architecture."[17]

Whether the town was rebuilt adjacent to the destroyed settlement (Ganajenos) or superimposed over it (Brunete), the orthogonal grid was the common feature of the reconstructed towns by the Department of the Devastated Regions. This morphology strongly contrasted with the medieval, often irregular and chaotic, organization of the blocks and lots in the destroyed towns and cities. An efficient system of land redistribution permitted this complicated process of urban re-platting or transfer of property rights from the destroyed area to the new town.[18] The elongated rectangular blocks were functionally oriented according to modern solar charts; they were divided and dimensioned to accommodate a limited number of housing typologies that fit the needs of the agricultural or industrial population. Moreover the towns were built as if they were "a single edifice," that did not have to grow and reflected the precise quantitative conditions of the reconstruction project. The models and perspective drawings reinforced the "finite and autonomous edge" of the foundations, the "vision from afar" that in some way made them analogous to the German *Siedlungen* of the Weimar Republic.[19] The grid and its edges provided spaces for new programs such as parks, sport fields, small hospitals, and other necessary buildings for modern life, while the peripheral blocks acquired the characteristic of a genuine urban façade.

As the political ideal of civil life under the national-catholic regime could be summarized in the triad family/work/town; it was thus logical that the *plaza mayor* became the point of crystallization of the reconstructed urban context. Scores of new, geometrically designed *plazas*, often in a style reminiscent of Juan de Herrera's (1530-1597) works at the Escorial and Valladolid, were built or rebuilt anew to appear like they had always been there:

> The center will always be the traditional *plaza mayor*. The plaza, with its arcades, is faced by the representative edifices of the City, of the State, and of the Party. The streets that depart from it lead to the workplaces in the fields and in the factories. In addition to the deeply rooted municipal and political tradition of the *plaza mayor* as civic center, the {new} town will have a second religious center. It consists of the *plaza de la Iglesia*, with its attached rector and catechesis house, its church and tower, dominated by a cross whose open arms will watch over the future life of the population.[20]

Yet, in contrast to the traditional Spanish plaza carved out of the urban fabric or to the Latin American one created by the removal of a block within the grid, the plazas of the reconstruction were new and modern creations. They were often placed asymmetrically within the plan, in order to have a more direct access from the outside and to open directly to the surrounding greenbelt and the countryside (Brunete, Villanueva del Pardillo, Gajanejos). Moreover, as in Sabaudia and other Italian new towns, the squares were essentially defined by thin "bar-like" buildings, and assemblage of interconnected objects.[21]

Period aerial photographs clearly make explicit the strong correspondence between the rational town layout and the housing typologies. A limited amount of party-wall types, generally organized around a patio, established the fabric of the towns. In order of decreasing size, they were destined for farm owners, farm administrators, and agricultural workers. Other special types were planned around the squares and at some significant street corners, generally with commercial ground floors. In the towns developed by the Department of Devastated Regions, houses were rationally conceived behind a vernacular mask. Designers systematically documented the architectonic elements of tradition (ironwork, balconies, doors, arches, etc.), and catalogued the different typologies in relation to the climate and other regional characteristics. This scientific labor was supported by a series of publications such as *Construcciones rurales, La vivienda rural, and La vivienda de los pescadores*."[22]

4.0 Colonial landscapes and settlements

When Luis Buñuel shot his third film *Las Hurdes: Tierra sin pan* in 1933, the gap between Spain's urban life and the blighted countryside had reached increasingly dramatic and politically dangerous proportions. Using a George Bataille-inspired technique of chilling montage and abrupt juxtaposition, the "anarchist-surrealist" documentary about one of the poorest and most remote village of Spain was immediately censored by the Republican government, intent as it were to promote a more optimistic vision of rural Spain through various projects of agrarian reform and propaganda.[23] In the footsteps of Mussolini in Italy (reclamation of the Pontine Marshes south of Rome) and Roosevelt in the United States (Tennessee Valley Authority), large-scale irrigation, dam construction, electrification, and foundation of new settlements were all necessary solutions to the improvement of rural life and overall political stability that the Second Republic studied, but had no time to implement.[24]

The planners of the *Instituto Nacional de Colonización* (I.N.C.) identified six major river basins whose improvement could help spur both agricultural development and improvement of the rural way of life: the Guadalquívir and its associate rivers such as the Viar in Andalucia; the Guadiana River that was the backbone of the Plan Badájoz from Badájoz to Ciudad Real; the

Tagus and Alagón Rivers from the Portuguese border to Toledo; the Ebro River between Huesca and Lerida; the Duero River between Salamanca and Palencia; and the Segura River around Murcía. During three decades, the architects, planners, and workers of the National Institute of Colonization worked in collaboration with State's hydraulic engineers to create new man-made landscapes of dams, irrigation canals, electric power plants, towns, and church towers. Overall, the fine network of canals and reservoirs infrastructure that channeled the water within the newly irrigated fields was relatively invisible with the exception of some large dams, for instance near Alcántara on the Tagus River at the border with Portugal. As very few towns were founded on the banks of a river, the connection of the infrastructure was primarily visible from and within the fields. More than sixty-five thousand colons and their families—thus an estimated half a million of residents considering the size of rural families and their service employees during that period—settled in these newly reclaimed and historically poor and under-equipped regions of Spain. Three hundred and two towns were built and integrated within the new regional networks. Relatively small in size and low density (mostly one story high), they included more than forty thousand dwellings, designed both as residential and productive unit with their outbuildings and patios for animals and machines. Within the newly irrigated river basins, towns were generally built six or seven miles apart, each at the center of a specific radius of cultivation in practical distance from each town center.

Arguably, the program of colonization was not an experiment ex novo. From the Reconquista, Spain had forged a rich and brilliant tradition of urban foundation, both in America and in the Peninsula itself.[25] Architects and planners of the I.N.C. found a fertile ground in that heritage, yet they were equally and unequivocally aware of modern planning in Germany, Palestine, and Fascist Italy.[26] Italian new towns like Sabaudia and Segezia, as well as the 1933 *Concurso de Anteproyectos para la construcción de poblados en las zonas regables del Guadalquivir* served as blueprints for the first generation of towns.[27] Morphologically, early towns like Bernuy (1944, Manuel Jiménez Varea, Gimenells (1945, Alejandro de la Sota), Suchs (1945, José Borobio), Torre de la Reina (José Tamés, 1951) or Valdelacalzada (1947, Manuel Rosado) were planned rationally and systematically, albeit with a lot of design diversity, according to a loose grid centered on an enclosed and at times arcaded plaza mayor. Each town was planned and built by a single architect as a unified project responding to a precise program. The town edges provided spaces for parks, schools, or sport fields, while the peripheral blocks created a genuine urban façade fronting the fields. Within this overall strategy, the towns continued to appear within the agricultural landscapes as compact white settlements dominated by a slender, and usually postwar modern in design, bell tower. This distinct architectonic element functioned mostly as a visual symbol allowing to visualize and to recognize the towns from the| main roads. Interestingly, as the detached towers did not really have a precedent in rural Spain, the main source of influence for this modern typology were the well published images of Sabaudia and other Pontine cities to which the contemporary literature made ample reference.

The towers were, and have continued to be, an artifact that linked the towns to the concept of a regional landscape of colonization. According to the Spanish Dictionary of the Real Academia, a *colonial landscape* (paisaje colonial) is the "result of the valorization of previously uncultivated areas through new agricultural production, and its population with persons that were brought from outside, as results from territorial reorganization through the use of special plans and laws." In addition, according to the Dictionary, "the whole process is typically generated from outside the territory itself in relation with the needs of the metropolises."[28] Although these were clearly the conditions under which Franco's regime embarked on the process, the National Institute of Colonization made a concerted planning effort to permanently "populate" these landscapes. In that sense, the landscapes of the I.N.C. implied a structural transformation of the discussed regions.

5.0 MODERNIZATION: THE ALHAMBRA AS NEW MODEL

In 1939 the newly created National Institute of Housing enacted the *Ordenanzas de la Vivienda*, a set of regulations based upon pre-Civil War research that established all technical conditions necessary for the new worker dwelling unit and colonist house, including number and dimensions of rooms, orientation, preferred materials, and ventilation systems.[29] As a result, the typology within the I.N.C projects was strictly regulated. The houses were rationally conceived behind a vernacular and, within the first generation of towns, "regionalist" mask that would recall the typical dwellings of the region. Likewise, all basic constructive elements like windows, bars, balconies, and urban furniture were standardized. Given the amount of new foundations, the limited number of types and their systematic repetition within the towns, standardization at the I.N.C. became "such a natural process that [architects] had to redouble their efforts to avoid it."[30] As Alejandro de la Sota wrote about Gimenells, it was important to achieve a variety of urban form that "without being overly irregular would be sufficient to evade the rigorous aspect of a town of grid-like pattern."[31] The Vth National Assembly of Architects of 1949 marked a seminal date for the Spanish architectural world, which opened to an international forum after ten years of relative isolation. Italian guest lecturers Alberto Sartoris and Gio Ponti argued for a new architecture of "mediation" whose modernity would reflect "the rational and functional concept of the art of building… as old as the world and born on the coasts of the Mediterranean," thus reconnecting with the pre-Civil War debates in Spain.[32] Josep Antonio Coderch's projects for Sitges in the 1940s, the birth of *Grupo R* in Barcelona (1951), and the Spanish Pavilion for the IX Milano Triennale (1951), among others, provided the impulse and the cultural alibi, not only to adopt a stripped-down vernacular as a politically acceptable form of Spanish modernity but also to set up a less rigid relational system between buildings and their environment. Likewise, whereas the reference to the Escorial had dominated Spanish architecture during the 1940s, many saw in the Alhambra in Granada a more appropriate historical and multicultural reference to the modern condition and needs of postwar Spain. Accordingly, architects Fernando Chueca Goitia and Miguel Fisac, among others, issued the influential *Manifiesto de la Alhambra* in 1953.[33] On the "colonization front," from the early 1950s and the foundation of Esquivel onwards, a new generation of I.N.C. towns sprang up from the drawing boards of Alejandro de la Sota, José Fernández del Amo, Miguel Herrero, Fernando Terán, and others like Antonio Fernández Alba. For this new generation of architects, the search for a more abstract urban form to match the modernized vernacular implied that the grid and the block could lose their absolute character and be substituted by more organic plans and relationships between city and nature. Camillo Sitte's tenets of urban composition, which provided a traditional sense of identity to the first generation of new towns built in the 1940s, remained critical, although in a reinterpreted manner, to the implementation of that novel dialectic between tradition and modernity.[34] Accordingly, de la Sota designed the pioneering Esquivel (1952) as a symmetrical fan-shaped figure, whose apparent rigidity reflected "it was born all at once on a flat terrain."[35] An extensive system of pedestrian-only streets, alleys, and small squares gave access to the front of the houses, whereas another system of streets, wider and border by high courtyard walls, concentrated all the agricultural traffic and the commercial movement. Overall, Esquivel's urban spaces were traditional, yet, as William Curtis wrote, "they were abstracted in order to adapt them to a new order and a new landscape."[36] Likewise, the church and the town hall did not appear as the walls of a square, but rather rose as a corporeal, freestanding, and somewhat surrealist complex at the edge of the park that separated the curved town façade from the regional road (fig. 3). José Luis Fernández del Amo developed further the vision of a modern urban form in Cañada de Agra (1962), Villalba de Calatrava (1955), Miraelrío (1964), and especially Vegaviana (1954).[37] Planned as a settlement of three hundred and forty houses, Vegaviana was located in the midst of a thousand-year old landscape of oak trees. Aware that the countryside would disappear over time for cultivation, del Amo decided to conserve the oak groves throughout the town, as natural relics and monuments. He allowed the landscape to penetrate the whole organism, and made it indispensable to the loose definition of the streets and squares. Blocks became like groupings of attached patio houses that could be read as large-scale objects or urban fragments within the urban context. The *plaza mayor* with its church, town hall, and shops still came into view but its edges mutated into an informal and poetic mix of built fabric and landscape. Located less than fifty kilometers southwest of the infamous Hurdes region, now part of the dammed basin of the Alagón river, Vegaviana was praised as a work of "human, plastic, and social quality,"[38] "whose architecture derives from man and serves his vital fulfillment."[39] As Del Amo would write, "I have run across the Spanish land and have learnt, in all its corners, what an anonymous architecture could teach me…. Going from surprise to surprise, I have been taught to guess the measure and the function of the spaces that man built to shelter his life and his work, and how he set up an environment for social life. So were born and were made the villages and small towns that I admire and from which I have gathered the hidden laws of spontaneous organization" (fig. 4).[40] Beyond the pragmatism of the program and the timeless quality of their streets, a dream-like and "surrealist" atmosphere often transpires. De la Sota's "expulsion" of the church from the fabric of Esquivel, his circular brick church in Entrerríos, the "fractured centrality" of Villalba de Calatrava, the open plazas of Gévora, Hernán Cortés, or the ring of farmhouses of Miraelrío… are all examples where, in the words of Antonio Pizza, "in lieu of the center, conventional pole of the 'Full'… we come across the spectacular exposition of the "Void." [41] In *Profession Reporter* (1975), Michelangelo Antonioni captured the power of this "metaphysical," or rather "surrealist" void, when, leaving the Palacio Güell on their way to Almería, Nicholson/Locke and the Girl enter a sun-scorched and deserted Andalusian town of the I.N.C.[42]

Notes

1. Alejandro de la Sota, in an interview with Martha Thorne, *Quaderns d'Arquitectura i Urbanisme*, April-May 1983, p. 106.

2. Lluís Domènech, *Arquitectura de Siempre: Los años 40 en España*, Barcelona, Tusquets, 1978, p. 44. Other similar exhibitions were organized in the following years and traveled from city to city. The Falange was an extreme nationalist political group founded in Spain in 1933 by José Antonio Primo de Rivera. Influenced by Italian fascism, the Falange issued a manifesto of twenty-seven points (February 1934) repudiating the republican constitution, party politics, capitalism, Marxism, and clericalism, and proclaiming the necessity of a national-syndicalist state, a strong government, and Spanish imperialist expansion.
3. The first issue of the periodical *Reconstrucción* was published in April 1940. The magazine was discontinued in the early 1950s. On the reconstruction see the exhibition catalogue *Arquitectura En Regiones Devastadas*, Madrid, MOPU, 1987.
4. Domènech, pp. 23-24. The analogy with Fascist policies in the Pontine Marshes following Mussolini's Speech of the Ascension Day are thus quite obvious, but a comparative analysis remains to be done. The I.N.C. all took over the responsibilities of the Department of Devastated Regions in the 1950s.
5. Domènech, pp. 16-17.
6. "Muerte y reconstrucción de unos pueblos," *Reconstrucción* X, 8, 1949.
7. Domènech, pp. 18ff.
8. Sesiones de la I Asamblea Nacional de Arquitectos, Madrid, Servicios técnicos de FET y de las JONS, 1939, p. 4.
9. Carlos Sambricio, "L'architecture espagnole entre la IIè république et le franquisme", in *Les années* 30 – *L'architecture et les arts de l'espace entre industrie et nostalgie*, Paris, Editions du patrimoine, 1997, p. 181.
10. Sambricio, p. 181, in reference to Oriol Bohigas, architect.
11. Ibidem.
12. See for instance Antonio Pizza, "The Mediterranean: Creation and Development of a Myth," in J. LL. *Sert and Mediterranean Culture*, Antonio Pizza and Josep Rovira, eds., Barcelona, Colegio de Arquitectos de Cataluña, 1995, pp. 12-45; Josep Rovira, "Ibiza y la mirada de la vanguardia," in *Urbanización en Punta Martinet, Ibiza*, 1966-71, Josep Rivera, ed., Almería, Colegio de arquitectos de Almería, 1996), pp 33-54; and Carlos Sambricio, "La normalización de la arquitectura vernácula: un debate en la España de los veinte," *Revista de Occidente*, December 2000, pp. 21-44.
13. Josep Lluis Sert, "Arquitectura sense 'estil' i sense 'arquitecte'", *D'Ací i d'Allà* 179, December 1934. Also see Alan Colquhoun, "Vernacular Classicism," *Modernity and the Classical Tradition-Architectural Essays 1980-1987*, Cambridge-London: The MIT Press, 1989, pp. 21-31.
14. Domènech, pp. 33-34.
15. Carlos Sambricio, "L'architecture espagnole entre la IIè république et le franquisme," pp. 184-5. I found the expression "style of the devastated regions" in the special issue of *Reconstrucción*, November 1946, pp. 268-9.
16. All affected persons were granted the right to solicit long-term loans at a low interest rate from the National Reconstruction Credit Institute which was created for this purpose by the Law of the 19th of March 1939, a couple of days before the end of the Civil War. Interest rates for a 30-year loan went from one to three per cent.
17. José Moreno Torres, *La reconstrucción urbana en España*, Madrid, Artes Gráficas Faure, 1945, unpaginated.
18. See José Moreno Torres, unpaginated.
19. Alberto Ustarroz and Manuel Iñiguez, "Città con luce di patio: Da Brunete a Vegaviana," *L'altra modernità*, Savona: Dogma Edizioni, 2000, pp. 174-175.
20. Quoted from a government pamphlet by Carlos Sambricio, "Ideologias y Reformas urbanas. Madrid 1920-40," in *Arquitectura* 198, 78. Philip II was one of the heroic figures of the Falange and the Franco regime.
21. On issues of typology in Fascist new towns, see Jean-François Lejeune, "*Guidonia città aerofuturista*: A Fascist and Rationalist Company Town" in *Proceedings of ACSA International Conference 1997-Architecture as Politics*, Washington DC, ACSA, 1998, pp. 73-78
22. Domènech, p. 23. A similar investigation was realized in France and in Italy during the same post-war years.
23. On *Tierra sin pan* (Land without Bread) and its relationship to politics, see Jordana Mendelson, "Contested Territory: The Politics of Geography in Luis Buñuel's Las Hurdes: Tierra sin pan," Locus Amoenus II, 1966, pp. 229-242. Also see Jordana Mendelson, *Documenting Spain: Artists, Exhibition Culture, and the Modern Nation, 1929-1939*, University Park, Penn State University Press, 2005. One can also make a relationship to North American social documentaries on the poverty-stricken Tennessee Valley in the 1920s-30s: see Robert L. Snyder, *Pare Lorentz and the Documentary Film*, Norman, University of Oklahoma Press, 1968.
24. See Javier Monclús and José Luis Oyon, *Políticas y técnicas en la ordenación del espacio rural*, Volume I of the *Historia y Evolución de la Colonización Agraria in España*, Madrid, MAP/MAPA/MOPU, 1988.
25. On Spanish America, see Graziano Gasparini, "The Spanish-American Grid Plan, an Urban Bureaucratic Form,"

The New City I, 1991, pp. 6-17 and in the same volume "The Laws of the Indies of 1571," pp. 18-33; Mario Sartor, "La città latinoamericana tra antecedenti precolombiani, leggi di fondazione e tradizione," *Zodiac* 8, 1988, pp. 14-47. On 18th century foundations, see a summary in José Tamés Alarcón, "Proceso urbanistico de nuestra colonización interior," *Revista Nacional de Arquitectura*, November 1948, pp. 414-424; Carlos Sambricio, *Territorio y Ciudad en la España de la Ilustración*, Madrid, MOPU, 1991.

26. See José Tamés Alarcón, "Proceso urbanistico de nuestra colonización interior," op.cit.; and "Actuaciones del Instituto Nacional de Colonización 1939-1970," *Urbanismo*, COAM 3, 1988, pp. 4-18, where he referred directly to Sabaudia, Segezia, and Nahalal, the kibboutz-village designed in 1921 by Richard Kauffman.

27. "Concurso de anteproyectos para la construcción de poblados en las zonas regables del Guadalquivir y del Guadalmellato," *Arquitectura* XVI, nº 10, 1934, pp. 267-298.

28. See Águeda A. Villa Díaz y Juan F. Ojeda Rivera, "Paisajes coloniales en el Bajo Guadalquivir. Origen, evolución y carácter patrimonial," *PH. Boletín del Instituto Anadaluz del Patrimonio Histórico* XIII, nº 52, 2005, pp. 43

29. José Fonseca, Director of the National Institute of Housing, was an important link between the pre-Civil War era and the reconstruction: see among others José Fonseca, "La vivienda rural en España: estudio técnico y jurídico para una actuación del Estado en la material," *Arquitectura* XVIII, nº 1, 1936, pp. 12-24. On the Housing Ordinances of 1939, see Manuel Calzada Pérez, "La vivienda rural en los pueblos de colonización," *PH. Boletín del Instituto Andaluz del Patrimonio Histórico* XIII, nº 52 (2005): 55-67; Ignacio de Sola-Morales, "La Arquitectura De La Vivienda En Los Años De La Autarquia, 1939-1953," in *Arquitectura* 199, April 1976, pp. 19

30. Manuel Calzada Pérez, "La vivienda rural en los pueblos de colonización," p. 61.

31. Alejandro de la Sota, "Vivienda agrupada. Pueblo de Gimenells," *Revista Nacional de Arquitectura*, November 1948, pp. 439-441.

32. Antonio Pizza, "The Tradition and Universalism of a Domestic Project," in ed. Antonio Pizza & Josep Rovira, *In Search of Home: Coderch 1940/1964* (Barcelona: Colegio de Arquitectos de Cataluña, 2000), 89-90.

33. See Gabriel Ruiz Cabrero, *The Modern in Spain after 1948*, Cambridge, The MIT Press, 2001; Carmen Rodríguez and José Torres, Grup R, Barcelona, Gili, 1994. For the Manifiesto de la Alhambra see *El Manifiesto de la Alhambra 50 años después: el monumento y la arquitectura contemporánea*, Granada, Patronato de la Alhambra y Generalife, 2006

34. See Victor Pérez Escolano, "La diffusione dei principi sittiani in Spagna e nell'America Ispanica," in Guido Zucconi, ed., *Camillo Sitte e i suoi Interpreti*, Milano, FrancoAngeli, 1992, pp. 156-161; and Carlos Sambricio, "De la ciudad lineal a la ciudad jardín. Sobre la difusión en España de los supuestos urbanisticos a comienzos del siglo," Ciudad y Territorio 94, 1992, pp. 147-159. On the second generation of towns, see Antonio Pizza, "Die Dörfer Der Agrarkolonisation Im Spanien Francos," in *Die Architektur, Die Tradition Und Der Ort: Regionalismen in der Europäischen Stadt*, Vittorio Magnago Lampugnani, ed., Ludwigsburg: Wüstenrot Stiftung, 2000, pp. 464-93.

35. Alejandro de la Sota, "El Nuevo pueblo de Esquivel, cerca de Sevilla," in *Revista Nacional de Arquitectura*, 133, December 1953, pp. 15-22; "Pueblo para el Instituto de Colonización, 1952-1956, Esquivel, Sevilla," *AV: Monografias (Alejandro de la Sota)*, 68, Nov.-Dec. 1997, pp. 38-45. Interestingly, Esquivel recalls, at a smaller scale, Ernst May's unrealized project for Siedlung Bornheimer Hang in Frankfurt (1926).

36. William Curtis, "Dúas obras." Grial, 109, 1991, p. 17. Quoted in Pedro de Llano, *Alejandro de la Sota: O nacemento dunha arquitectura*, Pontevedra, Deputación Provincial de Pontevedra, 1994, p. 41.

37. For an overview see *Fernández Del Amo: Arquitecturas 1942-1982*, Madrid, Ministerio de Cultura, 1983; José Luis Fernández del Amo, *Palabra y Obra*. *Escritos Reunidos*, Madrid, COAM, 1995. On Vegaviana, see "Vegaviana: un poblado de colonización," *Revista Nacional de Arquitectura*, 202, 1958, pp. 1-14.

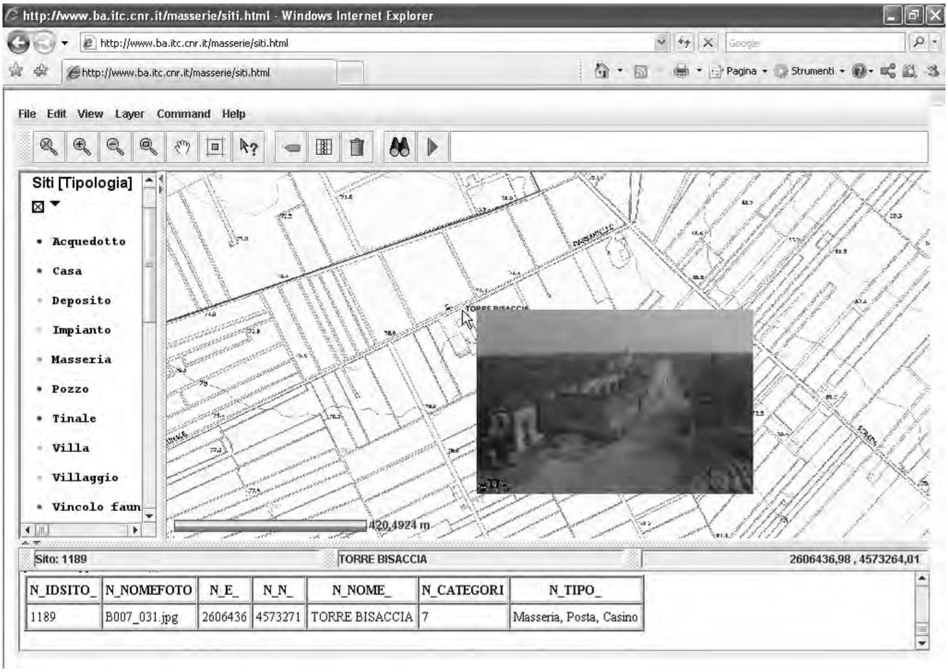
38. Quoted from Francisco Javier Saenz de Oiza, "El Pueblo de Vegaviana," *Arquitectura*, 7, 1959, pp. 25-28, reprinted in Fernández Del Amo: Arquitecturas 1942-1982, p. 46.

39. Oscar Niemeyer, catalogue of the 1961 Biennale of São Paulo where Del Amo received the Gold Medal, quoted by José de Castro Arines, "El hombre y la obra" in *Fernández Del Amo: Arquitecturas* 1942-1982, p. 16.

40. José Luis Fernández del Amo, "Del hacer de unos pueblos de colonización," *Palabra y Obra: Escritos Reunidos*, Madrid, COAM, 1995, p. 77.

41. Antonio Pizza, "Los lugares del habitar en los poblados de colonización" in *La habitación y la ciudad moderna: ruptures y continuidades. Actas del Primer Seminario DOCOMOMO Ibérico*, Zaragoza, Fundación Mies van der Rohe, 1998, pp. 137-143.

42. Research for this essay has been made possible with the support of the University of Miami, the *Agenzia per la città (Roma), and the Regione Lazio*.



Research, localization and visualization concerning "masseria Torre Bisaccia"
WebGIS realized with JShapeview

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ENVIRONMENTAL IMPACT MITIGATION IN RURAL HERITAGE MAINTENANCE

1.0 Introduction

This paper examines critical issues in the preservation and maintenance of rural building in the Apulia region. On the basis of the peculiarities of this precious part of our cultural heritage and of criticities emerged in protection and promotion processes developed in the last decades, the work here presented aims at introducing an innovative approach, represented by the VIRIDIA research program carried out at ITC-CNR (Bari). Focusing on the setting out of an integrated system of support tools for the planning and management of rehabilitation projects, the research aims at enhancing the environmental quality of the rural heritage and at facilitating an effective involvement of the different stakeholders of promotion processes. Among the project's results, the 'Guidelines for environmental impact mitigation', which represent the objective of a specific activity line within the research program, will be described in the paper.

2. The Apulia rural Heritage

2.1 Characters and problem areas

Probably in few other Italian regions like in the Apulia territory, the progressive and age-long moulding of the rural landscape brought about by human presence has been marked by such an utmost differentiation of cultivation and breeding practices and of the ensuing lifestyles and settlement patterns. Likewise, the tangible evidences of those settlement and production models that are to be found in rural architecture, from dry-stone walls to irrigation works, from dwellings - '*masserie*', '*trulli*', '*casedde*' - to towers, wells and '*tratturi*', are characterized by the same multifaceted characters.

This architectures' inheritance shows extremely peculiar features: on one hand, the quantitative consistence of architectural resources and their distribution in the territory assign them a value of 'diffused heritage'; on the other hand, the close interrelation between single resources and their context, above all through the functional relations within production processes, leads to refer to a real 'network system' (like in the case of '*masserie*' or of coastal towers). Such peculiarities, besides calling for targeted solutions for knowledge management and implementation both for mere study purpose and in support of conservation programs, assign the value of real ‘permanence’ to a territorial richness for which the definition of ‘minor heritage’ – as opposed to monuments or historic and cultural ‘excellences’ – appears more and more inadequate. The contemporaneous consideration – and care - of single monuments and of the surrounding context – building ‘fabric’, production models, landscape and cultural environment – that has generated them is the only correct approach that can lead to an effective preservation of the Mediterranean territories’ cultural identity. Recent trends within regional and local administrations prove the centrality of this concept within territorial promotion policies [1].Even more importance should be attached to that wealth, in terms of environmental sustainability content, that is deeply inherent in rural building – a wealth still unexplored or underestimated for its most part - that can effectively support the achievement of higher environmental compatibility levels in territorial development processes.

The system of the ‘*masserie’* represents a perfect synthesis of that eco-logical content: ***as tangible testimony of a ‘sustainable’ way of life:*** from the rational use of water resource to the deep sense of compensation for deforestation damages through the consolidation of slopes, terrace-cultivation and the addition of red earth to the advantage of soil fruitfulness, to the self-sustainability of the community living within the *masseria*, everything is evidence of a close cooperative relationship between man and environment; ***as ‘building container’***: the specific characters of this building typology are a direct expression of that sustainable lifestyle that resulted from the directions that nature itself provides and that man was able, then, to understand, from thick walls, mitigating summer radiation effects and limiting warm dispersion in winter, to sun-reflecting white lime painting; from porches and loggias protecting against high-slope summer sunrays and directing low-slope winter sunlight, to the careful exposure; from compact volumes for the minimization of thermal dispersion to natural ventilation and, above all, to local building techniques and low-cost traditional materials. This last feature in particular, together with the diffusion of different production practices, has then led to that variety of structures that can be noticed among the areas of *Gargano, Tavoliere, Murgia Barese, Salento* and *Daunia*, and that has been impassioning generations of researchers [2].

Reflecting on the meaning of very recent terms, such as *‘ecobuilding’* or *‘ecological design’*, it becomes immediately clear that the ancient ‘poverty’ of the *masserie* is really, on the contrary, a precious ‘up-to-date’ patrimony.

Nonetheless, preservation initiatives for this peculiar inheritance meet manifold barriers, starting from legislative schemes that are often enough rigid to actually disable owners in the maintenance of buildings; furthermore, a wrong conception of resource fruition for tourist purposes, focusing on the management of single buildings in terms of a sacred but harmful isolation, deletes or buries their relations with the context, missing the opportunity to enliven, in fact, a much more powerful resource like the territory. The mere physical access to properties – still before their visit and fruition – is hampered by the lack of clear and structured information, a valuable resource also for the establishment of effective co-operative interactions among the stakeholders involved in territorial promotion programs. Finally, the establishment of maintenance practices that disregard that peculiarly close relation between the building and the environment represents the main jeopardy for the preservation of the rural heritage’s physical integrity. On the contrary, the integration of environmental compatibility criteria in rehabilitation projects is the only possible approach, since homogeneity with the building's original conceiving facilitates re-qualification at the technical level and, on the other hand, by reproducing the artifact's generative course, ensures correctness and consistency with the historical content of traditional building techniques.

2.2 A Tool For Enhancement: Information Web-Sharing

In the perspective of the enlargement of the roles involved in knowledge integration for the promotion of territorial micro-systems, specific issues emerge that deserve further investigation and are substantially related to the necessity of tools for site relevance assessment and for information sharing.

In practical terms, this means supplying potential users with adequate information to support decisions on sites to visit, taking also geographic location in due consideration. The increasing part played by the Internet in information spreading, together with the availability of license-free software tools (freeware or open-source), allows now to contextualize information on the territory with the help of WebGIS applications.

Within a post-degree course on Digital and Information Technologies for Cultural Heritage funded by the Regional Administration of Apulia – at its completion stage at present – JshapeView Rel.0.7, a free java applet for cartographic information visualization, was tested for educational purpose by ITC-CNR. Jshape reference site (http://www.jshape.com) offered a wealth of technical documentation and practical examples, thus supporting unexperienced learning. The experimentation revealed a versatile and multifunctional interface, though requiring the use of text files containing parametric data to be used as input in the GIS projects.

The operational procedure set out for the class-project comprised the following steps:

1. information on-site gathering and insertion in tables created with OpenCalc (http://it.openoffice.org/); besides geographic coordinates, the following features can be referred to in order to support decision on sites to visit:

a. Visitability (closed / open on demand or in limited periods / open; opening hours; admittance conditions; admittance cost; site's insertion in thematic itineraries);

b. Basic services (wardrobe, WC, multilingual or monolingual information materials, safety devices, additional services like bookshop, bar, guided visits);

c. Cultural activities (exhibitions with relevance to the site);

d. Accessibility (distance from public transport lines, parking availability, insertion in guided tours), support facilities for disabled visitors;

e. Peculiarities (remarkableness / curiosity / sight worthiness);

2. data import and cartographic archive generation (standard shapefile [3]) created with QGIS (opensource GIS software, http://qgis.org/);

3. digital cartography (typically .dwg files) export into .tif format and georeferencing with QGIS plugins;

4. transformation of georeferenced .tif images into georeferenced .jpg images;

5. GIS publication on the Web (fig. 1) after the arrangement of text files containing the correct parameters for the visualization of information layers [4].

3.0 Problem areas in maintenance processes

Traditionally, interventions on the territory as execution of general and detailed plans have been governed, at regional and local scales, through the concurrence of two 'written' planning instruments: the Building Code (*RE, Regolamento Edilizio*) and the Technical Implementation Rules (*NTA, Norme Tecniche di Attuazione,* attached to plans). These tools imposed, and still impose, rules for detail planning on the basis of strictly quantitative parameters and of qualitative indications generally applicable to the whole of the municipal territory. Weighty contents, bound to the peculiar specificities of different – urban, rural, mountain - micro-systems and sub-systems that compose a territory were, and are still, lacking.

Despite such limitations, in the presence of a shared concept of 'architecture', those instruments originally accomplished their task decently even if, however, operational problems frequently emerged: poor consideration of the built environment's characters and values together with a marked trend towards demolition&reconstruction, only to mention some, although, fortunately, only to a certain extent.

From the 2nd post-war period on, with the explosion of well-known mass-tendencies such as urban migration, abandon of rural areas, spreading of the 'secondary dwelling' concept, the traditional schemes of RE and NTA have been revealing more and more undeniable limits (among other things, little attention toward the environment, prevalence of quantitative parameters, vagueness of qualitative criteria, and so on), allowing to carry out each and every design hypothesis. At the moment, no signs of revision or evolution of those planning tools can be seen, neither within national legislation nor in regional instrumentation or in current planning practices. The full inadequacy of present-state instruments has substantially helped forward the spreading of degradation processes that are widely complained but not hindered through effective measures.

Considering the failure of 'police-like' approaches to territorial development – as confirmed by the long succession of conditional amnesties for building code violations of the last decades – the opportunity to substitute the concept of 'control' with the idea of process 'governance' recently led several public and private institutions to issue specific regulations or guidelines. The objective of these– not yet compulsory - measures consists in orientating the different actors involved in building processes through examples, descriptions and 'behavioral' models aimed at stimulating a new approach to design activity, that takes the 'context' in due consideration, thus making the project 'integrate' in it, rather than, like it frequently happens, 'oppose' to it. Along the research stages, a conspicuous amount of documents and guidelines were surveyed, for a large part available on the Piedmont Region and Bolzano Province websites. In the former case, the following documents are also available:

- *Instructions for the rehabilitation of out-houses*, Building and Planning Dossier n.5/2003;
- *Landscape in territorial governance*, 2005;
- *Instructions for the recovery of traditional building heritage*, Workshop Proceeding, Fontanafredda, 2000;

- *Instructions for the recovery of traditional rural buildings*, 1998;
- *Criteria and orientations for landscape preservation*, -.

To these documents, the website '*Progetto Cascine'* dedicated to the knowledge, rehabilitation and promotion of the Piedmont's '*cascine'*, an equivalent of '*masserie'* of Apulia [5].
On the Bolzano Province website the following documents can be consulted:
- *Nature and landscape in Alto Adige (Guidelines),* 2002*;*
- *Building in the rural landscape, -.*

Among others, an interesting short handbook, *Rural landscape protection: criticities and good practices* (RuralMed, -) was also examined.
All these documents – different in many respects - have a "descriptive" structure in common, in that they generally contain a commented list of laws and regulations for landscape protection, followed by a discussion of the different problem areas related to specific landscape components and finally a description of the procedures and tools available for each intended purpose. More specific indications on the appropriate contents and methods of the design and operational phases of concrete interventions, possibly with the description of "good practices", can hardly be found. It must be pointed out, too, that many of those initiatives have been carried out in a vulnerable context such as the Alpine belt, thus confirming the need for innovative tools to support traditional instruments that often prove to be, for different reasons, of little effectiveness.

4.0 Environmental quality in promotion strategies

The Apulia region, wealthy in natural, cultural and historical resources, has in tourism its most promising and strategic sector; furthermore, the Regional Administration has formally stated, in the general frame of its programming activity for territorial promotion, the basic principle of the integration among cultural heritage exploitation, development of tourism entrepreneurship and environmental quality improvement, pointing out, as priority action line, the realization of "a tourist accommodation system aimed at the improvement of general and environmental quality standards and of classification levels within the whole region through the recovery of ancient farms (*masserie*), towers and fortifications" [6].
Local rural heritage, blending in itself the opportunity for the recovery of cultural and architectural values with the potentialities of a more sustainable fruition of rural buildings also in terms of accommodation service (the recent explosion of agritourism is a fair demonstration of this), conjugates uniquely that principle, pointing to tourist initiatives based on the concept of 'itineraries'. Tourist activities, chief factor and driving force in the growth of our territories, is also, on the other hand, a main consumer of non-renewable resources and source of chemical and acoustic pollution, able to operate serious alterations in the local communities' life quality, in every respect. As a consequence, it holds in itself also the elements for its exhaustion, through the unavoidable degradation of destination places. If, on one hand, the attention towards sites of historical, cultural and environmental interest and above all towards the so-called 'minor destinations' is growing at the same pace with the tourists' and residents' environmental awareness, on

the other hand, the continuous abandon of minor towns in the last decades and the resulting dismantling of historical building 'containers' have been accelerating and intensifying their physical deterioration. This is especially true in the case of rural buildings: although the spreading of agritourism has in certain ways acted as an incentive towards recovery and rehabilitation works, recent surveys revealed that unoccupied rural buildings built before 1918 and needing rehabilitation works figure up at tenths of thousands [7]. The urgency of an approach that integrates sustainability of tourism activities and cultural heritage protection was more than evident already in the 'Charter for Sustainable Tourism' of Lanzarote (1995), that pointed to considering tourism effects on historical and cultural heritage and assigned priority to sustainable tourism development initiatives in vulnerable areas – in environmental and cultural sense – damaged through high-impact and obsolete flow models.
It is, then, easy to understand that the 'system' of rural architectures holds in itself the priceless potential to become a strategic resource for the promotion and exploitation of the territory, offering at the same time valuable answers to the need for higher sustainability levels in tourist flows and to the demand of cultural tourism. It becomes thus crucial to make tools available that can support rural heritage maintenance in full compatibility with the necessity to preserve the context's environmental quality.

5.0 The 'Viridia' guidelines

5.1 Description

In this perspective, a specific research line, within the general frame of the 'VIRIDIA' program [8], focuses on the setting out of specific guidelines for building interventions in the rural landscape of Apulia.
It must be premised that our region has been long investigated through general and specific analyses, that have effectively pointed out the historical, morphological and environmental characters of its territory. Those studies, however, have remained fragmented to a certain extent, lacking any synthesis effort that could generate appropriate 'instruments' for territorial management and for recovery, restoration, rehabilitation and construction intervention planning in consistence with the whole context, in all its components. In this regard, the lack of significant contents within the Regional Thematic Plan – 'Landscape' (*PUTT, Piano Urbanistico Territoriale Tematico 'Paesaggio'*), issued by the Regional Administration in 1994 after a 'preparatory' period of 15 years and definitively approved in 2000, should be mentioned. Beside this substantial "gap", municipal planning instruments should also be considered, that deliver extremely vague guidance for interventions in rural areas, lacking in content and, subsequently, in efficacy. The research program in course of development at ITC-CNR was formulated along the following lines:
a) bibliographic investigation, aimed at gathering and classifying the knowledge on the territory, that has remained in years stratified and fragmented, as explained above; b) bibliographic survey on appropriate methodologies for the recovery and re-qualification of the building heritage, assigning priority to those methods that specifically focus on the

Apulia territory, although these studies, too, require an effort of operational synthesis; c) documental survey on examples of guidelines set out in other Italian regions, with specific reference to those initiatives that present innovative features, with respect to information sharing and divulgation through the Internet; d) documental survey on the contents of municipal planning instruments for the preservation of landscape and rural areas. Along with the different research phases, the guidelines' outline was generated.
The most appropriate scheme for the guidelines appeared to be an articulation into two 'fruition channels', parallel and mutually integrated.
The first 'channel' is represented by the elaboration of synoptic sheets consultable in the Internet, describing recurring typologies in rural building heritage and structured into levels of complexity, from finishing elements to the whole territorial complex, in accordance with the following scale:

1) 'Landscape' level – The attention is focused on complex settlements with impacts at the scale of the surrounding landscape, such as the system of rural villages, the electricity distribution grid, trans-receiving antennas, monumental trees, wind-power installations, cultivation areas, and so on;

2) 'Building typologies' level - In this level single buildings are comprised, such as masserie, isolated dwellings, single farmhouses within the villages, trees in connection with the building complex;

3) 'Building elements' level – It comprises the different typologies of building elements, such as outer walls, coverings, floors, partition walls;

4) 'Finishing' level – It refers to building technologies and typologies of outer works such as dry-stone enclosure walls, outdoor paving, and so on.

For each level, the sheets indicate:

- recurring pathologies;
- appropriate interventions with respect to environmental and architectural compatibility and to energy consumption reduction;
- inappropriate interventions;
- references for further investigation.

The second 'channel' refers to a specific 'document' containing the Guidelines in strict sense, drawn in accordance with a descriptive methodology, with the illustration of the different building typologies, their historical origin, main distinctive features, recurring pathologies and a commented list of suggested and inappropriate actions.
The two channels will be 'cross-linked', i.e. specific links on each of the two channels will allow to navigate to the other one. Special attention was paid to the conspicuous bibliographic links for further deepening.
The Guidelines will also be a printable document, for traditional consultation.

5.2 Goals and expected results

The final goal of this ongoing research is the setting out of a support instrumentation for the planning of territorial and building interventions that meet landscape preservation exigencies and facilitate environment protection and energy consumption reduction, thus integrating obsolete building and planning legislative tools in local contexts. The whole VIRIDIA project holds an even wider potential, as a consequence of a systemic and integrated approach to rural heritage. The concept of 'environment' as a resource that must be not only preserved but also managed through a balanced combination of production activities entails an approach that requires the availability of heterogeneous knowledge and information on the environmental components of the context. The ultimate goal of the VIRIDIA project is the creation of a knowledge base on environmental heritage of evident usefulness for all the professional categories committed with the management of the environment, the territory, landscape and environmental quality, in particular for institutions involved in territorial governance.

As already explained, each resource draws its qualification and its value from the global environment that generates it; the knowledge base should then necessarily contain also information of geographic and historic nature. A deep motivation for heritage preservation is on the other hand as much necessary, since the mere physical 'conservation' of resources can only slow down a decay that starts long before – in terms of significance – from within the community and subsequently develops in their physical dimension, through material deterioration.

A further objective of VIRIDIA consists then in the commitment of local communities both in knowledge acquisition processes and in resource promotion initiatives, through a multi-thematic web portal and a Geographic Information System capable of search sessions for the definition of customizable tourist itineraries, virtual exploration of interest sites through images or videos, document consultation and site-visit planning. The possibility to upload comments and suggestions represents a precious resource for municipal administrations' planning activities as it allows to focus on programs with higher success potential since based on a larger consensus.

Local Administrations will have the possibility to access the information available in the portal, such as main general (cartographic) and specialized (thematic) data bases, implemented by agronomists, for different purposes: territorial planning, environmental protection and local resource promotion programs' arrangement, land management, territorial marketing, and so on. Moreover, they will rely on useful knowledge for the definition of public services that better meet citizens' exigencies, with specific reference to general cartography, distribution and supply networks, data bases, archives of design hypotheses, sites with landscape interest or value and urban green areas. The guidelines, in particular, will constitute an important mean for the integration of sustainability principles in the revision of general and thematic plans;

Universities and Research Institutions will exploit the information available in the portal to support their education, divulgation and research activities;

Private/public companies, professionals, citizens will find the contents available in the portal (free or on payment) useful for consulting services and technical support activities such as for project financing in favour of design schemes submitted by registered users through innovative real-time on-line communication modalities.

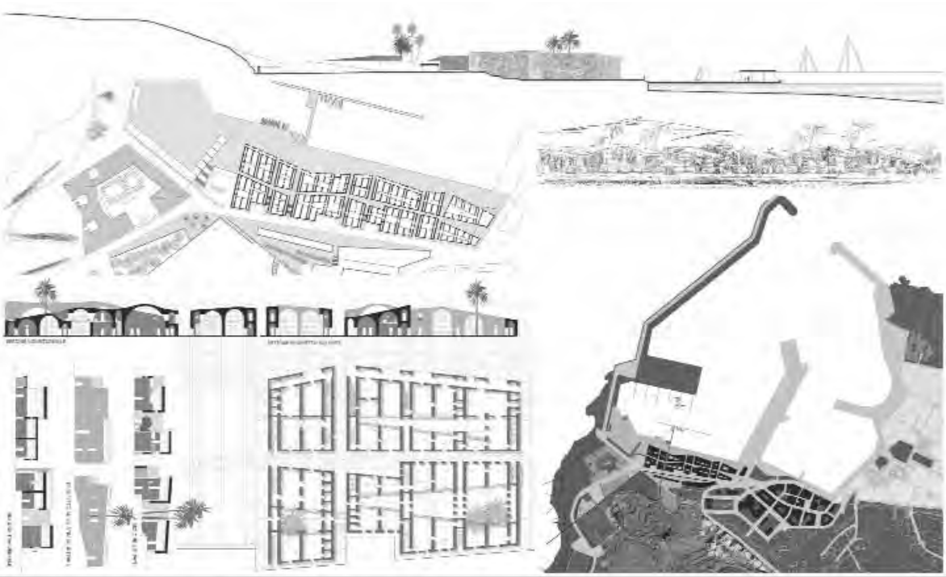
6.0 Conclusion

The research lines within the VIRIDIA project, illustrated above, stem from the identification of problem areas in rural heritage preservation initiatives at different scales - single resource, district, whole system - and aim at delivering support to programs and actions for heritage rehabilitation and promotion with a systemic approach, based on synergies that can be triggered between multi-purpose operational tools – such as design guidelines – and a constant and effective information sharing, supported by I&CTs. In particular, the opportunities offered by opensource software tools of recent formulation allow to outline innovative paths towards a broader commitment of local communities, as fundamental condition for the effectiveness of territorial promotion initiatives.

Notes

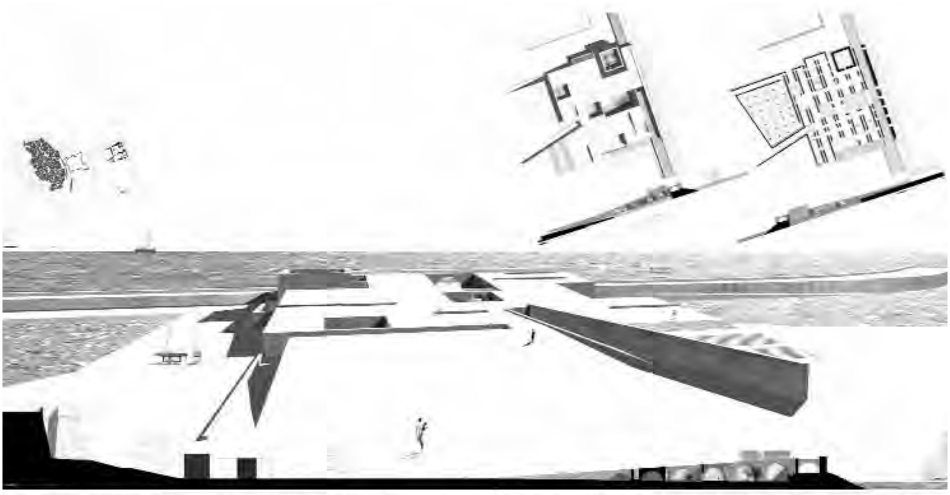
1. The Regional Administration (cfr. POR PUGLIA 2000-2006, Complemento di Programmazione, Misura N° 4.14) indicates, among the priority lines of its programming activity, "the recovery of ancient farms (masserie), towers and fortifications". The Municipality of Conversano (district of Bari) has recently stated as basic principle within its Statute (art.11) the preservation of the masserie heritage
2. http://www.glocus.it/foto/Paesaggio%20e%20beni%20culturali.pdf
3. Shapefile is a file format for geospatial vectorial data used in Geographic Information Ssytems, developed and ruled by ESRI with open specifications in order to support interoperability between ESRI products and other firmware; the main files associated with shapefile groups are files containing geometrical information on objects (".shp" archives), alphanumeric attributes associated to shapes (".dbf" archives) and the index of the related connections (".shx" archives).
4. The main files contain project-specific and layer parameters (.ini), theme-related parameters (.tmt) and parameters attached to icons assigned to sites (.pat). For each information layer more themes can be defined, depending on data in "dbf" archives
5. http://www.webgis.csi.it/website/cascine_internet/viewer.htm
6. POR PUGLIA 2000-2006, Complemento di Programmazione, Misura N° 4.14
7. Data from CENSIS-ANCE, 2003
8. VIRIDIA - project proposal by Agronomist and Forest Doctor Professional Federation - aims at achieving the implementation of a knowledge base on environmental issues; it comprises a specific module (1.c) focusing on measures for the mitigation of impacts associated with building activities. The research is funded by the Regional Administration within the POR 2000-2006 program.

Acknoledgements
Par.1, Par. 2.1, Par. 4: A. Lerario
Par. 2.2: N. Maiellaro
Par.3, Par. 5.1: V. Zito
Par. 5.2: A. Lerario, V. Zito
Par.6: A. Lerario, N. Maiellaro, V. Zito



AUTORE: Giancarlo Mainini, Francesco Rispoli, Vanna Fraticelli, Antonello De Luca, Francesco Viola, Francesca Bruni, Angela D'Agostino, Antea Andriello, Sarah Avvedimento, Raffaele Di Vaio, Alessandra Forino, M. Teresa Giammetti, Virginio Tenore

TITOLO: **Pantelleria, il porto turistico**



Un secondo suolo, un segno imponente là dove finisce la terra, un grande spalto, inclinato dalla sua radice nella memoria del Castello e proteso verso l'infinito marino, riunisce spazi e avvenimenti in un'unica piazza a vari livelli.

La luce ne racconta la forma. L'ombra ne rivela la potenza dello strato lapideo eroso fino al suolo naturale. Quasi una gravina, ne mostra la controforma cavata nel suo spessore.

Tra le due anse del porto le preesistenze virtuali delle tracce di un arsenale. Un tempo fabbrica e ricovero di navi prima che l'ultima catena le sciogliesse all'incontro con il mare.

Una ambiguità è in opera. Una doppia sospensione: quella del volume e dello spazio di un grande oggetto che affonda e poi emerge dal suolo, e quella del tempo in cui cessa ogni antecedenza tra il lavoro di scavo e quello di costruzione.

La piazza è di per sé luogo dell'incontro. In questa piazza tornano ad incontrarsi ancora la presenza e la memoria, la luce e l'ombra, il rilievo e il cavo, la terra e il mare e, insieme, il cielo.

AUTORE: Giancarlo Mainini, Francesco Rispoli, Vanna Fraticelli, Antonello De Luca, Francesco Viola, Francesca Bruni, Angela D'Agostino, Antea Andriello, Sarah Avvedimento, Raffaele Di Vaio, Alessandra Forino, M. Teresa Giammetti, Virginio Tenore

TITOLO: **Crotone, il fronte a mare sul porto**

G. Mainini, F. Rispoli, F. Viola [1]

THREE OCCASIONS OF CRITICAL COMPARISON

Abstract

1.0 Pantelleria the turistic harbour

The project works on the structure of the dividing line between earth and water, clarifying theirelations of the ancient settlement, in which the original rural tipology of the *dammusi* in time and meeting different conditions, becomes more clearly an urban place; other expressions of this rural and city cohabitation are the *magazzeni* or *sardune*, buildings that introduce a system of great simplicity and clarity, with two parallel walls and a barrel or cruise vault, spread out in the Mediterranean.

A particular role has been entrusted to the cover layer in which to constructive logic of the lower surface of the single elements ago reply the putting in shape of the upper wing surface that re-unites, through a second ground rising, that one that otherwise would turn out one mere summary of participations. This layer, true and own double cover, is corroded from holes and suffered that, like *pools of shadow* and memory of the garden introverts of the Arabic architecture, they offer to the host the appreciate one protection of the coolness.

1.1 Crotone: the waterfront on the harbour

Here, where the port is the threshold between earth and water, the plan has assumed like own two topics: that one of the arsenal, than often in the Mediterranean area characterizes this limit and that it joins sea to sea, of the two opposite handles; and that one of the platform balance, that links to the ground and is raised until the wharf measuring some the unevenness and give, in such a way, one risen of bradisismic to the tettonica of the first topic.

Beginning from the plan has searched the dimension of an able imposing fragment of giving, on the waterfront of the port, order to the accidental bequests here gathered in the time between the sea and the Castle, to which this second presence renders homage and with which, however, is confronted for dimension and with the power of a tettonic gesture that reunites in an only public square several spaces and varies levels.

In the cover layer, to constructive logic of the lower surface of every single element, ago reply the only plain of the upper wing surface that re-unites, through according to ground, one that

otherwise would turn out a giustapposition of several writings, corroding itself in order to reveal the below spaces.
From the tettonic point of view the plan develops a principle of specific foundation, the arsenal beginning from, treaty as virtual preexistence in which the doubling of the walls on which the serving spaces unload the times qualification, while the longitudinal bodies accommodate the spaces for the artistic activities and the exposures. From the point of view of the object of the plan, instead, it is the outcome of an inverse distance, from a job of digging in the stone that reveals the thickness of the great mass. Also here, therefore, it is in work an ambiguity in the sequence between the writings of the ground pertaining to artifice and the preexistence: with a double suspension, that one spaces them, of the great object that come up and down in the ground, and that thunderstorm, that it invests the antecedence between the construction job and that one of digging.

1.2 Urban requalification of four parvises in the historical town of Sulmona

Of the four parvises that lie along the Corso Ovidio, the one of S. Chiara on a side and the one of S. Panfilo on the other represent two complex urban junctions on which a variety of situations and functions converge, therefore they act like the terminals of the system in which the urban life more intensively occurs.
The fourth parvis, located in an intermediate position, is dominated by the monumental complex of the Annunziata, which builds an relationship with its preceding space that is unusual when compared to the most current condition in the hystorical town, where squares and monuments are traditionally located on the same side of the street. Here, instead, the long façade of the Annunziata and the square that lies in front are split by the Corso.
Santa Chiara and San Francesco della Scarpa form an urban junction that needs to be solved through a variety of interventions of different kind, but that should be done in an unitary way. In order to try to give sense to this difficult interlacement, one needs to observe the fragments that constitute it in their multiplicity, instead of reassuming them in an abstract unity. In this way it's possible to organize individual materials in the plot of a story.
Moreover, our project retakes the idea of the Aschieri plan to enlighten and give value to the Casa Santa dell'Annunziata, but it uses a more modest gesture: simple, the one of giving space to the parvis, to *let* the trees and the well *be*.
A long, linear element breaks itself in two parts, and flows to the back of the square, wrinkling its ground in a synthetic gesture which "levels" the parvis. Its material substance is stony - the same material of the stair of the Casa Santa - with an essential profile, almost a rigid extrusion where - as delicate as pillows - the grit benches lie.
For San Panfilo, the announcement underlines the necessity to determine the limits of the sacred space looking on to the Cattedrale, and to requalify the identity of the place also through the transformation of the elements around it, in order to rehabilitate the urban role of the monument.
On one hand, the marginal and inconsistent design of the extension of the Villa which – as it appears currently – ends in nothing; on the other hand, a shapeless open space between the Church and the Stadium is also cut by the road that runs along the Villa. In this context, San

Panfilo appears in its unrelated solitude, inadequately drawing near the other objects (the Villa and the entrance to the Stadium) that cohabit here.
Our proposal takes upon itself to collect all these presences together into a sort of "hybrid" parvis, a pavement, conceived as it was chronologically (and logically!) previous to the objects lied upon it.

2.0 Foreword

Teaching, research and design are three aspects strongly tied in the work of the equipe of Architectural and Urban Design of the Master Degree in Construction Engineering and Architecture of the University of Naples "Federico II". Within coordination and open discussions among all the members of the group, critical rethinking, along with new ideas and work hypothesis, take place and develop, fullfilling the teaching and research paths, other than and frequent design experience fostered in architectural competitions.
Every year, the School of Engineering of the University of Naples " Federico II" organizes an exhibition and a publication to give credit to the teaching and research activities.
This year, the presentation proposes a few design projects that have been fostered in two important architectural competions.
The first competition was sponsored by the "Decima Mostra Internazionale di Architettura della Biennale di Venezia, Mostra Città di Pietra – Progetto Sud". Giancarlo Mainini coordinated a work unit composed by Francesco Rispoli, Vanna Fraticelli, Antonello De Luca, Francesco Viola, Francesca Bruni, Angela D'Agostino, Antea Andriello, Sarah Avvedimento, Raffaele Di Vaio, Alessandra Forino, Maria Teresa Giammetti e Virginio Tenore. The group presented two entries: the first one, titled *Pantelleria and the touristic harbour*, was published in the exhibition catalougue, while the second one, on *Crotone and the city waterfront*, was published in the catalougue and selected for the exihibition in the Venice Biennale 2006.
Within the second architectural competition, Giancarlo Mainini coordinated the work of Francesco Rispoli, Francesco Viola, Luigi Stendardo, Maria Teresa Giammetti and SPSK+ Office, and entered the proposal titled "METAM", winner of the first price *ex-aequo*.
In the first two projects the architecture is made of stone: the tectonic and its massive presence seem to be the main feature of the projects. Design tecniques involve the escavation and erosion of the mass, which reaveal the thickness and the solidity of the construction. The *Gravine* situated in different places of Southern Italy (the most famous are in Matera, i *Sassi*) show the ambiguity that relates stone architeture (the *artificial*) with its surrounding environment (the *natural*). Remembering also of Michelangelo's *Prigioni,* the *Pirrere* in the island of Favignana, Alvaro Siza's *Piscinas* in Leiça de Palmeira, stone architecture often tell of the encounter between past and present, revealing and conceiling the stone artifact within the preexisting geography.
Following an analogous suggestion, both the projects work within the idea of overlayering two surfaces: the new and artificial that reveals and hides the old and natural. In a paradox, the old (natural) layer is build up as an architecture, while the new (artificial) layer is escavated, showing the voids. It frequently happens along the coasts of the Mediterranean sea to find places whose identity is the result of layering up of millenia of history; in these places,

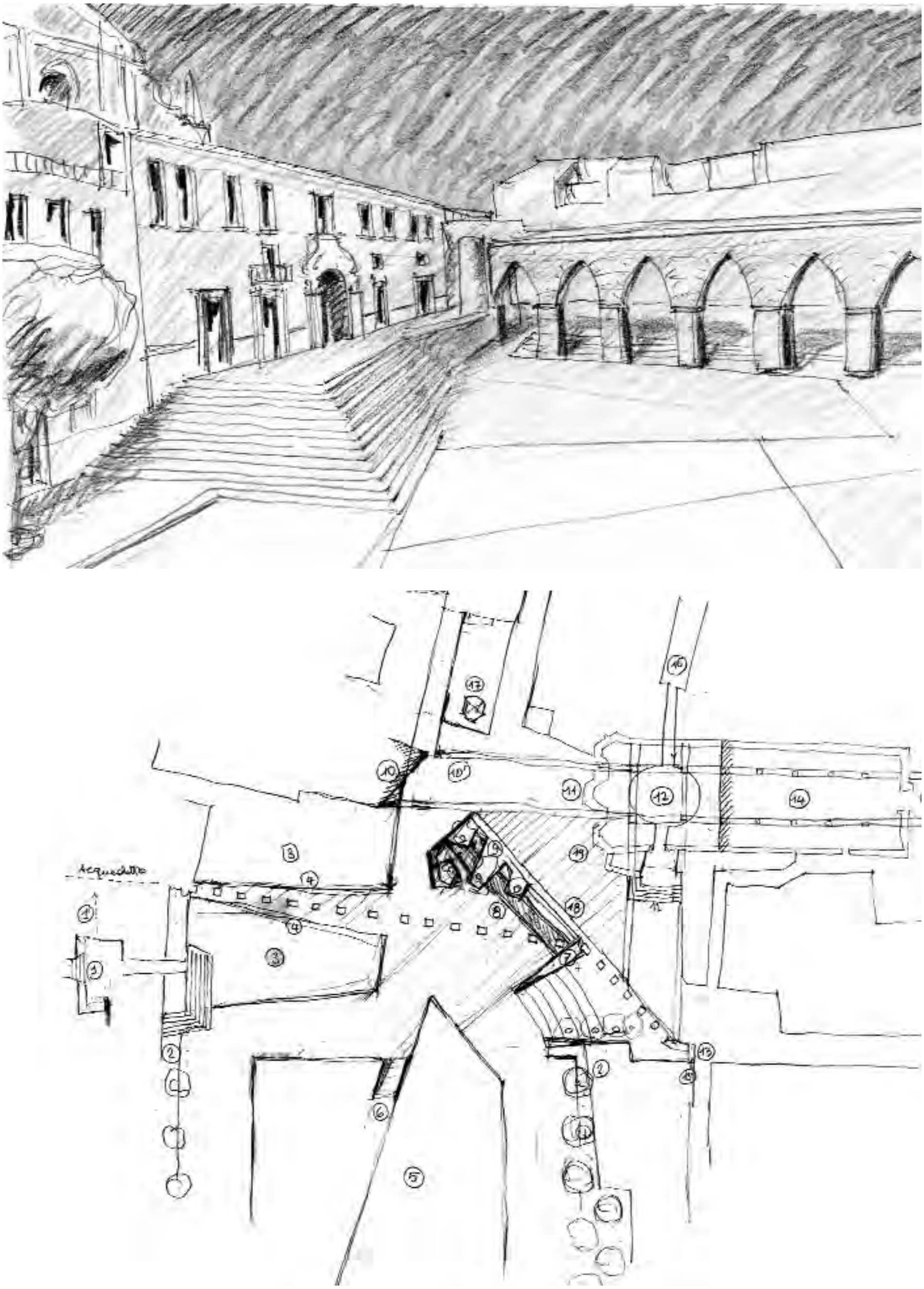
the act of *digging* into the soil often means bringing to light, while the act of *building* a wall often hides and throws shadows on the past. Stone, light and shadows are the main elements of mediterranean architecture.
The third project is located in Sulmona's historical center; the issue is the reconversion of four parvises lined up on Corso Ovidio, which are strategic locations in terms of historical meaning and geographical position within the city. The project investigates the possibility of articulating different architectural features and working strategies in a general and consistant design.

2.1 Pantelleria: the touristic harbour

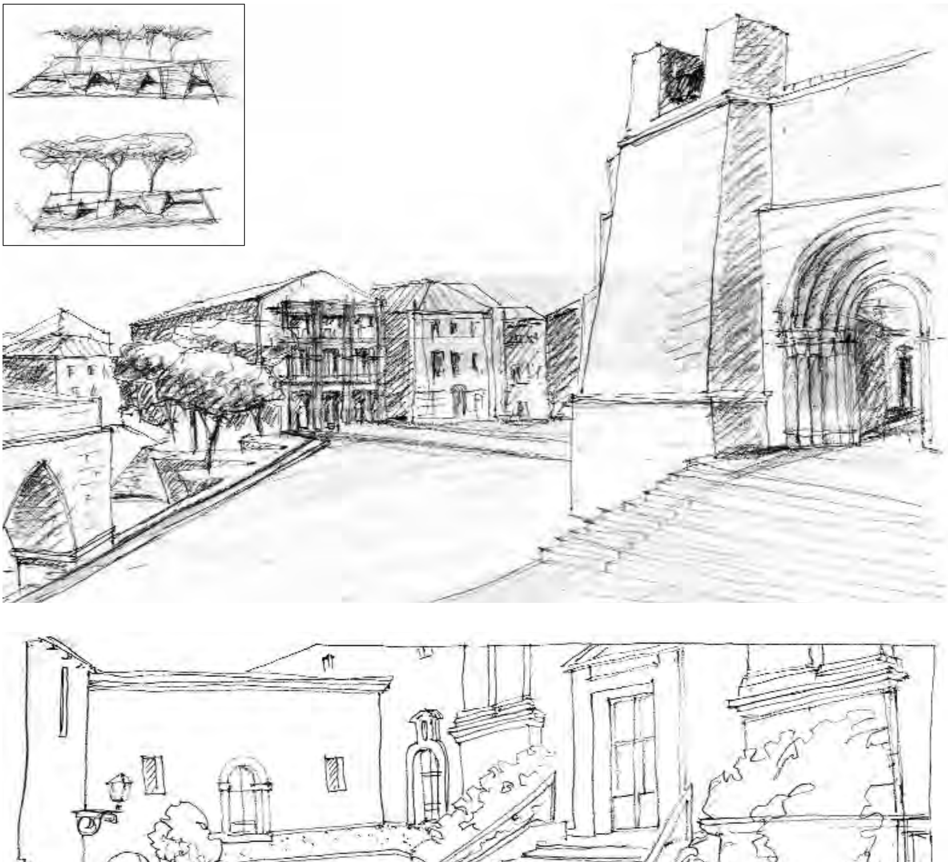
In Pantelleria, masonry construction has always been one of the most tangible sign of a slow changing history, as have the cultivation of the caper, wine and olives.
The harbour is the "gate" to the island: the threshold that for millennia has welcomed the arrivals and saluted the departures.
The project works on the borders of the new marina, clarifying its relations with the old urban center; the town shows the signs of its rural origins, in the typology of the *dammusi*, and the *magazzeni*, very simple masonry constructions made by parallel walls covered by barrel or groin vaults, frequently found in mediterranean architecture.
In this typological and morfological frame, the project has reached the definition of urban blocks that resemble in terms of dimension and structure to the ones of the historical center.
The unity of the dwelling is given by the fluid conformation of the roof, that covers multiple adjacent vaults in a single continuos surface, mimicking the corrugation of the landscape. The artificial soil is cut through by courtyards and patios that reveal the thickness of the construction and give the dwelling the cooling confort of islamic gardens.
The front facedes are articulated adding side by side different specific solutions, evocating the idea of the slow layering of individual constructions through a long period of time.
Behind the new harbour, a large boulevard borders the new dwelling, fostering different activities and urban utilities: here the accesses to the stone quarry, the street market, the park and the different utilities located in the harbour line up in a peculiar urban sequence.
Along the waterfront, the docks that protude from the coast into the sea and the masonry armour that embraces the gas tanks confirm the subtle relation between artificial soil and natural environment that reigns in the entire proposal.
Landscape design carefully reproduces natural conditions of mediterranean coastal flora, using palm trees in large open spaces and scented bushes in private courtyards.
The structural aspects deal principally with the vault covering of parallel masonry walls. The interior spaces, defined by the progression of parallel walls, differ in width and are mounted by barrel vaulting which vary in hight. The horizontal thrust is neutralized by the side-by-side disposition of the vaults. The masonry structure is respectful of both traditional building tecniques and modern masonry construction codes.

2.2 Crotone, the waterfront

Masonry construction in Crotone has fostered ancient traditions, way back from Pitagora's filosophical school.



Urban riqualification of parvises in the historical town of Sulmona. G. Mainini sketchs



Urban riqualification of parvises in the historical town of Sulmona. G. Mainini sketchs

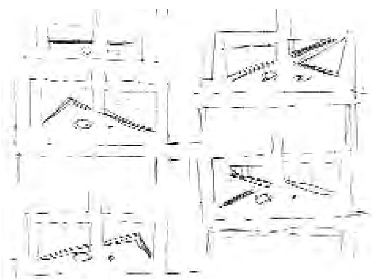
In Crotone, the harbour represents once again the treshold between earth and water, and the project works on the composition of two different issues, one related to the sea, the *arsenal*, which connects the two bays of the harbour with water galleries, and another related to the earth, the *weigh-bridge*, which resolves the fracture between the level of the urban soil and the hight of the dock, with the construction of a large sloping *piazza*, distorted by an imaginary earthquake.
The project has the dimensions of a huge fragment that polarizes different urban situations and incoherent constructions that gather around the harbour, mimiquing in a negative projection the symbolic weight of the castle.
One single architectural mark holds together different urban solutions: the street, the dock, the two bays of the waterfront, the historical part of the city.
Once again the roofing shows on the inside a progression of parallel barrel vaulting; on the outside is single continuos surface. In this case, the outer surface is a sloping plane that lift the city ground toward the sea, generating a dinamic progression of vaults of increasing height that lay underneath the *piazza*.
The waterfront stands as a grid that articulates different urban spaces and activities, among the others the new urban park and the new museum.
The construction is itself articulated in a double sequence of large spaces and small service spaces, located within the thickness of the bearing walls, appearing both as a preexisting construction that is being revealed by a process of excavation, and a new organizing principle of the space of the waterfront. Again, the ambiguity between past and present is revealed: the contrast between construction of the new layer and excavation of the old soil echoes the spacial ambiguity of the architectural object that rises from/sinks into the water.
Mediterranean flora punctuates different directions through the plaza; palm trees border the limit of the sloped surface toward the city.
The structural system is made by parallel bearing walls that define long, rectangular spaces covered by barrel vaults. The masonry structures are proportioned to both traditional building tecniques and modern masonry construction codes; special attention has been dedicated to seismic response of the structure, providing the construction with rigid elements aligned perperndicularly to the bearing walls.

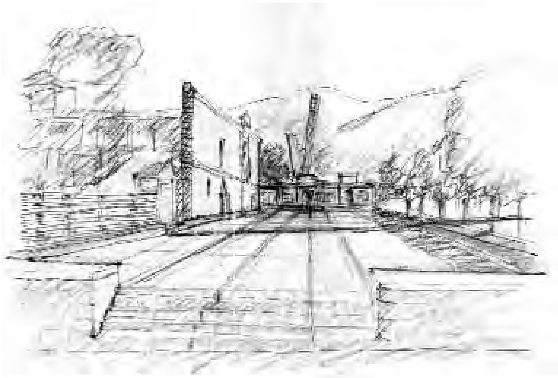
2.3 Urban riqualification of four parvises in the historical town of Sulmona

The parvises of Santa Chiara and San Francesco on one end of Corso Ovidio, and the parvis of San Panfilo on its other end, represent the starting and ending point of a complex system of urban public areas which defines the historical center of Sulmona. The fourth parvis is located halfway through Corso Ovidio, and is dominated by the monumental construction of the Annunziata; unlike the general urban pattern, according to which monuments and piazzas are located on the same side of the road, in this case the church and its parvis are located on opposite sides of Corso Ovidio.
The areas of Santa Chiara and San Francesco della Scarpa strongly relate to one another, although their unity is compromised by constrasting activities and urban forms, like the acqueduct, which dissolve in different directions the image of a consistent landscape.

It seems that the unity of the whole area can be revealed articulating the multiple urban fragment according to their specific logic, other than forcing them into an abstract global design. Therefore, the solution for Piazza Garibaldi is consistent to the tradition of specific uses and activities that have been fostered there for long periods of time.
The area of Santa Chiara's church is organized around a pedestrian surface that slopes down to the piazza, then turns into a small parvis, connects different urban levels and reveals the linear incisions of the acquaduct and the linear bench that functions also as a series of steps to fill the height gap.
Walking toward Santa Chiara it is possible to experience the contraction and the expansion of the surrounding space, before reaching the small court that leads to the entrance of the church, and to the Pinacoteca Civica of modern and contemporary art and to the Museo Diocesiano.
In Santa Chiara's court it is strongly suggested to build a connection to the upper level of the acquaduct that can conveniently lead to Corso Ovidio walking through the steps of the small staircase located behind the Fontana del Vecchio, a beautiful architecture of the Reinassance period. This way it would be possible to experience from the top of the acquaduct itself the peculiar urban relation that it marks with the city's open space, standing out as a strong confining border.
On this side, between Corso Ovidio and the piazza, the project works on the importance of the presence of the acqueduct, that has always been the symbol of the progressive and productive spirit of the city (as it is engraved on the seventh pillar of the structure, *Sulmontinorum laus est industria quorum hoc fieri iussit*). Wth this intent, the space around the base of the acquaduct is widened, to allow a better view of the structure and a more confortable connection between the higher and lower level of the Piazza. The gap betwen the two levels is confined by a battered wall; a blade of water comes out from an incision cut through the wall, filling a tank which also contains the base of one of the acquaduct's columns.
On Corso Ovidio, a long bench aligns to the first step of the *cordoni*; on the side of the bench there's the wall covered by water. A few blocks of stone emerge from the pool and hold three of the four pine trees existing on the site, while the fourth pine has a more distant and isolated base.
This composition of urban fragments and objects enhances the individuality of each element, like different characters on a teather stage, other than regrouping the whole urban scene in a single unity.
The design of the paving is originated from the traditional path of the religious easter procession of the "Eloping Madonna", and the partition of the piazza for the food market that was being hosted in the piazza during the nineteen hundreds.
In this area, the closed facade on the side of the acqueduct is designed by putting together, in a collage fashion, the cement liberty portals obtained from the demolition of the shops near the apse of the San Francesco church.
The demolition reveals the original features of the apse and its sorrounding, enhancing the monumentality of the pubblic building; for the same reason, the space around the belltower has been cleared, and the staircase has been redesigned.
The paving is designed as a continuos pattern on the inside and outside of the buildings, following the traces of the original outiline of the old San Francesco church.

In the spaces inside the *Rotonda*, it is possible to relocate some of the activities fostered in the demolished shops.
The restauration of the monumental system of the SS. Annunziata needs to be explained taking into account the will of Pietro Ascheri expressed into the urban plan of 1933. Aschieri suggested to clear and widen the spaces around the monuments of the city, to enhance their presence and their mutual relationships; he also wished to build a monumental system of architectures in the SS. Annunziata area.
The competition entry confirms Aschieri suggestions, with more humble gestures: the Casa Santa dell'Annunziata is clarified by opening up the churchyard, leaving inaltered the trees and the well.
For San Panfilo's church, an old deliberation of 1931 declared that it was necesary to demolish the "antiaesthetic wall" that bordered the field on the side of the cathedral and to use the space letf available from the collapse of the Palazzo Vescovile in 1706 as a pubblic space, connecting it to the Villa Comunale.
The competion entry tries to gather all the different urban fragments in the design of an "hybrid parvis", a sort of preexisting garden where other objects and activities take place.
The stone element that defines the watertable of the church is used for the paving of the open space, outlining a large room with no roof, paved all with the same material. This space organizes the entrance to the church, the soccer field and the Villa Comunale.
Once again, a long linear bench and the traces of the original plan of the church, projected outside the construction, are the elements that design the pattern of the piazza, and the enclosed garden, whose bordering walls protude as an ideal extension of the perimeter of the church.
Besides the soccer field, a change of material indicates the car crossing, while a small water feature relates the Villa to the boulevard of the railway station; finally, recessed floor light are located to mimique the ritm of the church plan.





Urban riqualification of parvises in the historical town of Sulmona. G. Mainini sketchs

NOTES

1. Professors at the University of Naples "Federico II", Faculty of Engineering, Department of Urban Design.

Figg. 1,2 - Restoration in Ravanusa (Agrigento), Sammartino house (Margagliotta, Tuzzolino)

A. Margagliotta, P. Vella [1]

PLACES CULTURE IN THE SICILIAN CONTEMPORARY ARCHITECTURE

1.0 Through the place and the resort to the concept of regionalism in architecture the general concept is tied to the particular one; indeed, often, through the revelation of the particular one we can reach the definition of a superior or general order. Regionalism ties the architecture to a wide and circumscribed territory and revealing its specificities and character , even if, inside the organizational statutes of the project, for long time the modern architecture assumed as base the adhesion to the place. In fact, the architecture that finds kind of link to a region finds the reasons for its modernity in the concept of place meant as fundamental material of the project. Through the knowledge of place the architecture finds again and expresses its identity, while with the individualization and the application of the principle of installation, the project is compared with the specificities of the places. Affiliation and identity put in evidence the ways with which the architecture builds his poetic characteristics, making reference to the character and the memory of the places, to the history and the traditions, to the materials and the techniques of the construction, indeed to all that references that the same place renders explicit. In the contemporary search on the project of architecture it is so possible to point out themes and ways in order to establish strong and meaningful relationships between the architecture and the places. The attention toward the local (the characters of the form, the diffusion and the interest for the setting of formal, functional and constructive typologies, the choice and the rediscovery of the materials of the tradition, the predilection of colors, the definition of the system of the bucatures, the relationship between inside and outside- and therefore the ways of definition of the enclosure-, the systems of coverage, etc.) they contribute to define an identity of the architecture tied up to a local condition that is possible to frame inside a referable cultural system to one determined region. If however we start from general choices that get near to the adhesion to the particular one, the trial is finalized to the identification of the ways with which the architecture can express a proper character that makes it specific of the context and of the area in which it finds its roots and the ways to take office. This way, in few words, the architecture finds its own identity and denotes the identity of the place. The contemporary architecture has its beginning in the action of *renewal* operated by the Modern Movement, that transmits a language generally valuable (almost a new form of classicism above the local limits to the extent to define it as International Style), furthermore it is dissolved and it finds specific declinations in the regionalist contaminations. The two *roads*, with other ramifications, conduct to the actual state of the architecture in which the two tendencies can be identified with more extreme characters and great autonomy: that globalizing one tied up to the concepts of *atopia* and abstraction from the localisms; the other one tied up to the search of themes and representative values, the aesthetic values and the local expressive potentialities. Nevertheless it could not be correct, or permissible, to be frame this language in the phenomenon of the mere regionalism, rather than in a cultural situation in which the more general characters are able to welcome and to make explicit the consequential influences from local themes, that is to establish and to communicate connections with the specificities of the places, the stronger they are. It is the case of the recent architecture in Sicily.

2.0 The conditions of island and isolation have almost made of Sicily a continent with a proper identity and an almost autonomous culture, even though it is defined with contributions and external contaminations. Also the architecture (historically) is distinguished for proper characters, also inside the great expressive tendencies that have marked the different epochs. «Certain works - Goethe writes in the account of his Trip to Italy - would not exist if there were not in Sicily marbles of various colors: it is not the spirit that chooses the proper material for its project, but it is the material that determines the character of the work».[1] Expressing a negative judgment on the Sicilian architectures that he judges deprived of planning, Goethe recognizes an identity of the Sicilian architecture of the eighteenth century just that for the absence of the spirit of the art and for the dependence from accidental circumstances that, he judges, countersigns it; among these, and to the first place, the availability and the beauty of the materials of the construction. Then a strong bond with local factors characterized the expressive culture giving birth to expressive and constructive traditions. The same innovative experience of the Liberty in Sicily, if on one side ties the architectural culture to the vast European movement of the modernism (Art Nouveau or Jugendstil as you prefer), finds inspiration and authenticity inside a local tradition relived and meant as creative memory, which includes and interprets in a new way the islands forms (from Arab-Norman works to the works of Matteo Carnilivari and Sicilian fifteenth century architecture) together with the expressions and the manual ability of the material tradition (the decoration with the use of majolica, the mosaic, the art of the concrete decorators and the false materials and so on). The cultural theme according to which the materials of the construction contribute (for the majority) to define a specific region architecture's characters is quite old: first theorized during the nineteenth century under the name of *ambientismo*, which is linked to Fischer's theories in the terminology, it actually lasts until the twentieth century and includes some experiences tied up to the traditional architecture (*vernacolarismo*, *neoralism*) during the years of the post-war reconstruction and over. The theory of the *ambientismo* attributes to materials the role of decisive elements for the decoding and the formulation of the architectural language.[2] This brings back to the rediscovery of traditional materials and the rediscovery of the «ability of natural and traditional materials of a place to well harmonize with the nature of the same place, with the colour of vegetation, of rocks, glue light and the colour of the sky».[3] In Sicily the theory is supported above all by Salvatore Caronia Roberti. «The good acclimatization of a work - he writes - is without any doubt one of the qualities of its Beauty»;[4] the environment incorporates several aspects inherent in the architecture starting from the artistic tradition of a date region, to the material and physical elements of the landscape, to the architect formation, to regional material, with their colours and workmanship specific characteristics. «in Palermo, and in great part of western Sicily, the yellowish *tuff* stones of the quaternary age have been used for centuries… The yellow and the grey are therefore the prevalent colours of the Architectures in these areas of the island,

and the taste of the local Architects finds its way around this range of light shades ... In estern Sicily whitish marble limestone is widely employed ... and the lava stone... In Catania a good hydraulic mortar is available, with volcanic sand called *taglime*, natural blue grey beautifully coloured, it is widely used for cover of protective external plaster, and it gets on well with the light of the marble limestone. The result for the city is a various polychrome rich of pleasant contrasts which is well inserted in the shining vivacity of the surrounding landscape. The architect from Catania, as a consequence of the environment in which he lives, cannot be more colourist of the one from Palermo».[5] The environment also influences the architect and the action of the labour, it is an «essential element for the execution, element to the tradition and used to the job of the materials of the region».[6] The landscape environment instead is referred to the characters of the landscape, with its forms and its colours and it constitutes not only a background for the architectural work but also the atmosphere. «Looking the temple of Segesta from a distant position the sight reminds to an architectural product of the ground that surrounds it, this is the prodigious harmony between the monument and the landscape».[7]

In this view of the artistic product as natural emanation is also possible to glimpse an attitude or a propensity, to the adaptation (even if cynic), in order to bend more properly what it is adaptable to the character of the island or to incline toward what is more suitable for the conditions of the island. We are also suited to consider the things of the past with the spirit of the local situation, if not actually in a native spirit, and in this way also the ancient classical temples become in Sicily *trespasses* from the order through the specificities of the materials offered by the places, that make them protagonists of a regional history and product of the ground rather than expression of a classical expressive code and, for this reason, situated over the spatial and temporal specificities. Such thoughts, as that one about the judgment (or prejudice) of Goethe on the prominence of the material on the sketch in the Sicilian architecture, allows also to underline a character of the architecture in Sicily that marks the past and, in some way, it actually reaches us; that is to say the bond with the elements of the nature (first among all the resources offered by ground and subsoil) that a bond expresses with the Earth. After all this propensity belongs to wider systems. One of the most evident aspects of the Mediterranean constructive tradition, perhaps the most remote, consists really in the strong relationship with the earth, the ground, the rock. By the way Ettore Sottsass writes: «The life of the architecture of this southern land is all opened and tied up to the ground as a deep well of water : earth and architecture stir together as dunes of a same desert».[8] This attitude recalls ,rather than a choice of convenience, a primitive condition of living meant in the heideggerian meaning, as condition of prelude to the construction. The building is made of the same substance of the ground, it is mixed with the corroded stones of the earth and with the roots and the trunks of the olive trees, enlarging as a great symbiotic work: «earth is architecture and the architecture it is the earth».

Actually, to the architecture of a determined territory, characters of originality originate from far both as it regards the space that the time, even if cannot only be interpreted as conditioning of the material resources and characteristics of construction materials. In fact, he/she is known, that alone the material can influence but not determine the language of the architecture. The Village of the Olive trees although Leonardo Ricci realized it in 1963 in Riesi (Caltanissetta) is built with the local stone, dug and recovered on the site of project and left to sight, despite is an architecture that it suits him for the condition of the place, it stays nevertheless an expression of the organic architecture that is inserted in the place but transcends it with the affiliation to a more general principle.

3.0 Some years ago, Lotus architectural review published an article about contemporary architecture in Sicily, pointing out that this triangle of land offers an «high quality architecture», in a reality divided between «the ones who want to reaffirm and consolidate traditional values and… the ones who speaks new radical languages» [9]. The expressive aspects could not be analysed only referring to time (tradition=past, change=present), as they also concern with space. The idea of regionalism (if we can talk of that), cannot be limited within restricted geographical areas, but it ‘s linked to wider systems that characterized spaces of business and cultural relationship and exchange. Sicily in an island of the Mediterranean , the sea that was not a barrier, but a way for cultures diffusion. Themes and languages, instruments and methodologies don’t belong just to a specific region but they lie inside a large territory. Apart from the fact that every region declines its own language, it is possible to catch a common linguistic code , with own rules, shared by different architectural experiences.

That’s why, for recent architecture in Sicily, we can talk of «legitimate pride of a fair evaluation in an international context, avoiding to consider it as typical regionalism, result of a particular local condition , as it has been for the Portuguese Siza’s architecture or for the so-called *scuola ticinese.* On the contrary, a plurality of aspects bears witness a rich tradition, whose modern origin can be referred to eighteen-century archaeological campaign’s deeds, to the modern architectural European influences, to Gino Pollini and Giuseppe Samonà’s *humanistic* rationalism…».[10]

The contemporary architectural experience makes its way, as it happened in other Mediterranean areas, following Modern Movement principles and paying attention at the same time to the cultural themes and problems of the island. Considering both extremities ,on a hand the pure Modern Movement principles of abstracti approach , and

on the other hand the local characteristics, the *aura mediocritas* moderation draw them up in a summary solution.

So, in contemporary architecture in Sicily, we can identify its own characteristics like a careful spaces interpretation and sympathy; the search of an intellectual affinity with the ambient, a method based on a work elaboration born from place and landscape suggestions; the nature’s reference mark; the use of modern and archaic techniques; the creation of a new way of using traditional materials.[11]

In case the Le Courbusier’s lesson of the volumes’ wise game under the sunlight, prevails over materials own language, the architecture casts aside its physical substance, making use of the most precious Mediterranean material: the sunlight. If the use of white plaster can denounce a modernist approach, on the other hand it holds a continuity with the traditional Mediterranean culture. The formal search is based on a poetic of excavation and subtraction that leads to essentiality (that could be metaphorically linked to the natural erosion process). That is a phenomenological approach rather than a methodological one, because form is strictly conditioned by the relationship between inside/ outside. The place is read like a physical support and a historical and cultural context. The project expresses its willingness of making a connection with the past, but at the same time, it search for new elements that could give a strong identity to the place. The language is made up by working on the place, so that there will be specific answer to single situations. The creation begins from what there’s on the site (shapes, spaces, colours, materials) so as to assure a further connotation to the tie with the place, in a search of an integration of what is new with what already exists.[12]

We can also recognize the search of a communicating skill, that means expressing an aptitude to notice and reveal, take and return a question about the connections between

Figg. 3, 4 (top) - Belvedere-teatro, Cammarata, Agrigento (Margagliotta, Tuzzolino)
Figg. 5, 6 - Restoration of Catarella House in San Giovanni Gemini, Agrigento (Margagliotta, Tuzzolino)

natural condition and modification, between topography and architecture, included the relationship with landscape and geography, through the steady comparison between nature ambient (mountains, sea, coasts) and city.

4.0 An important role, in Sicilian architecture renewal, has been taken by the teaching method of architecture especially referring to its formation skill from the 70th onwards.

Provincial and peripheral architectural culture condition, from this time onwards, concurred to discover some protagonist of Italian and international architectonic debate (Aymonino, Benevolo, Bisogni, Doglio, Gregotti, Lenci, Melograni, Nicolin, Pollini, Quilici, Samonà, Scolari, Tafuri, Tentori), who laid the basis for the constitution of a project school. It is in the proposal for the new didactic setting (system) of the Architecture university of Palermo, formulated from Vittorio Gregotti and then underwrite by Alberto Samonà and Gino Pollini (1973), that it comes evidently denounced the central role of the school in an architecture's project, thought like operating instrument that is able to embrace the local sphere of the sicialian territory and the international one of universal architecture. We can obviously find a willingness of following ways parallel to similar geographic realities such as Spain and Portugal.[13]

The School tends towards the constitution of a strong link between University and territory, in which themes like the relationship between form and context, cognitive and formative characters, memory as invention, come to the surface.[14]

In this academic context, a new teachers generation grow up, busy, apart from didactic, in a concrete project experience and as consequence, in an architectural search and diffusion. In this cultural context, we can also notice a further revival of local characteristics through coming back to architects own places (that is not only an intents statement but it also represents a way back to the origin).

Lots of young architects, from everywhere in the island, decide to go back to their origin places after their studies at the university of Palermo, with the consciousness of acting as intermediary the places where they get the acquisitions ,and those physical and cultural ones where they get learned, aware of assuring quality in the process of territory's transformation.

«A new culture of the project, beyond regionalism, joins local cultures with international modern architecture's dictames».[15]

Local condition doesn't means that search tends to regionalism at all; it‘s a Sicilian contemporary architecture made by Sicilians indeed. Actually, working in this multiplicity of specific contexts orients the search to a necessary and critical reinterpretation of Modern Movement paradigms, that are anyway the load-bearing structure of this renewal process. This trend strongly characterized the inside search (in the formation) and the outside search (in the production) of the Architecture School of Palermo, while we probably have to wait still for a potential role of the Engineering University of Palermo, depending on the development of its course in Architectural-Engineering (Ingegneria Edile-Architettura), that is in the meanwhile giving good results.

5.0 The materials cross-breeding of contemporary constructions influenced a lot the actual landscape forcing us to live with *foreign bodies*, contributing to make a wound of the tie between buildings and ground. That brought about the alteration of a spontaneous organic balance, that assured a certain coherence in the choice of a material (usually taken on the spot),of a constructive technique (in keeping with the material chosen) and of the consequent formal solutions. Just in the moment in which a migration of techniques and materials seems to have erased the identity they suggest, a pursuable way needs to be identified. It has to be able to support a local culture and take to a good quality architecture. That means , that the project has to be like an element of distinction, of residence and of opposition. The actual debate, instead, is slowly losing its specific characters of local search[16] on behalf of a speculation oriented to *big dimension* themes, that characterized especially metropolitan and sub-metropolitan areas. Wide dismissed areas recovery and abandoned spaces valorisation in contexts grown up without any urban planning, end up by moving away from sensibility requested by the specific site, and looking for faraway models. These are the themes that feed up the debate about an architecture's project today, in Sicily like everywhere else. And this is one of the main relapses of globalization upon the actual building culture.

NOTES

1. J.W. Goethe, *Italianische Reise* (1816), trad. it. *Viaggio in Italia*, Milano 1983, p. 261.
2. A.Margagliotta, *Materiali e Tecnologie del Liberty in Sicilia*, doctor's degree thesis, DPCE, University of Palermo 1995, pp. 285-286.
3. L. Quaroni, *Progettare un edificio*, Milan 1977, p. 199.
4. S. Caronia Roberti, *Introduzione alla Composizione Architettonica*, Palermo 1949, p. 180.
5. Ibidem, pp. 181-182.
6. Ibidem, p. 186.
7. Ibidem, p. 189.
8. E. Sottsass, *Scritti 1946-2001*, Neri Pozza, Vicenza, 2002, pp. 77-81.
9. Cfr. *Abitare*, n. 320, luglio-agosto 1993.
10. F. Irace, *La Sicilia degli architetti*, in « Abitare» n. 320, july-august 1993, p. 54.
11. Referring to these last considerations we can underline that the tragic event of Belice's valley earthquake in 1968 and the rebuilding experience gave birth to new architectural project themes. The earthquake wiped off the traditional construction techniques giving space to a typical new reality shaded situation.
12. Such characteristics have to be also referred to particular economic condition, that in a economically behind schedule system, points out to old techniques and materials, to the detriment of a technological innovation. A particular vision is expressed by Franco Purini, who feels Sicilian culture conditioned by time and ways. «Construction in south Italy - he writes - also means long time spent at the building site. A dilatation of building time corresponds to a particular Sicilian reality as a work realization becomes a social event and it is set out both to commitments and common people judgments. That gives time for an aware acceptance of what is new».
F. Purini, *Casa del farmacista di Gibellina (Sicilia).Un cantiere nel sud*, in «Lotus» n. 40/1983, p. 80.
13. A. Angelillo, *Verso una primavera siciliana*, in «Casabella» n. 617, november 1994, p 50.
14. G.F. Tuzzolino, *Cardella, Pollini. Architettura e didattica*, Palermo 2001.
15. P. Culotta, *Giovani architetti siciliani*, in «Casabella» n. 515/1985, pp. 18-29.
16. M. Panzarella, *Interviste di PresS/Tletter,* www.presstletter.com

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Fig. 1 - Map of the Vesuvian area located on the Bay of Naples, Italy, showing the location of Herculaneum. (Image: Ines Maddaloni/HCP)

Fig. 2 - Roof discovered during the excavation of the archaeological site of Herculaneum. (Image: SAP Archive C2506)

L. Mollo [1], P. Pesaresi [2]

RESTORING ARCHAEOLOGICAL STRUCTURES USING REGIONAL TRADITIONAL BUILDING TECHNIQUES

1.0 Introduction

An evaluation of the built environment in the area at the foot of Mount Vesuvius in the Bay of Naples, Italy, confirms that until very recently, building practices were very much a continuation of ancient building techniques, especially with regard to masonry, roofing and paving. Architectural heritage from the Bourbon palaces of the Golden Mile to the Liberty villas of the early 1900s employ traditional construction methods, even for more specific elements like iron-mongery. However, in the last half century, as intense urban development has taken place and social problems have risen, the local building industry has progressively moved towards the use of modern low-cost techniques and materials. Local contractors - often only individuals - who still have knowledge of traditional building techniques and the expertise to use them - are getting rarer and rarer. Consequently, not only are traditional skills at risk, but so is the built heritage of the area, as soon there may no longer be any one able conserve it properly.
A particular case where knowledge of such traditional building techniques may prove to have substantial value is the Roman city of Herculaneum (Bay of Naples, Italy – see Fig 1), both in terms of favouring understanding of ancient practices and ensuring that knowledge is harnessed and implemented by the local building trades today. Here, an ambitious project to save the archaeological site of Herculaneum was launched in 2001. Since 2005 the work of the Herculaneum Conservation Project[3] has included a campaign for the consolidation and restoration of the structures across the site.
Herculaneum's burial by the eruption of Mount Vesuvius in AD 79 was the cause of the extraordinary level of preservation of Herculaneum's structures (from the intact second floors to the survival of architectural elements in timber and metal). This survival permits detailed research into ancient building techniques, and should be considered a precious (but to date under-exploited) resource for increasing understanding of Roman building processes. In addition, a significant connection between the ancient architecture of Herculaneum and the later architecture of the region is being recognised. One of the challenges of the project is to then use these traditional techniques to both restore the ancient structures and to substitute (where possible) the failing and inadequate modern reintegration work (usually in reinforced concrete) carried out during the 1940s and 1950s. The use of traditional materials and technology in reintegration work is proving to be less intrusi-

ve and more compatible with the archaeological remains than other alternatives, both from a technical and an aesthetic point of view.
The Herculaneum Conservation Project is also trying to develop studies in both areas to increase the comprehension of the site and to increase the capacity to provide suitable conservation approaches. In this way, the conservation work at Herculaneum will hopefully also be a step towards the preservation of the more widespread traditional building techniques and heritage in the Vesuvian area. Moreover, this work could be a way of consolidating the traditional skills-base of the local contractors and artisanal production.
This paper explains the initial results of one area of research: study of the traditional pitched roof in the Vesuvian area with a comparison to the ancient ones present in Herculaneum. Obviously this article does not aim to be exhaustive on such a complex and articulated subject as traditional roofing technologies in the Vesuvian area. Instead it aims to offer a survey of the most frequently used building techniques for roofing, and to explain the experience in restoration works of roofs in Herculaneum, in order to form the basis for the development of ad identicum restoration techniques for the pitched roof at Herculaneum.

2.0 Continuity of construction techniques in the Vesuvian area since the Roman period

In the Vesuvian area traditional building techniques, which continue to be very similar to ancient methods, were used until the first half of the twentieth century saw the spread of construction in reinforced concrete. Over the centuries, skilled workers have transmitted their knowledge of ancient building technologies to their apprentices, and interacted with engineers, often consolidating and perfecting techniques, and architects studying architectural theory in handbooks. In this way, practical and theoretical knowledge were integrated, but in recent decades this combination of knowledge and expertise has been lost.
Although traditional techniques for roofing construction have not been entirely abandoned over the last fifty years, modern structural types, especially floor slabs in reinforced concrete, are becoming increasingly used in the Vesuvian area, thanks to the ease and speed of construction work and related economic advantages. This is despite the fact that flat roofing needs more maintenance and tends to deteriorate quickly, allowing rainwater infiltration into the building below[4].
The survival of pitched roofs in the area is endangered by constantly diminishing production and the consequent lack of skilled workers. Research and publications on the topic of traditional roofing are therefore helpful contributions for preserving the theory and encouraging the practice of this type of construction, not only in new buildings but also in renovation and restoration projects.

3.0 Pitched roofs: materials and techniques in the Vesuvian area

The building materials used traditionally to build pitched roofs in the Vesuvian area can be broadly divided into three categories: clay-based materials, stone and wood.
From ancient times clay has been used to create a wide range of products, including building elements, such as bricks, floor or roof tiles. The most common use of clay-based materials in structures in the Vesuvian area has been for covering purposes. The tiles most frequently used in the Vesuvian area for pitched roofs were a combination of flat tiles (in Latin, tegula/tegulae) and cur-

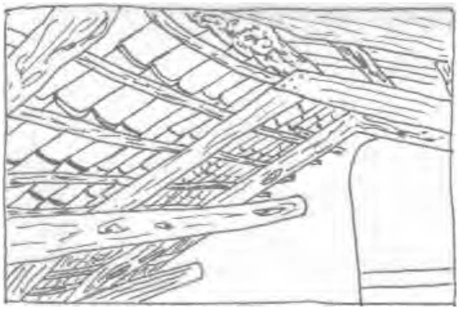

Fig. 4
Internal structure of a typical roof in the Vesuvian area (Image: Archivio Mollo/DIC)

Fig. 3
An example of typical roof in theVesuvuan Area (Image: Archivio Mollo/DIC)

ved tiles (in Latin, imbrex/imbrices)[5]. The tiles were undecorated and made in the shape of a parallelogram with two flanges on the long sides. The flanges of two adjacent tegulae were covered by the curve of the imbrices and rain water was channelled between them[6].

Tuff stone being a volcanic product is commonly found across the territory, and has been used in preference to bricks for building masonry since antiquity, and even today is the most common type of building material.

Traditionally, the most frequently used timber in the Vesuvian area, and throughout most of the Campanian region, is chestnut[7]. This wood has been preferred for its mechanical characteristics, since it has considerable compressive strength[8]. In addition to its impressive mechanical characteristics and its ready availability in the area, chestnut also owes its success to its high resistance to atmospheric agents. In fact, it is very rich in tannin, a natural disinfectant, which hinders the attack of moulds, mushrooms and insects. Chestnut was used in the form of debarked timbers with an average diameter of about 20-30 cm. For flat roofs or floor slabs, rounded beams were cut along their middle section and used as wooden boards - locally known as chiancole - with a diameter of about 10 cm; or, again, as boards for fixtures and fittings (doors, windows, grates, etc.), or for lintels.

In the Vesuvian area sloped roofs made of wood and tiles can be divided into three general typologies: a single-pitched roof resting on masonry, a double-pitched roof resting on masonry, and finally a double-pitched roof on a timber truss.

The adoption of the first two construction techniques was possible in the absence of large rooms (and hence large spans) and where load-bearing walls could be built at relatively short distances apart (4 to 5 m). This allowed the use of chestnut poles (debarked timbers with a round cross-section which retain the natural taper of the original tree) of the type employed in the construction of flat floor slabs. The third type of roof was generally used only for large buildings which, in most cases, were of high status.

The single-pitched roof resting on masonry is certainly the most widely-used solution employed in the Vesuvian area since antiquity, as seen at Pompeii, Herculaneum and other sites[9]. It was typically used for small buildings and was created by building up one of the load-bearing walls about

2m higher than the uppermost floor slab, and then adding an additional 0.50 to 0.90 m to the opposite wall. Debarked chestnut poles were arranged as 'purlins' on top of these, parallel to the eave line. The poles were placed, at intervals that varied between 1.5 to 2.0 m, directly onto the walls, with care to place them head to tail with respect to their natural tapering. Ginelle bastarde (small-diameter chestnut beams, with or without bark[10]) were fixed to these using forged iron nails, and were laid at right angles to the eaves at intervals of about 350mm, formed the framework on which the outer covering of the roof could be placed. The roof was created in such a way that it jutted out slightly from the perimeter wall of the building so as to protect the plaster from the effects of weather.

The double-pitched roof resting on masonry was an evolution of the similar single-pitched roof. The building technology involved was rather simple but effective as the many examples still in use demonstrate. The structure sustaining the roofs was made up of secondary walls built in correspondence to the load-bearing walls, these substituted trusses by being shaped to fit the slope of the roof[11]. These secondary walls – built in tuff blocks and aerial mortar with a thickness of about 35cm – were on average about 80cm high at the eaves and about 2-3 m high at the ridge with respect to the uppermost floor slab. There were holes in the partition walls, or rather sockets, into which the debarked poles were inserted, these were positioned parallel to the eaves. The poles were placed at 1.5-2.0m intervals, directly in the masonry, with care to place them head to tail. Another series of poles was attached on top of these with iron nails, at right-angles to the eaves line, which acted as rafters and were linked at the ridge with a joint cut diagonally half way through the thickness of the beam. Often struts were used: a collar-tie was placed about 50cm below the ridge. This structural element countered the thrusts and gave rise to a type of simple triangular truss, which could not be used in its canonical form: this was due to the fact that the bottom chord was typically placed at few centimetres from the floor level of the below-roof space or actually sat on it, which would have made its use as a storage space difficult. Lastly, a small frame of ginelle bastarde was nailed on to the rafters, spaced at intervals of about 35cm, onto which the outer covering was then placed.

The third type of structure was a pitched roof with trusses. This roof, as already mentioned, was only used for high-status buildings with large rooms. It was made by using a local variant of the

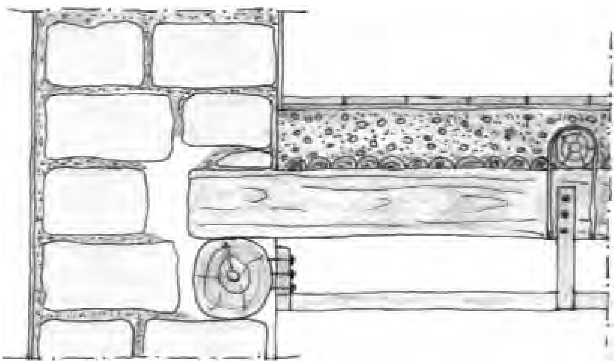

Fig. 5 - Detail of a floor slab with the use of ginelle bastarde.
(Image: Archivio Mollo/DIC)

simple kingpost truss[12].

In all these cases, the outer covering was made up of tegulae and imbrices, following ancient Roman building techniques. These tiles are still used today throughout Southern Italy as a waterproof and durable roof covering[13].

4.0 The case of Herculaneum: surviving structures and ad identicum restoration

Unusually, the catastrophic natural disaster that destroyed life in Herculaneum in AD 79 also provided the means which allowed its preservation for nearly two thousand years thanks to the volcanic material that buried the ancient city. This has delivered us a unique archaeological site as far as the survival of structures, surfaces and finds is concerned. Not only have excavations in Herculaneum uncovered a remarkable legacy of perishable materials (foodstuffs, rope, wood and other organic material) not found in most of archaeological sites, but also a remarkable number of almost compete buildings.

Not only were multi-storey buildings and intact roofs found during the excavation campaigns after the city's rediscovery by archaeologists, but wooden structural elements also survived. These supported the imbrices and tegulae of the roofs and were found completely carbonized and, while no longer structurally sound[14], information about their size, position and botanical nature was preserved. Similarly, terracotta elements were often found in situ and numerous upper floor slabs were also intact.

It should be noted that the major excavation campaign at Herculaneum, undertaken between 1927-1958 by archaeologist Amedeo Maiuri, included simultaneous restoration and presentation to the public of the site. The scope of his campaign, the approach adopted and the coherent results are indeed an important moment in the history of archaeological conservation practice[15]. Anastelosis was considered appropriate where the archaeological evidence was clear and was often driven by the fact that the structural damage from the volcanic eruption was in the lower portion of the wall fabric.

The restoration interventions not only involved the partial reconstruction of the surviving walls in order to reinstate their structural capacity, along with the conservation of wall paintings and floor finishes, but also the ad identicum reinstatement of many of the upper floor slabs and some pitched roofs, both complete and partial, to protect precious decorative features below.

5.0 Pitched roofs: materials and techniques used during restoration work in Herculaneum

During the work of Amedeo Maiuri (1927-1958) about 1,700m2 of the ancient city's pitched roofs were rebuilt, all of them replicating the original shape identified during the excavations[16]. The pitch generally had an inclination of about 20-30%. Most of the reconstructed structures were single-pitch roofs, but double-pitched roofs and pavilion roofs were also built. The wooden supporting structure used by Maiuri was simple and composed of a series of rafters extending from a wall plate to a ridge beam with the function of supporting the tiles above and respecting the Roman construction methods (see 3.0, this article).

In some cases binding rafters were inserted to support the upper rafters between the ridges and the

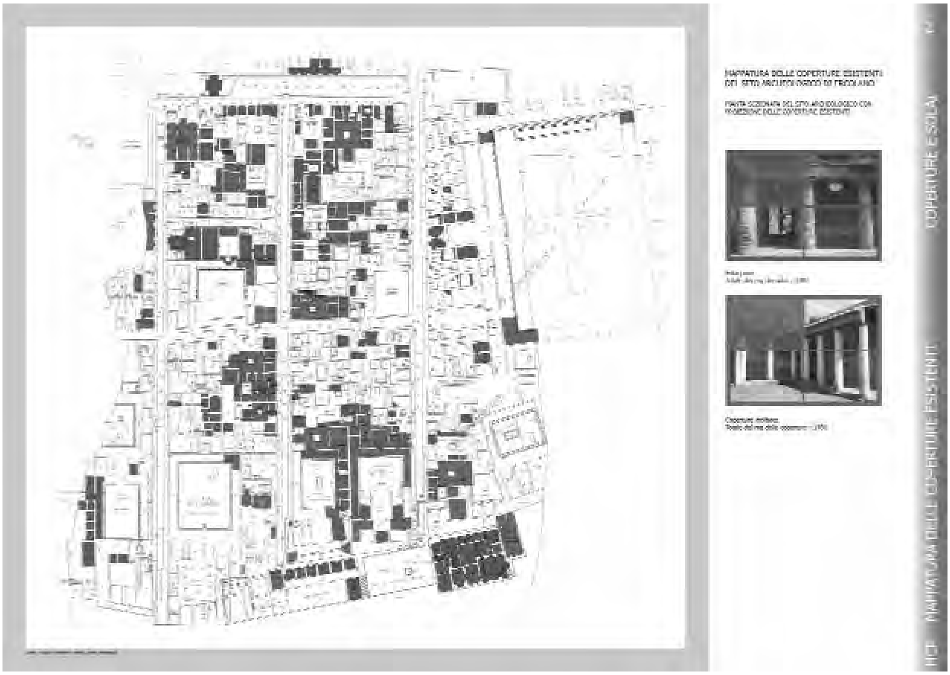

Fig. 6 - Map of the existing covering in the archaeological site of Herculaneum (Image: Studio Pesaresi/HCP)

eaves. There are also examples where the rafters or the ridge beam were rebuilt by Maiuri using reinforced concrete, instead of wood.

The restoration campaign on the roofs was carried out in parallel to excavation, in order to cover immediately those rooms where extensive decorative features (wall paintings, marble floors, mosaics, etc.) were still present, and also to provide visitors with an impression of the original space. This was often the case, for instance, of the atrium - the entrance hall of the traditional Roman house - originally covered with a compluviate roof (four inward slopes conveying the water into a central squared ring and from there down to a basin (impluvium) on the floor) The forms adopted in reconstruction were carefully based on archaeological evidence gathered during the excavations, for example, the traces left by the original wooden structures in the masonry walls such as beam holes. Archaeological documentation of the campaign is fairly exhaustive but there is little documentation of the conservation and restoration works, and only rarely are the reconstruction works seen among the archive photographs taken during the excavations. Consequently it can be assumed that the reconstructions were as correct as far as level of the information left by the original coverings was sufficient, but a degree of imprecision with regard to inclinations and levels would have been inevitable.

Reinforced concrete and iron beams were used as substitutes where the required dimensions of

Fig. 7 - Roofs currently in use at Herculaneum. (Image: Studio Pesaresi/HCP)

wooden beams were too large to be easily sourced and brought to site and, in some cases, probably as a consequence of episodic shortages of timber supplies. Iron beams were in fact extensively used for substituting lintels over opening: most of the lintels were left exposed and, at the time of the excavation campaign, their resistance to weathering and durability was still unquestioned.

Nevertheless and fortunately, the use of traditional materials was generally preferred in the early twentieth century, both for their similarity to the originals and for the ease of sourcing them locally where buildings were still being roofed with similar materials and techniques. Observing Maiuri's reconstructed pitched roofs the following can be noted:

- chestnut beams were widely used;
- wooden boards needed for floor slabs were cut using traditional methods for chiancole;
- both original Roman and new tegulae and imbrices were used together.

The use of materials and techniques still in use in the area was advantageous not only for ease of local sourcing but also for the presence of local knowledge and expertise in employing them. Indeed these factors were undoubtedly important in the restoration decision making, but archaeological information was also considered essential for defining the intervention. Only by comparing the surviving archaeological evidence and the restored structures is it possible to recognize

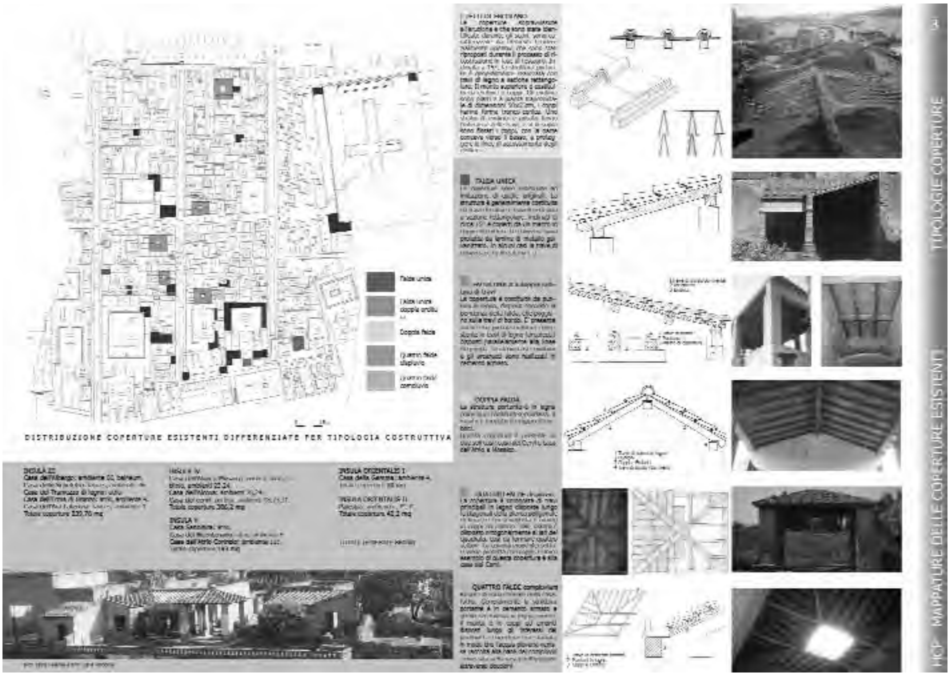

Fig. 8 - Mapping of existing pitched roofs in the archaeological site of Herculaneum by typology (Image: Studio Pesaresi/HCP)

which elements were built ad identicum and which were the result of the direct application of ongoing local traditional approaches.

6.0 The Herculaneum Conservation Project's roofing campaign

Since the end of the major excavation campaign in 1958 it became more and more difficult for the local heritage authority (since 2008 known as the Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei) to take care of the conservation and maintenance of Herculaneum (and other sites in its care), which in terms of size and characteristics resembles more the district of a city than a typical archaeological park. In the late twentieth century, decay set in throughout the structures of the ancient city due to the gradual failure of maintenance programmes and by the 1990s many areas of the archaeological site were closed to the public. Interestingly, in this context, pitched roofs proved to be the most successful roofing solution at Herculaneum in terms of durability and maintenance demands whereas the upper floor slabs reused as roofing (given the missing upper floors) turned out to be less effective in the long term, especially due to higher maintenance requirements. The pitched roofs reconstructed on the basis of original techniques remained relatively stable and functional, even without proper maintenance, for a long time, and only during the last two decades have they shown serious decay problems. However, those reconstructed pitched roofs which

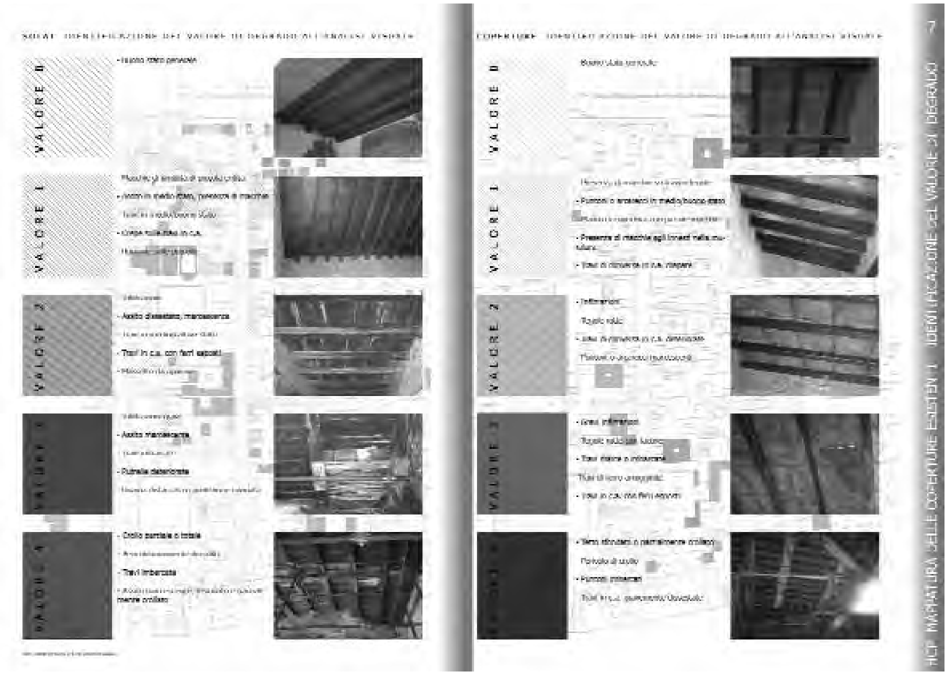

Fig. 9 - Analysis of degraded roofing in the archaeological site of Herculaneum (Image: Studio Pesaresi/HCP)

employed reinforced concrete have shown accelerated manifestations of decay.

The Herculaneum Conservation Project came about in 2001 as a response to the alarming increase in decay in the 1990s. Since 2005 the project has extended its scope to include a major campaign of conservation interventions across the entire site, with the aim of slowing down the decay that was dangerously widespread both with regard to structures and to decorative surfaces[17]. Currently, this campaign is focused on the stabilisation, repair and substitution of large numbers of the roofs and floor slabs that cover the houses, shops and public buildings containing decorative features[18]. Before planning these interventions, mapping of the existing roofing was carried out in order to identify the degree and type of decay, the roofing materials used and the condition of the decorative features they protected. The main objective of this analysis was not only to identify intervention priorities, but also to try to establish the 'correctness' of previous restoration work, both in terms of archaeological evidence (thanks to new data obtained from Herculaneum Conservation Project research) and in terms of compatibility between the original material and the modern integrations. The results of this mapping were than translated into trial ad identicum integrations and reconstructions, along with long-term planning for the substitution of the most seriously decayed roofs and the repair and maintenance of others. Ad identicum 'reconstruction' has generally been chosen, instead of 'modern' solutions, as a less invasive and more compatible way to guarantee the survival and legibility of the ancient structure. Working with compatible materials and following and improving the approach launched by Amedeo Maiuri at the beginning of the twentieth century is also vital to maintaining the urban coherency of the ancient city when viewed from above. The study of traditional Vesuvian techniques and materials has been crucial in identifying continuity from the Roman period and to plan interventions that are economically sustainable. The programme of interventions identified have now become a first campaign of works, which will involve the restoration of about 35 roofs. The goals of this campaign on pitched roofs can be summarised as follows:

• modern materials (such as iron beams and reinforced concrete) used in previous restoration works will be substituted with wooden structural elements;

• chestnut will be used for reconstructing wooden structural elements, given its ready availability in the area and its resistance, even where other types of timber were originally employed; wood will be treated to be resistant to weathering agents, to biological attack and fire;

• tegulae and imbrices will be produced in the area using traditional techniques, with close attention paid to the quality of the base material (clay) and to the original size and thickness of Roman tiles;

• more generally, the new 'ad identicum' roofs have been planned in a slightly different way compared to Maiuri's techniques, taking into consideration both the typical decay mechanisms that were recognized during the study of the existing roofs and new materials to reinforce and make the wooden elements durable; moreover, they should provide access for maintenance purposes in order to guarantee the long-term durability of the new roofs.

7.0 Conclusions

The study of traditional pitched roofs in the Vesuvian area and their comparison to the archaeological remains of ancient Herculaneum is the first step in a wider collaboration between the Department of Civil Engineering at the Second University of Naples and the Herculaneum Conservation Project. It which will hopefully extend to other building typologies that show continuity from antiquity. This research is potentially useful not only to improve knowledge both of the archaeological and traditional built heritage, but also to inform future conservation work in Herculaneum, as well as in the other Vesuvian archaeological sites and built heritage.

It is hoped that by publishing and disseminating the results of this on-going research, it can make its own small contribution to safeguarding and revitalizing the traditional building skills of the Vesuvian area.

Notes

1. Researcher in the Department of Civil Engineering at the Seconda Università degli Studi di Napoli.
2. Conservation architect specialized in archaeological structures, among other projects she is currently responsible for the campaign of emergency works on structures for the Herculaneum Conservation Project.
3. The Herculaneum Conservation Project is a public/private project of the Packard Humanities Institute (a non-profit foundation) in collaboration with the Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei (the heritage authority responsible for Herculaneum) and the British School at Rome (an international research institute). The project arose from a recognition of the risks to the survival of the unique and irreplaceable heritage to be found in Herculaneum. Its aim is both to support the heritage authority in the protection and preservation of the site, and to extend scientific understanding, public interest and awareness. The project aspires to learn lessons that will not only feed into the management of the site of Herculaneum, but that can enrich conservation working practices in Pompeii

and elsewhere. For further information please contact hcp@herculaneum.org.
4. Traditionally, pitched roofs were preferred to floor slabs for safety reasons too: obviously any building work carried out in the vicinity of Vesuvius has to consider the risks, not only those of dramatic proportions, but also minor phenomena (intermittent explosive activity, characterized by ejections of volcanic material and seismic activity). Over the centuries, the inhabitants of the area refined their building techniques taking into consideration these minor events. Of particular interest is the fact that domestic roofing was built with steeply inclined pitched roofs so as to avoid the collapse of the roof under the weight of accumulated volcanic material, such as pumice, lapillus, etc.
5. The Latin term imbrex/imbrices was abandoned in Italian in favour of the word coppo, while the tegulae became embrici, potentially giving rise to confusion. In English the Latin words remain in use. See: G. Brodribb - Roman Brick and Tile, Gloucester 1987; J.-P. Adam - Roman Building: Materials and Techniques London 1994.
6. The dimensions were approximately 50cm in length, and about 25cm wide at the narrow end widening out to about 30cm in width at the other end of the tile. Their thickness was always 1.50cm. Imbrices were half-truncated cones, 20 cm in diameter at the wider end, narrowing to about 16 cm and with a height of about 50 cm. As well as these so-called "big" cones, there was also a smaller type measuring about 37 cm high by about 13 cm in diameters, narrowing to 10 cm. Their thickness was also always 1.50 cm.
7. Chestnut has been widely used in Campania since the medieval period. It was rarely used for roofing construction in the Roman period, continuing research on the carbonized wood of ancient Herculaneum is demonstrating a preference for other species. See P.I. Kuniholm - Dendrochronological Investigations at Herculaneum and Pompeii in: W.F. Jashemski, F.G. Meyer - The Natural History of Pompeii Cambridge 2002, pp. 235-239. Further data are expected from research recently carried out by the Deutsche Archäologische Institut in collaboration with the Herculaneum Conservation Project.
8. Compressive strength of about 100 daN/cm2, and a tensile and bending strength of about 90 daN/cm2 if loaded parallel to fibres; see G. Giordano - Tecnologie del legno. Le prove ed i legnami di più frequente impiego - vol. III, UTET Turin 1976, p. 193 ff.; M.R. Migliore, L. Mollo, F. Ramundo -La valutazione prestazionale del legno strutturale antico, in the Proceedings of the conference Architettura e tecnica delle coperture, Ancona 10-11 March 2006, pp 181-186.
9. In particular, in Pompeii and Herculaneum the single pitch was used for covering the peristyle (columned porch surrounding a court or garden).
10. L. Mollo - Tipologie costruttive aversane, Aversa 2004, p. 32.
11. L. Mollo, A. Izzo, N. Maturo - I muri di sostegno e di recinzione in pietra vesuviani, in the Proceedings of the international conference Costruire in pietra fra innovazione e tradizione, Naples 22-23 February 2007, pp. 585 -592.
12. In all probability, the simple triangular truss was used by ancient builders, although there are no clear indications of the building techniques of the trusses used by the Romans. This is both because writers of treatises did not dwell too much on the subject, and, unfortunately, because the last roof of undoubted Roman origin, at the church of Saint John Lateran, was lost in a fire in the seventeenth century. Nowadays, only the roofs of some Byzantine churches in Sicily and Greece may perhaps allow us to relate these techniques directly to those used in classical antiquity. In AA. VV. Manuale del recupero delle antiche tecniche costruttive napoletane dal trecento all'ottocento, Naples 1996, p. 292 ff.
13. In Campania, as in other Italian regions, the use of both tegulae and imbrices has been substituted with the technique of using overlapping imbrices, placed in alternating concave/convex positions in order to facilitate the flow of water. Unfortunately, this technical evolution led to a significant increase in load per square metre.
14. G. Rizzi - Il problema degli antichi elementi lignei ad Ercolano, in the Proceedings of the international conference on Conservation of Historic Wooden Structures, Florence 22-27 February 2005, pp. 50-51.
15. D. Camardo - Gli scavi ed i restauri di Amedeo Maiuri. Ercolano e l'esperimento di una città museo, in Ocnus: Quaderni della Scuola di Specializzazione in Archeologia 14, 2006, pp. 69-81.
16. Where the archaeological evidence was limited, Maiuri instead constructed other types of shelter to differentiate between philological reconstruction and the simple need to protect the space with a roof.
17. P. Pesaresi, M. Martelli Castaldi - Conservation measures for an archaeological site at risk (Herculaneum, Italy): from emergency to maintenance, in Conservation and Management of Archaeological Sites 8.4, 2008, pp. 215-236.
18. P. Pesaresi, G. Rizzi - New and existing forms of protective shelter at Herculaneum: towards improving the continuous care of the site, in Conservation and Management of Archaeological Sites 8.4, 2008, pp. 237-252; P. Pesaresi - Gestire l'emergenza: una campagna di lavori di emergenza e di manutenzione su un intero sito archeologico: l'emergenza e la manutenzione delle strutture archeologiche di Ercolano, in the Proceedings of the international conference Vesuviana: archeologie a confronto, Bologna 14-16 January 2008 (in print).

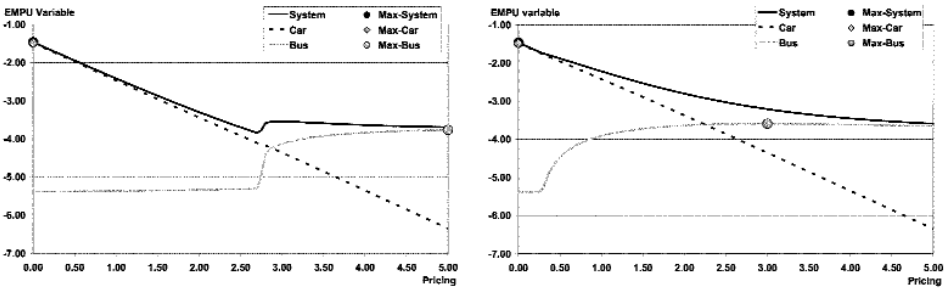

Fig. 1 - EMPU variable in the case of weak travel demand

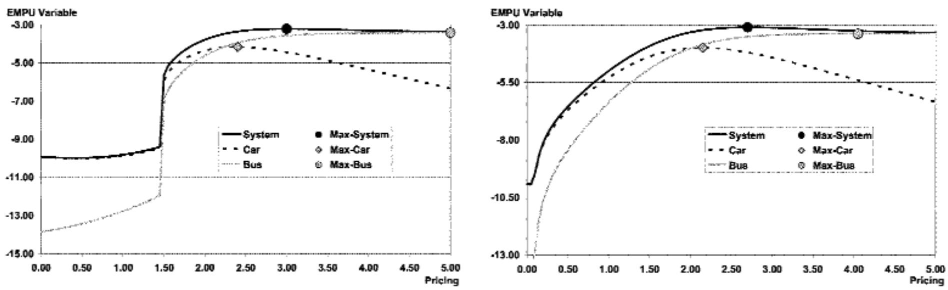

Fig. 2 - EMPU variable in the case of strong travel demand

B. Montella [1], M. Gallo [2], L. D'Acierno [1]

THE ROLE OF ACCESSIBILITY INDEXES AND PRICING POLICIES IN URBAN PLANNING

1.0 Introduction

The activity system of an urban area can be decomposed into three subsystems consisting in the households living in each zone, the economic activities located in each zone, and the floor-space (and the relative market prices) available in each zone for various uses. For instance, the number of households in a zone depend on employment opportunities (i.e. the subsystem of economic activities), the location of economic activities depends on the distribution of households, and both households and economic activities in each zone depend on the availability of specific types of floor-space and on their prices.

In this context, study and design of the transportation system is a major element in urban area planning because the relative "accessibility" generated among different activities could support or limit the development of these activities. Indeed, the need to use different urban functions in different places yields the potential transportation demand, although this potential demand has to (or should) be satisfied by a suitable transportation system. Hence, since household members make their travel choices according to some characteristics of transportation services offered by the different travel modes (individual car, bus, metro, walking), it is necessary to have some synthetic indexes that allow decision-makers to evaluate and forecast effects of transportation systems on urban activity development. Moreover, the relative accessibility of a zone in urban contexts also affects the real-estate market: zones with high accessibility generally have high real-estate prices. Hence, users locate their residence also according to their value of time, which can be considered as a measure of their income level (i.e. people with high incomes, who thus attach a high value to time, locate their residences in place with high accessibility where real-estate prices are high). These remarks are confirmed by the fact that the construction of a new metro station generally yields an increase in real-estate prices in the surrounding area.

It is widely held that synthetic indexes for evaluating transportation system effects on the external environment are accessibility indexes which can be defined[3] as "a measure of the ease of an individual to pursue an activity of a desired type, at a desired location, by a desired mode, and at a desired time".

In urban contexts, the variation in level of transportation services (hence of accessibility among different zones) is hard to implement by means of the construction of new transportation infrastructures. Therefore, a simpler and more feasible approach for yielding these variations is the optimisation of existing transportation systems, such as by means of pricing policies (road pricing, cordon pricing, parking pricing, integrated mass-transit system fares, etc.). Indeed, these policies allow us to modify substantially the modal split between road and mass-transit systems and therefore performances of each single transportation mode. Obviously, these fares have to be designed taking into account the accessibility indexes in order to prevent an odd pricing strategy reducing accessibility and impoverishing a zone.

Hence, the aim of this paper is to show how pricing policies supported by accessibility indexes can be considered a useful tool for planners who seek to take into account influences that transportation systems yield on the urban environment.

The paper is organised as follows: Sect. 2 describes the accessibility indexes proposed in the literature; Sect. 3 shows pricing policies and their influences on urban accessibility; finally, Sect. 4 concludes and comments on prospects for future research.

2.0 Urban accessibility indexes

The urban accessibility indexes proposed in the literature can be classified into 5 approaches[3]: graph theory and spatial separation, cumulative opportunities, gravity measure, utility measure, and time-space measure.

The first accessibility approach, *graph theory and spatial separation*, is based on a single measured quantity: distance. Since this kind of measures does not consider attraction quantities (such as land use), it does not properly fit the definition of accessibility measure. In this case, a general network accessibility measure according to the first approach can be formulated as:

$$A_1^i = \sum_j d_{i,j}/b \qquad (1)$$

where A_1^i is the accessibility measure according to the first approach of zone i, $d_{i,j}$ is the distance between zones i and j, and b is a general parameter.

The early interpretations of the graph theory version of the measure reduce a transportation system to an abstract representation composed of nodes and links represented in matrix form. Besides the general form above, accessibility can be evaluated in a number of different ways: degree of node (i.e. the number of links coming from a node where higher values are better), associated number (i.e. the number of links from a particular node to the one farthest away, in which case lower values are better), and Shimbel's accessibility measure[5] (a summation of links between a particular node and all the other nodes in the network. In this case lower values are better).

The second approach, *cumulative opportunities*, takes into account both distance and trip destination. This measure defines a travel time or a distance threshold and uses the number of potential activities within that threshold as the accessibility for that spatial unit. Its general formulation can be expressed as:

$$A_2^{i|t} = \sum_{d_{i,j} \le t} O_j\left(d_{i,j}\right) \qquad (2)$$

where $A_2^{i|t}$ is the accessibility measure according to the second approach of zone i in the case of travel time (or distance) threshold equal to t; and O_j is an opportunity located at travel time (or distance) $d_{i,j}$ from zone i.

The only information needed for this kind of measure is the location of all the destinations (such as shops or hospitals) within the desired travel time (or distance) threshold. Moreover, often, several travel time or distance increments are used to create an isochronic map[6, 7].

The approach based on *gravity measure* includes an attraction factor as well as a separation factor. While the cumulative opportunities approach uses a discrete measure of time or distance and then counts up attractions, gravity measures use a continuous measure that is then used to discount opportunities with increasing time or distance from the origin. The general form of the model has an attraction factor weighted by the travel time or distance raised to some exponent, that is:

$$A_3^i = \sum_j O_j \Big/ \left(t_{i,j}\right)^{\alpha} \qquad (3)$$

where is the accessibility measure according to the third approach of zone i, O_j is an opportunity located at travel time (or distance) $t_{i,j}$ from zone i, and α is a general parameter. Thus, data requirements for this measure are the size and placement of the attractions under investigation and the travel time or distance between zones in the study area.

The cumulative opportunities model is criticised for treating opportunities equally, whether they are right at the origin of study or just inside the isochronic line determined by the time or distance parameter. By including the time or distance in the denominator of the equation, gravity-type measures provide a dampening effect that devalues attractions far from the origin.

The *utility measure* approach is based on the formulation of individual's perceived utility for different travel choices. The most general form of this measure is:

$$A_4^i = E\left[\max_j \left(U_{i,j}\right)\right] \qquad (4)$$

with: $U_{i,j} = V_{i,j} + \varepsilon_{i,j}$ (5)

where A_4^i is the accessibility measure according to the fourth approach of zone i, $U_{i,j}$ is the *perceived utility* that is the utility perceived by each single user moving from origin zone i to destination zone j, $V_{i,j}$ is the *systematic utility* which represents the mean utility perceived by all decision-makers in the same choice context, and $\varepsilon_{i,j}$ is the *random residual* that represents the difference between the perceived and the systematic utility. Moreover, it may be stated that, if the random residuals are independently and identically distributed according to a Gumbel random variable of zero mean and parameter θ (where the variance of the Gumbel variable is equal to $\pi^2\theta^2/6$), relation (4) can be expressed as:

$$A_4^i = \theta \ln \sum_j \exp\left(V_{i,j}/\theta\right) \qquad (6)$$

Ben-Akiva and Lerman[8] proved that the utility form of accessibility met several criteria described by Weibull[9]. For instance, it does not decrease with the additional alternative and does not decrease if the mean of any choice utility increases. The two researchers also argued that since the above expression is the natural logarithm of the denominator of the "multinomial logit" destination choice model used in travel demand forecasting, it is often available with very little extra computational effort.
The fifth approach, the *time-space measures*, adds another dimension to the conceptual framework of accessibility corresponding to the time constraints of individuals under consideration. Initial work on this approach was conducted by Hägerstrand[10], who used a three-dimensional prism of space and time available to an individual for partaking in activities. The motivation behind this approach to accessibility is that individuals have only limited time periods during which to undertake activities. As travel times increase, the size of their prism shrinks. The space dimension of this measure is calculated with the accessibility measures described in equations (4), (5) and (6). Constraints on time are generally divided into three classes[10]: capability constraints, coupling constraints and authority constraints.
Importantly, the use of travel demand models in transportation design allows easy calculation of accessibility indexes based on the utility approach or time space approach according to the use of home-based or trip chain models. Therefore in our applications, we intend to use formulations provided with equations (4), (5) and (6).

3.0 Pricing policies and their influences on urban accessibility

Generally speaking, transportation system users can be considered rational decision-makers who maximise the utility of their trip choices. This assumption provides a network flow configuration, called *User Equilibrium* (UE), which is far removed from the efficient network configuration, called *System Optimum* (SO). In order to force user behaviour towards the SO condition, it is possible to apply a suitable pricing policy that modifies user utilities and hence their preferences for paths and modal choices.
In the case of urban accessibility indexes expressed by equation (6), it is worth formulating a systematic utility term $V_{i,j}$ such that it takes into account not only travel times but also monetary costs borne by users in their trips.
To show these concepts, it is possible to consider a trial network consisting of a single Origin-Destination pair joined by a single link shared by cars and buses. In this case the accessibility measure expressed by equation (4) can be expressed as:

$$Acc_{system} = A + BY_{system} \quad \left[Acc_{car} = A + BY_{car}; Acc_{bus} = A + BY_{bus}; Acc_{ped} = A + BY_{ped}\right] \qquad (7)$$

with $Y_{system} = \ln\left(\exp\left(Y_{car}\right) + \exp\left(Y_{bus}\right) + \exp\left(Y_{ped}\right)\right)$ (8)

and $Y_{car} = \beta_t \cdot t_{car} + \beta_p \cdot p_{car} + A_{car}\left[Y_{car} = \beta_t \cdot t_{bus} + \beta_p \cdot p_{bus} + A_{bus}; Y_{ped} = \beta_t \cdot t_{ped}\right]$ (9)

where Acc_{system} $[Acc_{car}; Acc_{bus}; Acc_{ped}]$ is the accessibility measure of the whole [road, mass-transit, pedestrian] system; Y_{system} $[Y_{car}; Y_{bus}; Y_{ped}]$ is the Expected Maximum Perceived Utility (EMPU) variable of the whole [road, mass-transit, pedestrian] system; t_{car} $[t_{bus}; t_{ped}]$ is the travel time of the road [mass-transit, pedestrian] system; p_{car} is the value of pricing applied to road system; p_{bus} is the mass-transit fare; A, B, A_{car}, A_{bus}, β_t and β_c are the model's parameters.

The aim of the proposed numerical application is to analyse the accessibility of the system related to different pricing policies. Hence, different scenarios were simulated by varying travel demand level from a weak demand condition to a strong demand condition. Simultaneously, we considered the possibility of using a portion of pricing revenues for financing the mass-transit system.

In the condition of low travel demand and a mass-transit system without pricing financing (fig. 1 – left side), the pricing increase always yields an accessibility decrease since, as the network is not congested, the increase in fares does not generate any substantial travel time reductions. A similar result can be found with the assumption of 50% of pricing revenues used for financing mass-transit system (fig. 2 – right side).

In a system with high travel demand and a lack of mass-transit financing (fig. 3 – left side), the pricing increase initially yields an improvement both in the mass-transit system where there is a reduction in travel times (related to a reduction in car users) and waiting times (the increase in bus users produces an increase in bus revenues that can be put into an increase in service frequencies), and in the road system where the travel time reduction (related to a user reduction) is certainly greater than the cost increase related to pricing policies. Obviously, over a certain threshold, the increase in accessibility of the mass-transit system can be neglected whereas with a decongested network the travel time reductions are no longer balanced by the fare increase. Also with the assumption of mass-transit financed with 50% of pricing revenues (fig. 4 – right side), the trend is similar.

It is worth noting that, in this case the mass-transit accessibility does not always increase since over a certain threshold the car user reduction yields a pricing revenue reduction and hence a decrease in mass-transit system financing.

4.0 Conclusions and research prospects

Numerical results show that pricing policies should not be used by local governments as a tool for increasing their budget. Indeed, if pricing revenues are not used for improving transportation systems, it generates a decrease in system accessibility, especially in the case of weak demand, and the pricing becomes a tax for road users. Instead, the use of pricing revenues for improving transportation systems yields benefits in terms of both system accessibility and employment (an increase in pricing collectors and inspectors for the road system and mass-transit personnel). Moreover, in the case of strongly congested networks, the use of a suitable pricing policy improves network conditions for all transportation systems, and therefore increases system accessibility. Future research could be addressed to analysing effects of pricing policy on accessibility indexes in the case of real size networks.

Notes

1. Professor at the "Federico II" University of Naples (Italy), Department of Transportation Engineering.
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M. Musto [1]

THE INDUSTRIAL BUILDING: SUSTAINABLE REFURBISH ELEMENTS

Recently, the disused industrial buildings requalification theme has raised a central placing in the refurbish main themes, that are, less and less, facing to study design models oriented to territory consumption, but more and more aware of the urgency of the existing settlings right use.
Actually, the industrial architecture is in large quantities available resource, with highly appreciated quality requirements; some time ago the industrial architecture was carry out of the towns, but now it is incorporated in central and strategic positions for its development and functioning.
Factory and Place are always tied with an interdependence relationship, so during the settling evolution is possible to read the social and economic events, that have joined the urban ground and industrial building together [2]. It is not a chance event that, in Italy, exists, also for the traditional industrial structures, a sort of architectonic regionalism; it is due to the existing local productions and especially due to the chronic Italian industrial expansion delay, compared to those of the other countries [3] .
In this context, to deal with the industrial buildings re-use in sustainable terms, has an extreme importance; to analyze the typical industrial towns is equivalent to study the most important environment changes of the natural and historic contemporary world landscape.
However, a new artificial landscape is born with an immensely emotional charge, like affirmation of the civilization cycle vitality [4]. To ignore this artificial landscape is a limitation for the right understanding of the traditional town evolution, while giving back a sort of "environmental dignity " to industrial buildings, allow us "to liberate" them and to reread the whole buildings like a much more spacious traditional architecture [5].
The industrial artificial signs left on the landscape and urban environment, are gifted of a strong emotional charge and symbolisms, so that we can redefine new suggestions and distinguish marks for the place.
[…] *One of the most important Industrial Revolution effect has been the introduction of structures, in the landscape, far from human scale, instead, they reflected the "super-human" scale of the industrial activities.* [6]

During the passing from traditional town expansion to its transformation, it's better to think again to the traditional urban web and non urban web connections, in this way, we can characterize the new internal connections with existing territorial structures (real environmental systems), that Marx called:" The production vascular system".
To study the industrial area transformation means: understand the industrial buildings environment imprint and to allow to the refurbishing object engages its "Place" dignity, in the Marc Augè meaning: Place intends like symbiotic relationship site with local material and symbolic culture. It becomes important to recover the environmental complexity and dynamic, using advanced technological tools, that permit to fill the gaps created by environmental exploitation.
The industrial building requalification, theme that we will face, will start adopting new sustainable materials processes and installations in an architectonic organism, that not lose its original characteristics and using its energetic-spatial structure features.
We don't forget that the industrial buildings came through structural and system innovations, because it's intrinsic in its living organism nature: the innovation is the rule during its business life, being vitality symptom[7].
Finally, the architectural factory analysis roadmap is based on typological and technological aspects, those ones risk to suffer the major part of losses and transformations, they determine the loss of the original identification industrial architecture, having repercussions on the context and relative interactions, in the 1978 Borsi said:
The factory can not be considered itself, thinking only to its typical architecture and historic aspects, but it must be seen like a system centre of gravity, due to its tight functional connection with houses, streets, spare time places and service structures. [8]
We can define two big industrial architecture refurbish trends: the first is building reutilization after its revitalization , and the second is building re-use like a monument for the knowledge transmission about dismissed production.
To have the opportunity of choosing several re-use approaches, had produced a quarrel between "interventionists" and "conservatives".
We shall not support a position or the other one, but we are sure that each industrial building refurbish must be faced individually.
In this work, a summary of a sustainable refurbish research approach [9], will be described; it has been done what necessary to analyse some case studies, only the most innovative has been studied in depth. So we want to pass on the industrial building authenticity and to extend, by means of innovation, its real tendency to a correct in use destination.[10]
Therefore, an investigation on various applicable sustainable refurbish systems has been done, and on single topologies too. We have considered the limitations dictated by interventions on already shaped environment systems, where the site choice, positioning, shape, building size, opening layout have been already defined; moreover we have thought to installation, management and maintenance low costs interventions. Due to the disused industrial sites environment phenomenon's complexity, *it has been necessary made a subsets division: ambient context, settlements group and building organism*.[11]
Besides, the numerous constraints, due to the analysed building typology, its conserva-

tion grade, structural features, restrict the opportunities of using bioclimatic systems and technologies both. It has been studied the organizational, distributional and conformational characters of single manufactured building, and in particular *[...] the morphological, physical-spatial characters and building devices, on the basis of arrangement asset defined by natural and/or artificial place characteristics, [...].* [12]

For this reasons, the overcoming or breaking mono-functionality concept and industrial district marginalization process have been introduced, considering and defining a program, that involves the closeness in term of town planning, architectonic, technological and energetic aspects. The level of manipulation of some industrial typologies has been considered too, in fact depending by technological, energetic and functional urban decline, it is always high and permits us good margin of technical and formal intervention.

The strategy for functional-spatial adjustment and the bioclimatic technologies contribution offer, during the transforming refurbish, a possibility to avoid energetic resources wastes and to face the absence of formal manufactured building connotation, so it permits a better integration with the landscape.

The changing in use destination, from an industry to a non productive new one, it forces an high level of transformation and it determines the bioclimatic technologies use ; in this case it's much more important for two reasons.

It is evident that, the existing industrial buildings have low energetic features and the performance standard needed for home buildings are higher and expensive, so this kind of costs are justified only for adapting purpose.

In addition to the structural performance adjustments, the energetic, typological and system adjustments are justified too, when they are realized by bioclimatic technologies, we obtain an energetic saving and a better well-being condition for all users.

The disused industrial buildings quarrel is not only linked up to their production memory saving or to the saving of the most precious buildings, but it also joined to the new society needs, because the society is emotional joined to these installations, besides to keep their memories and meanings alive.

It is important to underline that, an industrial building reutilization project that uses sustainable technologies, besides the general increment of environment and technological performances, must solve and evaluate the overall building problems.

If a change on the use destination has been made, distant from the original one, the formal and spatial-functional distribution have a first place role.

In fact, the changes for the improvement on building organism use or for defining the right place for new users requirements, provide us the opportunity for a better application of bioclimatic technologies.

So the necessity to divide in little spaces a planimetry with an undifferentiated spatial distribution, or the external used mediation spaces creation, could become, if right designed, elements for building internal climatic control .

Seems evident the importance to create a web that connects the spatial and energetic element, defining *integrated systems for living space energetic use* [13]. So, simple models for

space-functional joints for the refurbish of these buildings are defined, using solution types deduced from the reference base models; these ones are differentiated considering the urban settlings scale, building wrapping scale and internal distribution-functional system .
The functional refurbish can be face with transformations that should include urbanistic and building refurbish together. The system adapting and those ones improving the energetic and technological performance are accompanied well by typological differentiation building offer operations[14]. These interventions must be conduct in different ways, depending by architectonic and historic building value, and depending by building potential analysis in function of changes and permanence's [15].
In case of a specific will of building of value refurbish, giving much more importance to permanence's instead individuated changes, shall work preserving the building unit dimension and making vertical and horizontal splitting up of the internal big spaces; it is important, concerning this approach, to connect lifting structures and service nucleus.
At a soft level, it can be foreseen the adding of internal volumes (made by light structures) with the scope of giving to the existing manufacture a volumetric complexity.
In case of a specific will of building refurbish, giving much more importance to changes, it can be foreseen entire building system partial demolitions and total parts reconstructions, with respect of the permanence's and have still an heavy weight, even if of minor importance.
The technological, energetic, and cover image deficit restoration, can be conducted so that to obtain a much more sustainable approach, with the aim of less energetic consumptions and polluting emission reduction.
The active reusing systems are made again at the same time of some new or refurbished elements, like cover and well integrated installations, so that they are integrated and not only added.

Notes

1. PHD in Architectural and environmental Technologies, Restoration and environment department, Faculty of Architecture, Second University of Naples.
2. Cfr: "Le fabbriche" in *modulo* numero monografico, n° 203, luglio – agosto, 1994.
3. In Italy, the industrialization process went in late of about twenty years, unlike to the others European country like England, Belgium, Holland, Germany and France, where, during the initial face, it was slow down for raw materials and energetic resources lack. Few productions – woolen industries and only in little realities was achieved a good expansion, like in some north Italy town – Biella, Vicenza, Schio. Cfr: V. Castronovo, *L'industria Italiana dall'Ottocento ad oggi*, Milano, 1980. Especially during the early years, the industrial development changed, it passed by home production to industrial building production, with simple typologies and re-used structures.
Buildings made before the 50' can be defined "Traditional industrial buildings".
4. Cfr: P. Carbonara, *Architettura pratica*, vol. IV, tomo 2°, Torino 1970.
5. We don't forget the first factory tipologies: the agile textile industries was expired to the constructive tradition. The use of light and natural ventilation was fundamental for the production. The external environment relationship was preferential and requested; but from the period between the two World Wars, the industry get a morphological and constructive typologies totally separated by the territory.
6. J. M. Richards, "The functional tradition in Early Industrial buidings", London 1958, in Negri A, Negri, M., *L'archeologia industriale*, Firenze – Messina, 1978, pag. 18.

7. Cfr.: R. Raja, Architettura industriale, storia, significato e progetto, Bari, 1983, pp. 5, 9.
8. G. L. Fontana, "Introduzione" in AA.VV., *I quaderni di Patrimonio industriale*, Roma 2005.
9. Referred to author research for the work developed during its doctorate: "Dagli edifici industriali alle residenze collettive: un recupero sostenibile. Il contributo delle tecnologie bioclimatiche per il raffrescamento passivo".
10. "L'Hic et Nunc" from the "original" build up the concept of its authenticity […]. The entire authenticity field of a thing is the soul of everything could be handed down, from its material duration to its virtue of historic proof." Summoning W. Benjamin, *L'opera d'arte nell'epoca della sua riproducibilità tecnica*, Torino 1966, pag. 24.
Finding the re-proposal in the evolution process, it's important to preserve the building authenticity, also during its transformation.
11. M. Marocco, "I requisiti del comfort nell'istruzione del progetto ambientale", in M. Marocco, F. Orlandi, *Qualità del comfort ambientale*, Roma 2000, pag. VII.
12. Ibidem
13. F. Donato, P. L. Spadolini, *La connessione spazio/energia nella progettazione architettonica*, Tipografia Gino Capponi, Firenze, 1980.
14. We talk about the new refurbish buildings with mixed use destination: the Oxo Tower in London was transformed in shops and laboratories, flats, two restaurants and a pub. The Mulino Stucky in Venice refurbished in a hotel of 400 rooms, a SPA centre , a congress centre and in 140 flats.
15. Referred to author research for the work developed during its doctorate: "Dagli edifici industriali alle residenze collettive: un recupero sostenibile. Il contributo delle tecnologie bioclimatiche per il raffrescamento passivo".

Fig. 1 - Historical Plan and Top view of the city of Livorno

Fig. 2 (top) - View of the Market from the Royal Ditch

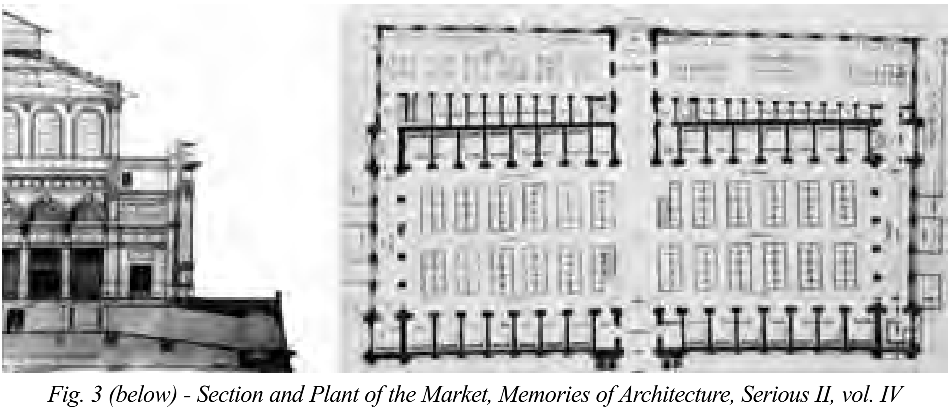

Fig. 3 (below) - Section and Plant of the Market, Memories of Architecture, Serious II, vol. IV

M. Palazzuoli [1], G. Croatto [2], C. P. Rini [3]

LIVORNO, MEDITERRANEAN CITY: THE OLD MARKET BUILDING "MERCATO DELLE VETTOVAGLIE"

1.0 Livorno and the sea

Livorno, was found in the second half of the '500 from the wish to build a new aggregative identity, in which the functional and structural organization was programmed as element of novelty inside the commercial equilibriums of the Mediterranean. Commercial vocation of this city was the heart of urban development.
Also the urban development took life according to the merchant vocation typical of this city, so much that growth was concentrated around the harbour, it's authentic commercial fulcrum. Livorno therefore belongs to the sea, and there is a so narrow relationship between terrestrial streets and streets of water, so suggestive, to push Goethe to compare it to the most famous of the aquatic cities, Venice, from which a part of city takes name: " nel quartiere Venezia si può andare in barca alla maniera veneziana, per dove si vuole, sopra canali fatti apposta da granduchi in favore del commercio [4]".
The city leans out on the Tyrrhenian sea since the origins, and it is surrounded by a continuous ditch, producing a deep and lasting relationship with the water, that will characterize its urban development for centuries[5] . Despite the strong effort contemplated to the realization of structures for the defence of the city, extended around the halves 1500 , the commercial equipments were limited and weak in comparison to those of the city of Pisa. The solution was the building of the first navigable channel, the Navicelli channel, a water street that would connect Pisa to Livorno, starting point that will characterise the future city for the following centuries. Military, hydraulic engineers and architects worked for strengthening the fortifications fully experimenting this new military technique. They began to build warehouses and stores, to pave roads and to improve the general hygienic conditions. Despite this it will need to attend the 1574 Bernardo Buontalenti[6] project to enact the born of the new city[7]. The Buontalenti idea, particularly ambitious, was to project a city able to accommodate around two thousands people, with a pentagonal structure built on its perimeter, and inside spaces organized like a chessboard and not defined in the details, so that the future merchant class could suit for the best the urban space to their own demands, which it allows us to understand the depth relationship between the city and it's ditches. If we would like to travel over the most salient stages of the binomial earth-water, we would need to make reference to at least three

relevant events in the following order: the birth of the New Fortress, with its relative ditch that entirely encircled it, the Royal Ditch erected in the 1601 around the new boundaries, and finally the new district, called Venezia Nuova[8] , a kind of island crossed by streets of sea water, equipped with bridges and ports, clear reference in the most famous lagoon city. The system of the ditches becomes therefore the dynamic part of the city, and it toke life equipping itself with benches connected to the road plan through 'scalandroni', and attributing itself the new role of "place of the commerce and exchange" symbol of the urban community. This will firmly define the characterizing building typology of the "livornese" urban city, based on the relationship among housing spaces, commercial spaces and streets of water, in a tightly functional equilibrium with the commercial activity: basements will open to the borders of the ditches with stores, warehouses and residences on the superior floors.
Alive and enjoyable patrimony, the system of the ditches, still today constitutes an unicum in the Italian panorama even though modified during the years. It is not an insignificant accessory: the history of Livorno was born in the ditches, it starts moving from the deep of its ditches rising from it sides up to its natural goal, the sea.
From the main commercial function of such navigable streets, we have slowly passed thorough the years to forget its original use, in some cases considering them of obstacle to the development of the city, sometimes burying them, cancelling that articulated functional mechanism that gave birth to the city, finally, little by little their rediscovery[9] .
Livorno, as more times underlined, has lived and continuous to live from a privileged relationship with the sea, that partially surround the city. The water, from fundamental element for the past has become vital for the future recovery, to the point that in order to allow the maintenance of this historical-architectural patrimony, and recover its original use, specially its basements and the overhanging buildings, it was not possible not to recognize a vital role to the ditches in comparison to the surrounding building and vice versa.
And this is the point of departure from which the project of recovery of the "Vettovaglie Market building" was born.

2.0 The new Market of Vettovaglie

Planned in 1889 by the Ing. Angiolo Badaloni, the New Market of the Vettovaglie was inaugurated in 1894 in an area adjacent to the Royal Ditch, "cleared" for the city with the demolition of the boundaries in the optics of reducing the ancient nucleus by the most recent expansion. A building almost entirely in masonry on which it detaches the coverage with trusses in steel. The new building did not find the consent of the population of the epoch, it was immediately thought about the missed opportunity for the city to equip him with a jewel of the technology of those times, as it could be a building in steel and glass, as it happened instead in the most greatest European centres.
The idea of Badaloni was instead a concrete building, strongly rooted to the place, whose technologies attuatives did not follow the current fashions but they were compared to the context, also appraising the future consequences of extensions of the building and of its necessary maintenance.
The project of the Market has not been thought only as exhibition pavilion of the new commerce but also as covered street, appraising all the composition, formal, technological and

material aspects. In this prospective considerations, but also perhaps of an Italian optics of a building method tied up to the tradition, he believed that structures in iron and glass were not suitable to the Mediterranean climate. The central gallery with the shops in masonry to the sides, open on its top to illuminate and to give air, is a clear reference to the international aspect of the project, that recalled, even though in different way, the greatest present works other European cities.
A non academic choice, but meditated, proven from the 112 years of life of the structure, during which, earthquakes, winds, hurricanes (destructive for the city the one of the 1899), bombardments (during the second world war), traffic and different pathologies like humidity, it has preserved in a nearly continues way its function guaranteeing the full carrying out of the activities still today present. The building in object introduces a rectangular planimetric structure, and it is formed of three saloons, from which the greatest measure 83 ms of length for 26 of width, with a height of 35 ms. to the height of the skylight; it is characterized by the imposing principal entry on the Scali Saffi (in front of the Royal Ditch) and other four side entries of smaller dimensions. Internally it is countersigned of a wide saloon on whose great sides find space 32 shops and two saloons of smaller dimensions along the side overlooking B. Buontalenti square, on which 23 shops are situated [10] . The building is also equipped with a basement for the maintenance of the alimentary provisions[11] , which is accessed through by the inside staircases or from the outside through two 'scalandroni' parallel to the shortest sides. The most meaningful aspect is constituted by the access to the Rotal Ditch ,that with it's shape sanctions the strong tie between sign and architecture inherent of this city, because it introduces an opening such original to allow a symbolic and allegorical reading, or, as the sepulchre of the saint is the heart of the Christian basilicas, generating fulcrum inside the sacred crypts, so the sea, carried in the Royal Ditch, penetrates in the most intimate part of the Market, producing a continuous relationship of exchange between the ditches system, the Market and the city. The market Of the Vettovaglie introduces him as an alive, actual and enjoyable system, a monumental building, frequented every day by thousand of people, centre for the commerce but also as a new "agorà" of the livornese city: a place where you can speak, bargain over, and where people meet each other. With the born of some new commercial centers in outskirts, the Town administration has felt the necessity to re-launch the economy of the city center beginning from the valorisation of the Market of the Vettovaglie, not only to safeguard an architectural good but also the culture of the commerce, adjusting it to the laws of the most recent normative in subject, but without totally interrupt the commercial activity that was in action and that was extended for the whole period of the jobs. The interventions of restructuring [12] began from the two side saloons, the Fish and the Gabbrigianes saloon, with the improvement from the humidity, the realization of a new system of disposal of the waters coming from the drainage of the fish, the restoration of the plasters, of the skylights, of the blinds, as well as the bare external facade toward Buontalenti plaza, and finally with the realization of new counters for the sale. All of these work now completed, realized always in continuity with the activity of the sale points of the central saloon. Just in this last is where the greatest problems have emerged, dictated by the necessity to realize a system of scaffolds that could guarantee the coverage of the whole space, contemporarily maintaining it's sales points in activity, and from the difficulty to correctly appraise the safety degree

of the structure of coverage[13] . The first problem was resolved with the realization of a reticolate system of scaffoldings, bound to the perimeter masonry and supported by punctiform elements post in central position. More difficult was to solve the evaluations on the structural behaviour of the coverage on which we still working [14] . Nevertheless it would be enormously reductive to think that the project for the recovery of the elegant market is aimed to itself, it is actually an integrated part of a wide seen job concerning the revaluation of the whole area, with a project that contemplate market spaces from the pre-existences as well as you the creation of areas destined to entertainment spaces, proposed as new poles for tourist attractions[15] .

The example of the Market is the clear testimony of how, with great strength in the Common in Livorno as well, it has come the awareness that the built historical patrimony is too fragile and in most of the cases it does not suit the safety and habitability terms of the regulations in force . The examined case concretely expresses how it's function and use, secular as the building, sometimes cannot be neither removed neither separated away from the place, and it tells, in the meantime, that a site and its surrounding spaces are often constituted based on it's function. The structure with its centuries of life, because of its length and continuity, has a strong historical dignity and it goes over the concept of architectural sign identified as 'anima animatrice', 'macchina architettonica', and even 'motore immobile' of the historical centre. For this and for other reasons it cannot be submitted elsewhere, even if there were other structures that most fit its needs. Being the activity a vital element, its was not even wanted to interrupt it because it's an integral part of the place. The Market, between past and future, nowadays it faces different main themes, that go beyond the technological and functional recovery, like the theme of the safety in the building field, as well as the urban promise of a continuity of its activity in commercial field, guaranteed by the remaining of the original attitudes of the manufacture. The technologies in researching the pathologies of the pre-existences have allowed more updated an approach to the project, focus on point by point intervention, process that was once of difficult realization. In Particular we understood how the last technologies in subject of research and modelling, made available by the science progress, have changed the way to plan the intervention on the existing building, in which it is possible to preserve the pre-existences acting in less invasive way. The produced novelty is therefore double, since it aims both a renewed relationship between project and building, as well as a new way to think about the intervention on the existing building, able to make it enjoyable for a following life, in a modern architectural metempsychosis, that only the recovery can offer.

NOTES

1. J.K. Goethe, Viaggio in Italia, edited by A. Farinelli, Regia Accademia d'Italia, Roma, 1932.
2. During Middle Age, after the first walls in 1392, role of Livorno in Mediterranean scene changed: from defense of Pisa harbor to dominion of French governor; after a period under rule of Genova become possession of Florence in 1421. Thanks to development policy of Signoria a new growth time started for Livorno harbor to control all ways to inland. The first bastions, fortifications are dated to that period and due to military pressure against Florentine state they were strengthened between 1550 and 1560.
3. The project was started in 1557 with the laying of the foundation stone.
4. During government of Francesco I, on 28 March 1574 with a civil and religious ceremony was ratified the

birth of the city and the foundation stone of S.Francesco bastion was layout under a lucky astral connection propitiatory of fortune and prosperity.
5. That neighbor is the symbol of the city, overlooking the see, the see is its life and its development and conformation is based on the inner navigable shipways.
6. They have been singled out some environmental reclamation interventions, banks and gangways recovery and up to dig up a part of a forgotten ditch.
7. Said "del Pesce e delle Gabbrigiane" from the name of the village Gabbro where countrywomen come from to sell agricultural produce.
8. There are even 92 cellars, each one with a direct path to the overhanging store.
9. Works planned and overseen by Dott. Ing. Cesare P. Rini.
10. Built by F.lli Gambaro at the end of XIX century by using steel reticular rafter, in Art Nouveau style with floral decoration at the knots junction.
11. Some measurement sessions to assess mechanical properties, in collaboration with University of Pisa (Prof. Ing. M.Froli), have been carried out. A FEM model of the roof has been also developed. At the moment, the evaluation of the roof response of under very high dynamics load values by Libeccio wind has been assessing in the wind tunnel in Brussels. Tests about diagonal compression, in order to evaluate shear strength of masonry, have to be commenced.
12.All this requires a global intervention on the area, starting from a planning of feasibility study for an underground parking places to clear spaces in front of the building from wildcat parking and to restore the ideal dialogue between Fosso Vecchio and Fosso Reale. These issues have been studied under the supervision of Prof. Ing. P.L. Maffei during a graduation thesis in Civil Engineering, by applying procedures and methods from Value Analysis approach in order to make choices in complex areas and recognize the best one between different alternative projects.
13. On the other hand, the reuse of architectural, historical or artistic goods or the will to maintain the same allocation for ancient buildings as the "Mercato" requires some adaptations to make those an available and live buildings and not only a testimony from the past.
14. Aristotele, Metafisica, Rusconi, Milano, 1994, pages 557-559 and page 567

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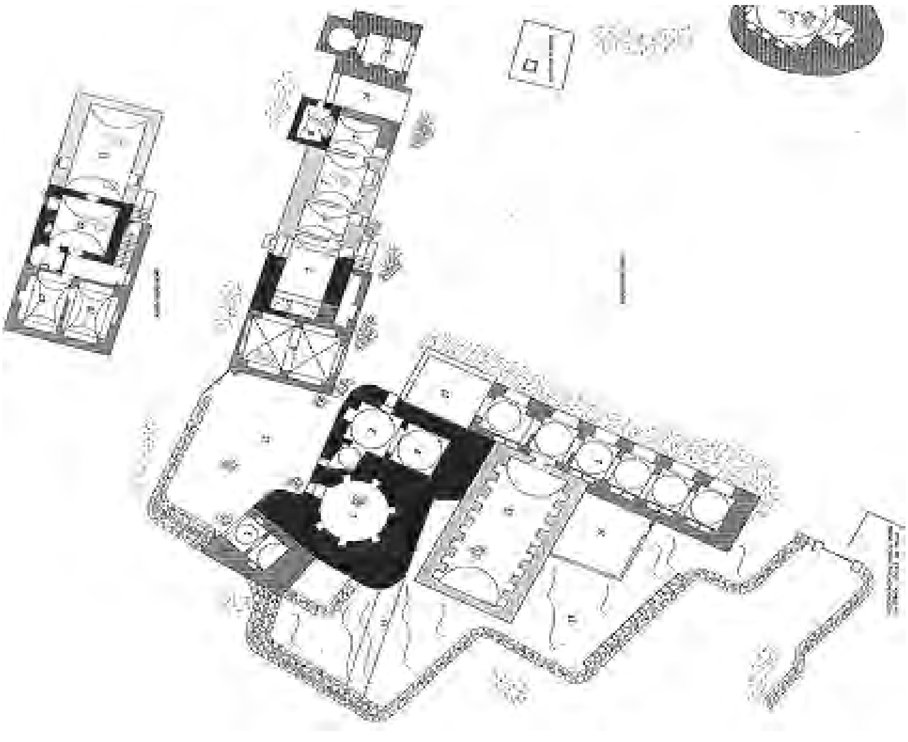


Fig. 1

P. Pastore

THE TYPOLOGICAL ORGANIZATION OF TRADITIONAL BUILDING

The typological organization of building organisms spread over the Murgia territory is not limited to one building type, there are a variety of types according to the orographic, climatic, productive and functional situation, and in relation to the different socio-economic conditions which have evolved in the course of the various historical epochs
The development of this organization has been determined by the priority of production rather than habitation; only in some structures known as “casini” or “masserie-palazzo” do the residential parts have the greater importance. This has generally meant more space is dedicated to the service structures with respect to those of residence, though the residence spaces are always central compared to the others and are often located on the first floor.
Security has always been a prominent requirement in the different historical epochs; where its need was most felt, the masserie are organized around a close courtyard or as a compact high block equipped with defensive works.
The size of the area on which it is possible to build does not impose a high building density: however, in the biggest structures the requirements of defensibility tend to lead to more compact internal spatial units. According to the degree of defensibility the structures adopted were simple linear, courtyard, side-by-side courtyards, enclosed forms (e.g. masseria Viglione), or the fortified masserie that tend to be grouped in a single block (for example masseria Iesce). In general, however, the masserie had external openings of reduced size, and were positioned in panoramic locations from which access and the surroundings could be controlled. Where security was of a lower priority the building types were organized in freer forms, and according to aggregations that grew in the course of time with the addition of spatial units.
Owing the need to hold animals in enclosed areas, sheep masserie are organized prevalently in enclosed structures; the field masserie are structured in side-by-side, linear or simple semi-closed block form.
Of decisive importance on the volumetric organization of the settlement are the environmental conditions (climate, orography, vegetation, geomorphology). The building organism is located and orientated so as to utilize natural factors as well as possible and

obtain constructions that will ensure internal microclimates that provide the best living conditions.
In the most ventilated places, on high ground or in valleys where the wind is channelled, the compact form with few openings creates conditions of greater protection against atmospheric agents. On the contrary, on flat ground protected by ridges, the planimetrical form and construction characteristics must guarantee the best conditions of ventilation in the summer.
Where possible, shaded areas are created also using vegetation to create situations of natural cooling. In the hottest and less ventilated areas the volumetric layout is developed according to more open patterns, with parts differently exposed to solar radiation to favour the creation of breezes, or situations of natural thermo-ventilation due to the effect of the temperature differences that are created between areas exposed to the sun and areas in the shade. When the air masses on the areas more exposed to sun warm up, they cause depressions due to the reduction of density compensated by movements of air at lower temperatures.
Apart from the requirements of security and functionality already described, as a whole the different requirements of utilizing the environmental resources as well as possible to attain the best level of living comfort, determine the different planimetrical aggregation.
Despite the wide variety of typological solutions, determined by different environmental conditions and productive requirements, all the typological aggregations are based on a number of individual technological units created with the same dimensions, construction methods and materials.
Each functional necessity corresponds with an elementary technological unit characterized by its own constructive organization and specific technological performance. Every elementary spatial structure represents a basic module that responds to precise requirements and modalities of use.
The dimensions and planimetrical configuration of the unit are always of a quadrangular form (rectangular or square) to allow the aggregation and growth of the building organism in the course of time by summation, along the orthogonal axes.
The building organism, formed by the summation of elementary modules, aggregates and grows in the course of time with the addition of further modules so that the building complex adapts to new productive requirements or the growth of housing requirements.
The technological units that form modules of the spatial aggregation can be classified according to the typologies of constructive fixtures adopted, each characterized by its own static functioning and executive modality.
The basic technological units, each corresponding to a basic spatial module, can be classified according to four solutions.
The technological unit with a barrel vault has a rectangular geometric base with a width of around 4-5 metres and a variable depth. The constructive fixture requires thick strong walls along the two long sides with external openings on the non-supporting sides. The short sides are also dimensioned like the long sides and linked in the corners to guarantee the external walls the character of a box on which to lay the roof.

Fig. 2 - Block typological organization on two levels

Fig. 3 - Closet courtyard typological organization

Fig. 4 - Block typological organization

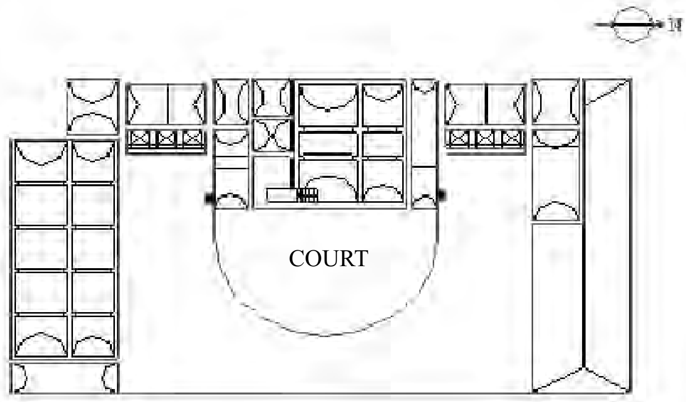
Fig. 5 - Side-by-side typological organization

Fig. 6 - Courtyard typological organization

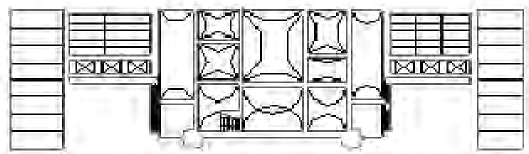
Fig. 7 - Fortified tower typological organization

BLOCK TYPOLOGICAL PATTERN

1ST FLOOR



2ND FLOOR



1. barrel vault technolog. unit
2. cross vault technolog. unit
3. cloister vault technolog. unit
4. lowered cloister vault technolog. unit
5. lunetted barrel vault vault technolog. unit
6. double sloping roof vault technolog. unit
7. sloping roof vault technolog. unit
8. overhancing technolog. unit
9. vertical connection technolog. unit

The vault in tufo blocks with a flat covering gives significant thermal inertia and a high degree of safety from external intrusion; these characteristics, together with the lengthened geometric form, make them excellent for storing the most valuable agricultural produce the conservation of which requires good conditions of temperature and humidity.
For use as a shelter for animals the unit needs to be deeper; this is the reason for the necessity to create niches in the thick walling, to create mangers, without having to increase the overall lighting of the vault.
The unit with a lunetted barrel vault is more complex in construction terms and is employed where it is necessary to increase the transversal width of the room without having to proportionally increase the thickness of the walls; in this way a structure is obtained which discharges its own weight prevalently on the columns, linked externally in a continuous way. The thickness of the walls is significantly reduced, permitting a better use of the internal spaces and providing a considerable useful transversal dimension to the room. In length the unit is extended by series of structural spans interspersed

by transversal supporting arches. Organized in this way the construction allows wide surfaces to be covered without intermediate supports.
The technological unit with a crossed vault has a prevalently square geometric basis with sides of dimensions within 4.5 ml. The construction, formed by four opposing parts of barrel vault supported on columns, does not require unbroken external closure. This makes it possible to create a number of equal units positioned in transversal or longitudinal sequence, which are balanced, as their reciprocal horizontal thrusts counteract each other.
The solution is utilized for particular purposes where the absence of walls on one or more sides or a greater covered area with points of support is required. Its use is therefore reserved for spaces destined for particular purposes, such as small churches, or the porches and colonnades of the massaria-palaces.
The technological unit with cloister vault has a quadrangular base with sides that are not more than 5 metres wide which support a vault determined by the intersection of two barrel vaults, which discharge their weight on all the external walls; this makes possible a substantial reduction of thicknesses at the base. The walling of the cloister vault unit is considerably more slender than that of the barrel vault. The cloister vault unit is therefore used almost exclusively for inhabited rooms, in particular those on the first floor that lie over the barrel vaults below. The lower barrel vaults correspond with two or more rooms above with cloister vaults that also rest on the transversal walls of the vault below, reinforced with arches in correspondence with the walling above.
The cloister vault unit, as opposed to the barrel vault unit, can have external and internal openings on all four walls, and bigger windows to improve the conditions of internal illumination. Variations of the round arch cloister vault are the lowered cloister vault unit, formed by the intersection of lowered vaults on a square or, more frequently, rectangular plan. Lowered cloister vaults are prevalently adopted for rectangular inhabited rooms.
The technological unit with a sloping roof has an inclined flat roof resting on external walls and on arches in transversal walling that rest on columns linked by the external walls. The walls are less thick owing to the reduced weight of the roof and the presence of intermediate supporting arches; often, with the exception of the columns, the walls of the smaller rooms are created with a single wall in tufo.
The sloping roofed technological units do not possess good qualities of thermal isolation, protection from fire or against external intrusion, nor of longevity or reliability in the course of time. They are therefore used only as occasional shelters for animals or as stores for produce of lesser value the conservation of which does not require particular environmental conditions.

Fig. 1 - The process

Figg. 2,3,4 - The "red – cottage" before the production stage

S. Pennisi [1]

THE GUARANTEE OF QUALITY IN BUILDING RESTORATION PROJECTS A CASE STUDY

1.0 The quality of a building restoration project

The concept of "quality" in the building industry is certainly not a new introduction. It already existed in the rules of the trade and the good advice of the contractors. The new concept is the measurability of quality, which involves a quantification of characteristics and parameters that are not simple and immediate as they are in other sectors of production.
The complexity of the building process makes the measuring of certain qualitative parameters difficult, above all because of the vast array of requisites that the product (the design and the work itself) has to have. This procedure is now a matter of routine in other production processes.
In fact, when a design is drafted we begin to get an idea of how difficult it may be to identify its objective evaluation parameters, above and beyond satisfying the client and the user. In fact, in the case of the design product and the building product the evaluation of functional parameters is not possible, but variables that are often linked to the specific case come into play (context, use, function…).
In building restoration the designer has the difficult role of satisfying the demands of the assignment, creating a product that has the necessary requisites with respect to what already exists, and attempting to "improve" the craftsmanship from the structural and functional point of view without damaging its other distinctive features.
The variety of parameters that are involved in a building restoration – we are only considering its interdisciplinary character and therefore the numerous professionals present–makes the outline of the entire process extremely complex, at the moment when the qualitative parameters need to be "measured". The task of coordinating the different disciplines that are involved, carried out by the designer and the site manager, is fundamental.
The building process must be more interactive and iterative than in any other similar case, with a constant flow of information between the people working on the project from the beginning, and it must be feasible. It must also be very flexible, in order to be adaptable to the demands of the people involved, but above all to the demands of the building itself.
The most compatible project solutions will be those that come from an in depth knowledge of the building and its surroundings. Because of this a preliminary cognitive process, which then becomes a guide for the project, is essential. Defining quality, or rather qualities, in building

restoration therefore becomes extremely complicated. It is a process of structuring evaluation around numerous parameters, to be analysed from the beginning of the project until the use of the building. This defining should be done on a case-by-case basis, taking into account the peculiarities that distinguish every restoration project. For one building the choice of materials may be a fundamental parameter of the evaluation, for another, the choice of a compatible function might be much more important, and for another, respect for the construction techniques used, and so on.

2.0 The guarantee of quality in the project

Compatibility is applicable to the materials used in the restoration, from the chemical / physical point of view, and also to the distributive, functional and spatial choices made with respect to the building itself. These demands should, of course, be compared to the demands dictated by concomitance and regulations. The designer has the difficult task of coordinating and relating the requirements with respect for what is already there, the rule book with new trends and the language of production systems, history and respect for it with the demands of the future use. Following a clear and comprehensive cognitive path, and documenting it adequately represents the first step to be taken, followed by the compilation of the project and carrying out the work, documented as much as possible with reports, tables and photographs, so as to guarantee the quality of the process and facilitate choices for possible future projects. The time taken to carry out this work corresponds with time / cost efficiency. Just think about how many projects you have been part of that were badly organised because of a lack of information, and how much expense this incurred.

3.0 An example of a case: a farmhouse converted into a nursery

For many reasons the case illustrated represents an example of the pursuit of quality throughout the entire process, from the design to the handover of the building and its use. The path followed has been long and articulated, both because of the characteristics of the building – its surroundings, its condition, its typology – and because of the peculiarity of the intended use chosen, and the resulting constraints of various different types. The model illustrated below represents a synthesis of the quality control process followed. The building being examined is a farmhouse situated inside the Parco d'Orleans, which contains most of the departments of the University of Palermo. In all probability it dates back to the end of the 19^{th} century, it has a stone structure and is small in size. The "red cottage", as it became known because of the colour of its plaster, seemed to fulfil Palermo University's requirement for a nursery for its employees perfectly, because of its position and size. The first phase of the preliminary study of the restoration project was aimed at evaluating the compatibility of the spaces with the end use chosen, for which there are strict regulations regarding both the dimensions of the rooms and the distances and thus the functional distribution. At the same time demand was examined, that is the number of places in the nursery that might be needed, in order to evaluate whether the dimensions of the building could fulfil the prerequisites. Description of the phases from the point of view of the pursuit of quality (customer requirements – quality of the existing building – costs-profits):

- Study of the site and its surroundings
- Customer requirements

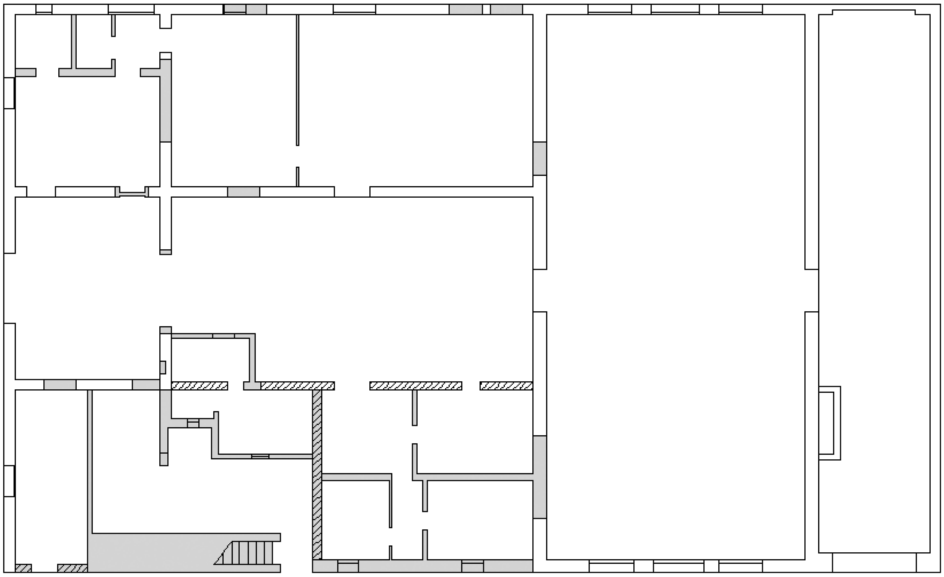


Fig.5 - The "red -cottage" before the production stage. The plan

- Design choices (the materials, the distributive transformations, “improvement” of the structure)
- Implementation
- Fruition (post occupancy evaluation)

3.1 The surroundings

The place where the red house was situated seemed suitable from the point of view of its position, near all the departments and with direct access to the park from the main road Via Basile, close to the ring road of the city on one side, and to the Metro station on the other. In addition, as is shown in the picture, the building is surrounded by more imposing buildings, but they are far enough away not to “suffocate” or overrun it. Finally the structure had some land with it, which could be used for outdoor play, given the mild climate in Palermo.

3.2 The demands

The requirements of the customer were, of course, connected to regulatory directives. Spaces, distances and the characteristics of the rooms are in this case governed by organisational demands, demands of hygiene and safety, and are also connected to the educational needs of the little users. The aim of the study was therefore to relate the existing spaces, which were rather restricted because of the structure of the building, to the needs of a nursery, with spaces for babies and toddlers.

The structure of the building, with the large space that used to be the central animal shed and the two symmetrical wings, was perfectly adapted to this kind of arrangement, because it allowed a clear distinction, which was obligatory, between the babies’ areas, the service areas and the mul-

tifunctional play area.
Also, the presence of the courtyard as an access allowed a passageway and a filter to be created between the street and the entrance.
The opportunity of satisfying the demands of the customer favoured the process that had been started and the design was drawn up, without neglecting the static safety aspect, a
prerequisite for which durability tests were carried out. Not much work was necessary on the walls, but for the roofing this would have to be decided once the work was underway.
In a restoration building site the quality control procedure sometimes involves time flexibility and being able to repeat the process – decisions made while the work is underway–and can be interdisciplinary in character.

3.3 The design choices

The architectural choices were based on respect for what was already there, so the farmhouse retained its original morphology, with the necessary adjustments to the interior for the intended use, but maintaining the spaces and the structures that were still in good condition, and also the colour of the external plaster, which had been a characteristic of the building for years.
The existing fittings, in particular the roof tiles and the ceramic floor tiles in some rooms were reused.

3.4 The production stage–the building site

Respect for security regulations, the continual flow of information between the people working on the project and the collection of documents guaranteed that there were no setbacks while the work was being carried out, and that it was carried out relatively quickly.



Figg. 6,7,8 - Some images of the building site



Figg. 9,10,11 - Some Images of the nursery

The pictures show some of the operational phases of the most representative transformations: the ventilation hole in the floor in the babies' area, the cordon on the existing stonework to take the new roof structure, the reinforcing of the wooden trusses and the newly constructed metal ones.

3.5 Fruition – evaluation of the requisites

An evaluation method successfully used abroad is the Post Occupancy Evaluation (POE) based on interviews with the users of the building. Using a similar procedure, members of the nursery staff were asked questions about different aspects of the building's use, in particular:
- The use of the spaces
- The materials used
- Physical wellbeing
- Psychological comfort
- The fittings chosen
- The furnishings

The results regarding the question of spaces are shown as an example. The evaluations that have a negative result are unfortunately related to the restricted spatial characteristics of the building, and therefore cannot be changed.
The problem of the limited size of the spaces in the open air is even greater when one considers the extremely mild climate in Palermo.
A procedure of this kind leads to a very precise picture of the evaluation made by the users and the quality of the restoration work carried out, which is useful for future projects that may present similar functional and morphological problems.

POST OCCUPANCY EVALUATION Spaces evaluation	Resolutely yes	yes	no	Resolutely no
Are the dimensions of the rooms in the nursery adequate for the functions carried out there?	30%	50%	20%	0
Does the situation of the rooms facilitate access in relation to their use?	0	10%	20%	70%
Do the characterisitics of the rooms provide a pleasant sensory experience?	70%	30%	0	0
Is the relationship between different rooms suitable with regard to the function?	0	0	50%	50%
Is the relationship between internal and external spaces suitable, with regard to their uses?	0	0	40%	60%

Notes

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F. Pernice [1]

THE MODERN TECHNOLOGY APPLIED TO THE RESTORATION WORKS OF THE RESIDENCES OF THE ROYAL HOUSE OF SAVOY IN PIEDMONT

It could be quite unusual the fact that, at the start of the third millennium, we are interested in a subject which is restricted to a specific territory where the "Residences of the Royal House of Savoy" of Piedmont are placed. But in the nation's history they have had and they still have, through an osmotic process with the Savoy dynasty, a very important characteristic: the whole system originates from specific control requirements and development of the Savoy territory and through constructive ability and architects who worked on a unique system. The result was the creation of a very important complex which was declared in 2003 "World Heritage" site by Unesco.

In the second half of the sixteenth century, Emanuele Filiberto moves his duchy capital to Turin; he starts the program of land politics and urban planning which is continued by his successors, with the precise purpose to find some basis which were of fundamental importance for the defence and surveillance of territories. In 1563 the city preserved its "*castrum*" shape divided into regular spaces and chessboard arteries, according to its roman system: so the city did show neither the aspect nor the structure worthy of a capital, but just a perfect geographical position, to the confluence between the Po and Dora rivers, along the road connecting France and Italy. Moreover, the local population was in urgent need of new houses as its constant growth had caused a big building disorder. In 1557 Emanuele Filiberto came to the throne of the little ducal reign: he dealt mainly with the defence of the city, realized through the construction of one of the surest fortified citadels in Europe which partially changed the urban perimetre. Anyway, he did not neglect the pleasant aspect of his political engagement as he bought some lands to build Valentino, Lucento Castles, and even Viboccone Caastle which was surrounded by Regio Parco area and used as a hunting and pleasures place; Emanuele Filiberto lived at Rivoli and Moncalieri Castles.

Carlo Emanuele I, who was Emanuele Filiberto's son, ascended to the throne in 1580 and started the urban plan for the spatial restoration of the city and for the establishment of the Absolute State, through architectural and urban models. This program was based on a precise building plan, where nothing was casual and whose top was reached by the realization of a system of royal residences, castles, palaces, and villas. The capital really

began to modify its aspect getting a baroque face thanks to the work of important Piedmont architects (Carlo e Amedeo di Castellamonte, Benedetto Alfieri) and Italian architects (Guarini e Juvarra). They worked at the Savoy Court and transformed the little "*urbe*" (city) in one of the most important European baroque cities. The idea of suburban villa gradually modified its meaning : place of delight, court's delight, hunting residence, holiday house. Every monumental building is born in a very unique moment in history and the thread that link all the residences is just the history: history of the Savoy dynasty, history of the emergent Piedmont state, which raises a new political dignity, history of the city of Turin and its urban development, history of a political and territorial system organized and centred on the royal power.
The peculiarity of these residences is that they create a system where each of them grew up individually with its different typological aspects that can be understood only if you know other buildings.
The realization of the "*corona di delitiae*" proceeds step by step. Cristina of France, governing from 1638 to 1663 in the place of her son Carlo Emanuele II and later himself, gave a new strong boost to the building sector. Actually, Cristina ordered the construction of the "*Vigna di Madama Reale*", a rural residence built according to Andrea Costaguta's design.
In 1663, Carlo Emanuele II's accession to the throne marks the beginning of a long period of peace even if it was rather unstable: the duchy of Savoy had to protect itself from French interference that did not tolerated House of Savoy's ambitions for autonomy. This is the most important period for Piedmont architecture which is being enriched by glorious royal and religious buildings: San Lorenzo Church, Sindone Chapel, Consolata Church, Carignano Palace and Racconigi Castle, all by Guarino Guarini's genius, the famous architect from Modena.
In the second half of the seventeenth century the construction of the most sumptuous Savoy residence begins: the Royal Palace of Venaria Reale, whose vastness represents the triumph of the absolute power. It is not just a sovereign's house, but it also constitutes a whole urban system for the celebration of the sovereignty. The scenic representation of the absolute power develops through the edition of the "*Theatrum Statuum Regiae Celsitudinis Sabaudiae*", a collection of 140 tables engraved on copper and commissioned by Duke Carlo Emanuele II, who unfortunately was not able to see the completion of the work.
The unitary royal system of these big royal residences has undergone different modifications throughout centuries, suffered several war damages, destructions, abandons, despoliation of furnishings, pillages and moreover it had many different uses. In any case, it has survived over the centuries, until our days, with the exception of the Residence of Millefiori, built in the modern Mirafiori area, and the residence of Regio Parco which were completely destroyed. The residence of Millefonti, built by Carlo di Castellamonte for the Duke, has been destroyed too with its park rich of fountains and watergames on the banks of the Po.
The historical and architectural system of the Royal Residences also extends outside the regional territory such as in Sarre in Val d'Aosta; other residences were private houses

Fig. 1 - Residences' map

such as the Castle of Sommariva Perno which was bought by Vittorio Emanuele II in 1857; even the thermal residences of Vinadio and Valdieri are important because, from the nineteenth century, they did not represent the power anymore in order to become bourgeois residences.

An other peculiarity common to all the Royal Residences is about the different phases of construction: the clients, the documented execution of the building yard, the top of magnificence linked to various uses of the residences during different periods, the decadence. The rise and fall of residences covers a temporal arc of approximately three centuries.

Basically, it is possible to observe a repetitiveness of construction as for the Royal Residences: the same planners, artists, surveyors, workers. And even the outline is generally similar: the courtly building, the palace, the chapel, the park, the gardens, and support zones (orangeries, stables and annexed areas) were built taking long execution times

Fig. 2
Vigna di Madama Reale"

Fig. 3
Chapel of Sindone

Fig. 4
Carignano Palace

with interruptions, widenings, modifications; it often involved a stratigraphy of architectural elements and the presence of continuous building yards which showed the "unfinished" characteristic.
Nearly all the residences had very long execution times and a procedure not so dissimilar to the present one: the yard, commissioned by the duke, was organised in accordance with the "*delibere*" (decisions) of a councillor called "*Consiglio delle fabbriche*" which organize the carrying out of the work in conformity with the planner's design; the "*tiletti*" were drawn up in order to assign the execution of the works; then there were the "*sottomissioni*" of the contractor, something like an engagement to realize works; architects and designers gave the "*istruzioni*" (instructions); there were the"*misure*"of work done, something such as modern yard accountancy, and the "*collaudi*" some tests carried out at the end of the work.
An other characteristic common to all the residences is the influence that they had on the neighbouring areas: parks, garden, villages and territories were modified and adapted to the residences which had a positive and crucial influence.
The last common characteristic was the progressive decadence of the royal residences during the period of French occupation beginning at the end of the eighteenth century: many residences were stripped of their furnishings and some of them were sold. A progressive decline begins and culminates, after one phase of concession, when the Savoy family leaves the residences to the state property or to other public bodies, even because of high maintenance costs.
The conversion of the destination from places of delight and holiday into other functions marks the beginning of a wide process of restoration and alteration of old architectural systems. It was necessary to use again the monumental complexes for new activities such as premises of military organisms which was the most important one.
The Head of the Authority for Architectural Heritage and Landscape of Piedmont has identified some criteria about planning choices in order to realize connections between the residences, according to the original concept of the "*Corona di Delitiae*". Actually, in the last decennium some yards are born to restore the monumental heritage and a cooperation among different istitutions, administrations and governmenthas been stimulated.
In this stimulating restoration process of the artistic patrimony, the yard becomes an important vehicle of search, knowledge and examination of the archives data, sometimes incomplete especially for modifications which are often not documented.
Moreover, protective actions over the territory gives a complete vision of all the royal residences, both private and public, to coordinate different restorastion works, to verify constructive metodologies and materials used in time, so as to delineate a unitary and detailed picture of the buildings. The restoration work is also a complex activity essential to find the right uses for the residences and which is fundamental for the protection and valorisation of the territory.
For this reason restoration works of an architectonic building are different from the ones of an artistic asset (such as a book or a painting), because they are strictly connected to their environment and to their use.

Fig. 5 - Venaria Reale, "Theatrum Statuum Regiae Celsitudinis Sabaudiae"

In this context the residence of Venaria Reale could be considered as an example for all other yards: it is the biggest one in Europe and his methodology for approaching the restoration and design has become an example for many foreign residences.
The operational practise is now consolidated thanks to a diagnostic investigation carried out through different kind of analysis able to give intercross data. It is executed in situ and it uses samples captured and studied in laboratory; they confirm the historical data and the construction of the "*fabbriche*" were architects and skilled workers worked during the centuries, using the same techniques and materials.
Analysis results have shown as it was so complicated to identify instruments and products in order to restore lost elements which represent a large part of the internal surfaces, not only about methodological choices but also about components of matter. But the same analyses have concurred to start the constitution of new compatible materials and techniques for a perfect restoration work. They have been able to bring down restoration and production costs and offer ancient techniques again, through the use of modern materials and instructing new craftsmen.
Microscopic studies and analysis, compared to what was done in past times through manual stratigraphy with bistoury, have allowed to discover very important data: in many places man-

Fig. 6 - Valentino Castle

Fig. 7
Royal Palace and Chiablese Palace

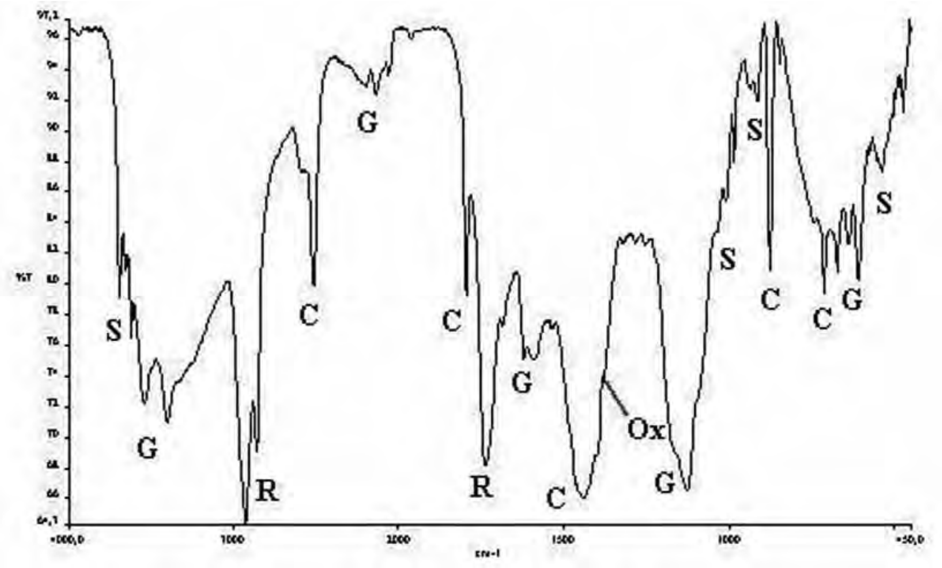
Fig. 8 - "Palazzo Madama"

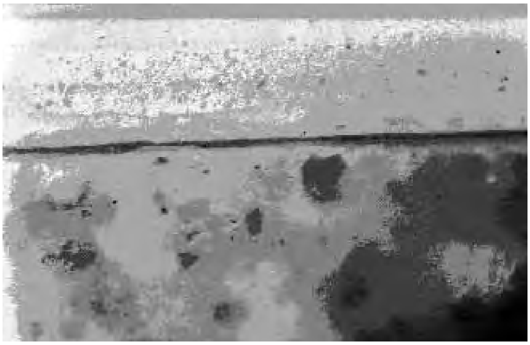
Fig. 9 - Agliè Castle

ual stratigraphy showed just some layers whereas now you are able to found many more.
So it has been demonstrated that there were intermediate layers, realized by the technique of “velatura” (air frame), that had not been found throug the normal technique with bistoury. It has showed how the results was often wrong in past times.
Different kind of analysis have been carried out in royal residences so as to give a comparative picture useful for the building yard, in order to avoid past mistakes when mortars were realized mixing empirically raw aggregates, sands, marble powder, talc, limes, lime pastes and cements, in order to pay more attention to a formal and visual composition than to a material one.
At the moment the analyses carried out as operative usual procedure of a restoration work in a building yard are:
CROSS and THIN SECTIONS, for the mineralogical and petrographic characterization of stone material;
MEASUREMENT OF CARBONATES USING THE CALCIMETER METHOD; DETERMINATION OF CALCIUM CONTENT; THERMOANALYTIC METHODS: based on physical and chemical transformations that the sample undergoes in consequence of a temperature increase. For instance the thermogravimetric analysis (TGA) where the variation of sample weight in connection with the gradual temperature increase is measured; or the differential thermal analysis (DTA) where the temperature variation of sample (and the consistent absorption or development of heat) in connection with the gradual and defined temperature increase;
MERCURY POROSIMETER: that allows to measure the porosity of a solid matter;
SOLUBLE SALTS DETERMINATION: through measures of electrolytic conductivity it allows to estimate the quantity of soluble salts; so it’s possible to get indications whether the chemical composition materials or the decay processes in progress;
FOURIER TRASFORM INFRA-RED SPECTROSCOPY (FT/IR): it can be useful in the analysis of finish layers and superficial coats of paint, which are complementary, through thin sections, to the observation in the stratigraphic analysis.
X-RAY POWDER DIFFRACTION (XRD): it allows the identification of all crystalline substances presents in the element.
The collected data after the diagnostic campaign have given some considerations about employed and analysed materials. For instance the mortars have shown a compositive-morphologic homogeneity.
The binder used for the execution of pastes is always obtained by a yellow lime, because of the presence inside of thin dispersions and aggregates of argillaceous-ochreous materials, so probably the original material is like a limestone slightly rich in marl, that is impure in clay.
The probable origin of these “*litotipi*” is the Superga’s hill where historical-bibliographical sources show their presence. This kind of binder, because of his clayey content, doesn’t work like a normal aerial lime, like the calcium hydroxide that in contact with the atmospheric carbon dioxide becomes calcium carbonate (carbonation), but it shows partially hydraulic characteristics. So the use of a lime, not white but yellow colour, with better qualities of resistance and tenacity compared with those obtained from calcination

of pure limestones.
To confirm bibliographical researches, “calci forte” (strong limes) are used for outside and structural works, instead of white “calci dolci” (weak limes) that have a magnesium bearing because of their origin from magnesic-dolomitic pure limestones. These materials are used for finish works and inside decorations.
The used aggregate is a silicatic kind of local origin because it’s made from 50 % of sand and gravel and more quartzy, and for the remaining part by potassium silicate, sodium, magnesium, iron, etc. They come from the destruction of typical Piedmont rocks, like quartzites, gneiss, granites, “prasinite” (greens rocks), rarely marly limestones, etc.
In almost all samples there is a particularly interesting presence of selenite fragments (crystalline gypsum), not unusual in Turin and Piedmont flowages in general.
Through the diagnostics in every building yard it has been possible to identify anomalies like reconstructions of the nineteen and twenty century or like very modified and badly conserved areas. In this way it has been possible also to know the causes about the decay of binders.
Normally as for sulphates the origin of the salts is due to alteration of carbonated binders caused by sulphur oxides commonly presents in urban pollution but also by the presence of cements pastes near the sample point.
As for nitrates and chlorides the origin is due to decay process of organic substances and their presence in the masonries is caused by sewage infiltrations, showing the presence of animals and barns.

Fig. 10 - Venaria Reale Castle





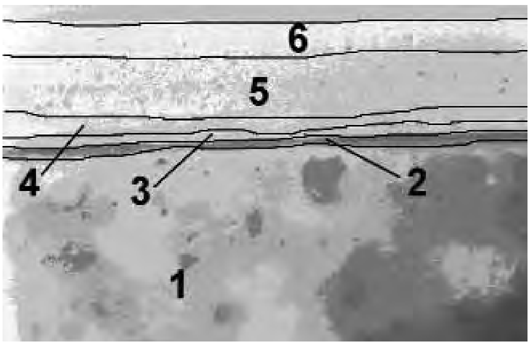


Fig. 12 (top) - Fourier trasform infrared spectroscopy; Fig. 13 (centre) - Section polished; Fig. 14 (below left) - Stratigraphy, Section polished; Fig. 15 (below-right) - Iron shapes to make frames

Naturally the microscopic analyses have been carried out also on masonry structures, bricks and stones, so as to able to choose the kind of restoration work on masonries using the "*cuci scuci*" technique (replacement of the bricks), or the "*stilatura*" (key) or the brick "*sagramatura*" (technique for the protection against moisture).
Usually the mortar for "*sagramatura*" consist of lime pastes and powder of "*cocciopesto*" (silicatic materials and calcium carbonate), in order to obtain the red brick colour and a certain mortar's hydraulicity.
The "*sagramatura*", or plastering or fog, that was carried out on a brick wall, from the half of the 1800's, rectified the irregularities of poor bricks or the walls unevenness caused by opening or closing of spaces. It was able to protect wall increasing the aesthetics and conferring greater uniformity to the front.
The drawing up technique was not covering, his thickness varied between 1 and 2 millimetres. In this way it has been possible to re-propose blends mortars prepared in laboratories, in order to bringdown the costs and to train again the young craftsmens to use of this technique.
The composition of plaster finish for inside is usually very similar to the one for outside and it is composed by a mixture of aerial lime and fragments of saccharoidal marble. The ratio between aggregate and binder is from 1,5/1 to 2/1.
This material, called improperly "*marmorino veneziano*", spread through Italy from the sixteenth century, particularly in nothern areas of the country.
In every area the "*marmorini*", also called "*stucchi lustri*", have been carried out in an original way by craftsmen lived in past centuries, for both the composition and the applied technique: but the secret to obtain a good final result was, and it's still now, the laying of the "*marmorino*".At the time craftsman prepared the mixture calmly and then he spread on the plaster, spreading different layers in sequencealways on "*fresco*"; after that he could polish and consolidate it so as to obtain a regular and uniform surface. This last treatment was essential for the finish degree because the more mixture was spread, the more surface was smooth and sleek. Moreover, the "*finitura stucco e lustro*" of the surface concerned the soap or wax finishing.
Nowadays craftsmen have been trained to use the same technique but now surfaces are not smoothed as much as to become "shiny": they are left translucent and afterwards they are treated by a final fog (*"velatura"*) to affect old-fashioned manners.
Actually, today the new material is composed after defining mineralogical and petrographical composition of original mortars. The mixtures are defined in qualified laboratories to re-propose mortars similar on composition and granulometry: it has been decided to use a natural hydraulic lime made by baking limestone (under 1250°C) more or less argillaceous or marly (calcareous stones of volcanic origin that contain from 8 to 20% of clay). Then, they became dust with or without grinding. It is a "very natural hydraulic lime", able to water-hardenning with or without any pozzolans additives as its "hydraulicity" is due to the quantity of clay contained in calcined limestone.
In order to obtain a good manual ability, the limes that have to be employed to carry out the plaster – called NHL ("natural hydraulic lime") according to ENV 459-1 – must preferably belong to the "weakly hydraulic" classification (hydraulicity index between

0,10 and 0,16). The NHL 2 is so called for the value of its compression resistance (minimum requirements) which is 2 N/mm^2 and it satisfies the following characteristics:
SO_3 content <= 3% (a higher percentage is allowed up to 7% provided that the stability is verified after 28 days under water)
free lime content <= 8%
mechanical compressive strength, after 28 days, between 2 and 5 N/mm^2
density in Kg/dm^3 between 0,4 and 0,8 Kg/l
The binder produced by a specialized laboratory comes from baking of Wasselonne calcareous stones, it's included in this category and has even a free lime content of 38%: the high percentage of lime and the low content of silica (medium-low index of hydraulicity) make it similar to the model for the mortars used by Juvarra for the plasters. This selected compounds have allowed to carry out mortars without any artificial hydraulic binder giving an excellent adhesion and cohesion with ancient materials and a compressive strength higher than aerial lime mortars but quite lower than those made by cement (after 6 months: 3 N/mm^2).
Instead, stuccoes were made by following layers of mortar. The reliefs had not to be very marked: if the overhang of the motif was too wide, most of the volume was made by sand or tiles mortar and just the most superficial layer of mouldings was made by the thinest mixture of lime and marble dust. Often a support structure was used so as to reinforce the connection of these stuccoes to the wall. This structure was made by rivets of different lengths or wooden pins inserted into the masonry and fixed by mortar; otherwise Juvarra used to brace mortars by means of hemp. The moulding was carried out using a shape which allowed to execute the profile. As a result of what we have found, after examination of archive sources and considering architect's instructions, today mortars used to carry out the reliefs have been made by a structure of mineral fibre and by means of natural hydraulic lime. These mortars have even a certification in conformity with European standard and they are spread in different layers by special templates up to the finish. A chemical and physical compatibility has been reached between the original mortar, simply restored and cleaned up from dust and pictorial pellicles, and the new mortar which made by manual methodologies.

Note

1. Superintendent for the Architectonic Assets and the Landscape of the Piedmont

P. Petrella [1], V. Capone [2]

RECENT FIRE SAFETY ENGINEERING TECHNIQUES FOR BUILDINGS

1.0 Abstract

The development of housing, both public and private, aimed at developing building more and more complex in terms of architecture, technology and the plan for the safety aspect, not only as a safeguard built heritage, but also to its content, a science of primary importance. For this reason, most industrialized countries are engaged in research to develop regulations that are designed with increasing depth to the resolution of problems and techniques of fire safety, aimed not only at safeguarding the people who should represent, of course, his goal. The application of such laws is entrusted to the charge of the activities at risk, who should be aware of having to organize a "safety philosophy" intended not as a tool to deal with sudden events and / or catastrophic, but as a set of actions needed for safeguarding the people and the preservation of structures and assets contained in them. This work will be highlighted for modern techniques of fire safety interventions on the built heritage that, in addition to meeting the objectives described above, do not harm its final content.

2.0 General

The culture of a people draws its origins from respect for its own past. Our country is rich of public and private buildings of great historical importance and/or artistic of which THE LEGISLATURE has the supervision without banning their use. This brings us often to investigate security problems and, more particularly, fire safety. The protection from the fires of the cultural heritage is conditioned by very complex technical problems. Part of this heritage including works of art, historic buildings and documents, in the past has been destroyed by flames. The chronicles of the fires have marked the history and the collective imagination since the antiquity, even before that the Greek Erostrato, a citizen of Ephesus, in 356 B. C. according to history, set fire to the temple of Artemide, one of the seven wonders of the world.
With D. Lgs. 368/20.10.1998, "institution of the Ministry for the goods and the cultural activities, in accordance with Article 11 of the law 59/15.03.1997" it was defined a structure that, in agreement with the requirement in Article 2, shall exercise the admi-

nistrative functions state on:

a) the protection, management and enhancement of cultural and environmental assets;
b) promotion of cultural activities in all their manifestations with particular reference to the drama activities, music, film, dance and other forms of entertainment, including circuses and traveling shows, photography, the plastic art, design industrial;
c) promotion of books, reading and publishing activities of high cultural value, devel opment of national bibliographic and library services;
d) promotion of urban culture and architecture, including the design and, in agreement with the relevant departments, the design works of significant architectural interest for cultural activities;
e) study, research, innovation and high education in the areas of expertise, including through support of activities of cultural institutions;
f) dissemination of art and Italian culture abroad, unless the powers of the Ministry of Foreign Affairs and in agreement with the object;
g) monitoring the CONI and the Institute for Credit Sporty.

It's of obvious interest for the legislature the preservation of built heritage, which is entrusted to the Congregation, as the task of protection of property appears to the first point in his duties. For protection in the specific area of fire safety, it's necessary to test the security situation in the built heritage and cultural assets, both from a procedural standpoint and the application of existing technology. To better assess the size and terms of the problem, we must remember that the buildings have always been subject to devastation by fire. The library of Alexandria, who was devoured by the flames, is one of many examples in the past, but also in times less remote wooden roofs of the basilicas of San Giovanni e San Paolo Fuori le Mura in Rome, were totally destroyed by fire. More recently still, we must remember the fires of the Petruzzelli theatre in Bari and of the La Fenice in Venice, the Duomo and the Palazzo Reale in Turin, the Royal Palace of Caserta, to mention only the most famous episodes. Unfortunately, the two theatres were completely destroyed and they no longer can play an important part of the historical heritage of those cities. A study sponsored by UNESCO, shows that in Italy 60% of the building patrimony has considerable historical importance and therefore deserves to be protected. The examples just cited make reflect on the extreme vulnerabilities to fires of buildings and groups of buildings of historical, artistic and cultural heritage, and the fact that in these cases it is of primary importance to take all possible preventive measures. The events reveal the difficulties encountered in these buildings to contain and control a fire because of the large quantity of combustible material present, considering also the damage caused by the same means use to extinguish the fire. Just think of the emblematic case of Venice, where the water of the lagoon, normally used by firemen in fire fighting operations, caused corrosion. On the other hand it is good to bring attention to the fact that, even at the institutional level, the need to protect the historical heritage is no longer just addressed to the buildings of major importance, but it is also aimed at the preservation of the urban environment from the smaller house building. The actual tendency aims to consider the disappearance of architectural evidences not less serious than events involving the major building patrimony. On the other hand there are examples of architecture in Italy that make the use of smaller urban spaces unique and singular and that characterize community and productive life. Just considering the many old towns that continue to be an obvious tourist attraction, with vital implications on the economy of entire areas. However, both in the cases of high national profile and local interest, the man can trace phenomena of loss of historical memory that, over the centuries, has been considered as inevitable but today it can be no longer passively accepted but must induce at least to a reflection on the problem. Indeed it is true that the historical buildings are particularly vulnerable to fire damage, their progressive loss cannot fit into the probabilistic assessment that is developed on the basis of data collected from past experiences. Expressing the terms of this issue is deliberately provocative, because it takes no account of the commitment that manages and professionals addresses the protection of existing assets on our territory. But if you analyze critical and recent events, it is highlighted a paradox in the procedural aspects of security, to focus on the artistic and architectural integrity of the property, it becomes less important, or overlooked, the fire control . Our country has the Law 1570/27.12.1941, the National Body of Fire which protects the life of the people and protect the property and the environment both natural and urban . Fire prevention has the task of preventing fires for all the building patrimony and therefore also the cultural and artistic heritage of buildings. The Ministerial Decree 16/02/1982 lists the activities that may risk to create a fire and are subject to a prior checking by examining the project and the release of the certificate of fire prevention following a visit. In this list it was explicitly stipulated that the buildings for fine art or history and those designed to include libraries, archives, museums, galleries and collections or objects of cultural interest, are still subject to oversight by the State under the RD 1564/07.11.1942, and therefore should be protected particularly. With the purpose of leaving to future generations the best part of our memory, the response was conditioned by two practical difficulties: the availability of security measures, in general only intended to protect new buildings, and the need to coordinate interventions shutdown without neglecting the protection and preservation of property. To establish that the actual knowledge are sufficient it's necessary to find out information that, in many cases, are not well known. To quantify the size of the phenomenon, it is considered a reliable to estimate that every day at least one building of particular historic or cultural value in the Community is damaged by fire. This is also why, despite the developments that the technique and science of fire have seen lately, there is not yet a common language to deal with this matter. Unlike all other branches of security, therefore, there must be defined more criteria to address specific issues of fire safety for cultural heritage. Among the most important there are: the assessment of the vulnerability of buildings to fire, the analysis of risk assessment, strategies for content protection, prevention measures against the spread of fires, training and information for staff responsible for monitoring . The designers are too often facing difficulties of a cultural and regulatory environment, and have to choose between not protecting well but keeping intact

the historic features, or to intervene in an invasive manner, by taking measures deemed necessary. In this context, even though Italy has done so for years to adopt regulations that set out the minimum measures to be taken in buildings protected, most of the problems remain and require a research effort and coordination among the experts.
The scarcity of resources available for research, which should be made available primarily from the countries most interested in the problem of conservation, requires strong international cooperation. For this reason, even though there are many research activities by individuals and industries, only in the exchange and international scientific cooperation is possible to recognize the real possibility of achieving concrete results. On these bases, especially abroad, the availability of the tools introduced in the study of fire safety engineering, has launched research initiatives that invest in both innovation in prevention and protection techniques for the assessment of risk. In Italy's cultural heritage building has about 3,500 museums, 100,000 churches, 18,500 libraries, including more than 20,000 castles, mansions and palaces of particular value, 900 theatres, countless archaeological sites and assets of environmental value. In addition, to consider fire risk, as mentioned earlier, it must take account historic centres, for which the risk increases due to 'high concentration of buildings and installations. As the experts agree that the preservation of heritage can only be based on integrated conservation, attributing that to the buildings appropriate function that preserves the good response to contemporary conditions of life and work, two needs arise between them in contrast . While on one hand, re-use modern standards leads to a worsening of the condition of risk (resulting in the largest influx of people, the use of combustible materials, the installation of a large number of installations) on the other hand there is a reluctance to increase the level of security due to the impact that they would have on the buildings. For the evaluation and design of fire safety, legislations recently introduced have been of considerable importance, such as obligations on the side of employers in the assessment of fire risk in accordance with the provisions in the DL 626/19.09.1994 as specified by the Ministerial Decree of 10.03.1998, and those of professionals for the activities subjected to fire prevention inspections, introduced by Presidential Decree 37/12.01.1998 and detailed in the Ministerial Decree 04.05.1998. The approach which leads to the performance of risk assessments is therefore an integral part of professional activity. A classification of the complex regulations that affect directly or indirectly the safety should be covered by the fire, the safety of the workplace and physical barriers, designed as structures to which disabled people may encounter risks. In these three areas of regulation it can be identified measures and action strategies designed to make acceptable the risk to which people are exposed in case of fire or other emergencies, the safety of products regulated by guidelines that are aimed at raising the level of security but rather to liberalize the movement of goods in European Union countries. Most of these rules have as their objective the protection of people, but they are as much main points for the guardianship is of the immovable good, since patrimony and belonging to the whole humanity. In the case of historic buildings, finally, he should remember the validity of the rules adopted for the protection of their conservation. Even from the strictly procedural point, it is noted that the

various regulatory areas mentioned are the different organs of control, each of whom shall be justified in the incomplete implementation of standards and the fulfilment of security requirements to be protected in accordance with the evaluation criteria acceptable risk.

3.0 The technical standards in fire prevention

The rule of the standardization in the activities of fire prevention was drawn since when agreement between the CNVVF and L'UNI has in some ways chosen the different roles that the technical standardization, and technical regulation, would have chosen in our Country. In that agreement was established the role that UNI, in collaboration with CNVVF would have written the necessary standardization not only for the realization of the components and the systems for the active protection but also for the construction and the evaluation of the basilar elements of the passive protection. Instead it was addressed to the responsibility of the public authority, CNVVF and its organs, the task to set the technical rules that are addressed to fix the minimum level of security to which all the activities on the national territories should have been confirmed. This way to proceed was than officially approved also at communitarian level from the laws CEE89106 and 89654 of the 1998. When we are talking about technical norms in the sector of fire prevention we have to introduce two concepts of relevant actuality: de directive on the products to built, introduces in Italy in 1994, and the Law 46/05.031990. These two standardizations have to be integrated in the field of fire prevention with distinct roles and functions. The Law 46/1990 is a fundamental step in the field of security of technological implants of buildings, and it was followed by a realization rule published with the D.P.R. 447/06.12.1991. This establishes the obligation to plan and realize the technological implants according to the "rule art". Moreover it establishes a direct connection between the application of the technical norms of building and the system of the UNI and CEI. In other words: the systems and the components built in agreement with the norms of UNI and CEI are 'ex lege' and to be considered made at "rule art". The D.P.R. 380/06.06.2001 parte II capo V has integrated the Law 46/90 since it says that 'the following implants are subjected to the application of the law whatever is there final use'. The state of the art of the technical standardization of the fire prevention, concerning the field of the active protection, is briefly summed up in the following paragraphs.

Technical standards for components and materials

As for the components and materials, which must meet certain special requirements in terms of resistance or reaction to fire, have been published over the years a number of technical rules by UNITA in collaboration with the CNVVF that are being or have been only partially replaced by European standards, harmonized or be on harmonization, since for all these products is in place since the publication of a European standard, the requirement for CE marking. Regarding the European standardization process for the system to be active at the time were published a significant number of harmonized rules among which the UNI EN 671-1/04.2003 and 671-2/04.2003 on reels and fire hydrants in the wall published since 1966, have only recently concluded the so-called period of coexistence, are operational in all respects including as regards the requirement of CE marking for products to them standardized.

Technical norms for implants and systems

Concerning the implants and systems for fire prevention, for the active protection, the state of the art is particularly evolved in the resent years reaching a good level beside some exceptions.

Hydrant networks: the UNI 10779/05.2002 establishes the hydrant networks in most of the uses and it is national norm that will stay also in the future.

Automatic sprinkler implants: the UNI 9489/04.1989, together with the UNI 9490/04.1989, establishes in our country the planning, the installation and the maintenance of the automatic systems rain. Before the end of this year they will be substituted by the UNI EN 12845/01.2005 on the sprinkler systems and there feedings.

Deluge implants: they are realized on the base of the American norms NFPA 15-water spray systems- although in line with the UNI 9489/04.1998 for the calculation of the pipelines and their installations.

Automatic detection implants: the UNI 9795/04.2005 deals with the fire prevention detection implants both with punctual and linear detectors.

Gas extinguisher automatic implants: the UNI 10877/04.2000, ISO 14520 gives the basis for the correct realization of the fire extinguishing systems that use chemical gas (halogenated hydrocarbons) and inert gas.

Foam implants: the norm NFPA 11, 11B and 16 deals with the different types of foam implants.

Powder automatic implants: the UNI EN 12416/09.2004 for the planning and installation.

Smoke and heat evacuation implants: the UNI 9494/04.1989 deals with the evacuation of natural smoke and heat, for buildings of one floor.

Aerosol implants: there doesn't exist any published standard not even in America.

Nebulized water implants, Water Mist: the American norm NFPA 750 and the European one of CEN.

4.0 The intervantion of active protection on the building patrimony

General criterions of fire prevention with detection implants

The fire prevention is an important subject for which many provisions are taken. The planning of a fire prevention system has to include automatic detection implants of a fixed type. Those are installed to detect the fire as fast as possible. For the planning, the installation and the use for these implants we refer to the UNI 9795/04.2005 CNVVF CPAI "Sistemi fissi automatici di rivelazione e di segnalazione manuale d'incendio". It defines the calculations of the numbers and the positioning of the detectors.

Sizing of the implants of fire detections

The sizing of the implants has to fulfill the following principals:

• Identification and selection of the area worth for control with the exclusion of toilets.
• Presence of conditioning implants with air velocity lower than 1m/s.

The protection of the environment is done with the installation of optical smoke detectors. In those area at risk and worthy of continues surveillance. In the offices, meeting rooms, warehouses and corridors the surveillance is made with the detectors for the ceiling. Fire detectors are not installed in unimportant areas like toilets, changing rooms and areas under surveillance with structures REI. The controlled areas are divided in sectors so that, after the intervention of a detector, it is possible to immediately identificate the area of interest. Each detector is meant as standing alone unit so that the localization is immediate. The detectors are gathered in groups to allow the interaction with the evacuation system for the command of the fire-stop gates. Their connection is set in closed loop. On the same line there are also manual detector buttons installed. The determination of the number of smoke detectors, and their positioning, has to keep in consideration:

- The height of the environment (lower than 6 meters)
- The shape of the ceiling
- The presents of false ceilings
- The distribution of the air for the human comfort
- The lack of aerosol emission zones sufficient to activate the automatic detection system.

In each room there has to be at least one detector. The detectors are not visible so they have to be indicated in a bright and visible way. The buttons have to be installed in positions easily accessible one meter from the ground. In the way that they can be reached by making a distance not longer than 40 meters. If there is an air-conditioning system there must be also a smoke detector inside the channels of air immission. The alarm system has to include also the signaling for the closing of the fire-stop shutters that are placed in the channels for the air transportation. They have to be activated in a autonomous way trough fuses. The collection of the signals has to be gathered for each floor.
The collection of signals must be cumulative for the plan or even part of it (zone). The number of smoke detectors should be chosen such that it does not exceed the limits of the specific protected (Amax) as a function of the height of the space of surveillance, the surface and the possible inclination of the ceiling. The maximum area of monitoring of each detector, for places with ceiling height of not more than 6 meters and a surface area below 80 square meters, is fixed at no more than 60 square meters. Smoke detectors, designed to protect those areas, have not be invested directly by the flow of air from an air-conditioning and ventilation. In the evaluation of the maximum protected in fake ceilings and subfloor type, which are not considered a vehicle for the conditioning, you apply a factor of 2 that may increases in cases they have an height of less than 1 meter, while for higher spaces, the number of detectors will be calculated as for the local municipalities. In rooms with emerging beamed ceilings, the detectors

must be installed depending on the height of the space and the thickness of the beam emerging. Where these facilities or other elements such as cations or conduits protrude less than 150 mm from the ceiling this can be considered as a plan.
If the protruding, dividing the ceiling panels, and detectors are placed on the ceiling, as required, they must be installed inside of the panes if the area is greater than 0.6 times of the maximum area protected. In ares of particular value for the presence of frescoes and paintings or in long corridors or in the vast halls there must be provides smoke linear detectors, that, waiting for the EN 54-12 / 10.2003, which governs the possible installation according to UNI 9795/04.2005, must be installed as specified by the manufacturer, to achieve the realization of the plant to perfection. The detection system should be equipped with two power sources of electricity, a primary and one secondary, each of which alone can ensure the functionality of the system and other equipment necessary for the proper and safe operation of the entire building. The primary feeding is made up by the primary network and the secondary feeding consists of the power supply to serve the central-processing and buffer batteries. The secondary supply must be capable of ensuring the proper functioning of the entire system continuously for at least 24 hours and the simultaneous operation of the warning alarm inside and outside for at least 30 minutes starting from the issuance of the alarms themselves. The connections of the central control and monitoring with external alarm detectors must be made with the fire resistant cables in accordance with the CEI 20-36. The cables to connect the central control and alarm management, must be of flame retardant and low emission of toxic substances (CEI 20-22) with a cross section of not less than 0.5 sq. mm. The laying of the cables must be carried in pipes, gutters and visible and / or not depending on the destination of the, with the corresponding junction boxes and junction, all in accordance with IEC 64-8.1 ÷ 7. The locations of particular value may arise with visible wires that therefore need to appropriately adapted to the environment. Each operative system shall be subject to inspection for at least 2 times a year, in order to check the status of efficiency, at intervals not exceeding 5 months. It should be noted that in culturally and historically significant buildings, it often occurs that the compliance to a rule can be difficult to enforce and, in some cases, may even effect the features of the building. It will therefore be necessary to assess case by case how it must be realized the distribution network of cables that are visible or not.

Linear detector

Linear detectors, to be used in buildings for fine art and history, where you can not install the Point detectors can be both analogue and interactive and are able to detect an out breaking fire or a false alarm. The logical addressing allows you to associate with each detector a surveillance zone, thus it allows to obtain a timely detection and not a false alarms. The operating principle of the detector is based only on the absorption of light radiation and should be equally sensitive to all kinds of smoke visible, particularly those produced by fires standard TF1, TF2 TF3, TF4 and TF5 in accordance with EN 54 . The detector, controlled by a microprocessor, has the ability to keep in a non-volatile memory information with different characteristic responses for specific applications and it's driven by predetermined parameters for the various applications. The response of the detectors is determined by a set of algorithms stored on the sensitive. Detection algorithms are designed to suppress spurious transient disturbances and other phenomena without reducing the ability to detect real fires. The detector is able to compensate for weak signal changes caused by dirt present on the lid, filter and the reflector, in order not to change the sensitivity over time. It's possible to transfer all the data related to the detector, including environmental conditions, on the PC for further evaluation. The detector, equipped with an indicator of response, has the chance to drive a remote indicator, to indicate the alarm conditions and provide service information. The detector keeps the transmitter and receiver in the same container. The reflection of the radius of detection is made via a suitable reflector installed at the opposite end of the field of detection. The reflector requires no electrical wiring. The field of application is between 5 and 100 meters, mediate the use of appropriate accessories. The reflector is designed so that any vibrations and distortions up to 20 degrees from perpendicular to the axis, are not due to deviations from the proper functioning of the detector. The detector length shall be protected against electromagnetic interference according to IEC 801-3 for values up to 50 V / m from 1 MHz to 1 GHz

Radio detectors

In recent years the technique of fire detection, in addition to integrated developing technology, is making smoke detectors more and more intelligence. It has developed the system for transmitting information via radio so that you can use devices without electrical conductors, which not require wiring, and relay the information to a receiver connected to the interactive loop of fire detection. This type of detector is particularly suitable in environments where it is impossible to perform masonry work and to realize the distribution network of electric cables, and where the physical characteristics do not allow 's installation of linear detectors. The detector is anyway an addressing kind of sensor. Commands and signals are transmitted in both directions between the detector and receiver. The receiver is able to talk via radio with a maximum of 30 detectors, and its range can be between 40 and 200 m. Keep in mind however that in the ancient buildings are of consistent thickness, so the radius of action, which allows you to place the receiver close to the smoke detector, is widely reduced and should be assessed case by case. The detection system operates in radio band SRB from 868 to 870 MHz, a frequency range with the highest reliability for operation and transmission.

Automatic plant shutdown

The protection of the premises of particular value in nature or content require active protection system that intervenes to protect the structures, either because required by law, when the fire load exceeds 50 kg/sqm, is through design. With this objective, to avoid producing by normal means extinguishing greater damage than that occurring with fire extinguishing systems are used with gas or water spray (Water Mist). This type plant is divided by type of gas that is used, then you can have gas-acting chemicals (FCs and HFCs) and gas physical action, also known as inert gases (argon, nitrogen or mixtures of the two).

Gas Chemical Plant

The chemical gases exert a catalytic activity against free radicals and prevent the fire burning to evolve. In addition to this form of action against the fire and the FC HFC also perform a choking action against the fire, preventing contact between fuel and oxidizer with displacement of air next to the hearth. Also lower the system temperature below the ignition temperature. A system of extinguishing this type is called a saturation environment. Contraindication to the use of these gases, given by the temporal limitation to their use, has failed with the coming into force of Law 179/31.07.2002 which repealed Article 3 of Law In the 549/28.12.1993 that limit their use to 31.12.2008. So, even after this date will be possible to use these gases for both refills of existing facilities, which for the creation of new ones. One possible factor limiting the use of these gases is due to the formation of secondary products due to high temperatures that could damage the property to be protected.

Physical gas installations

This category includes gas extinguishing all the inert gases, whose operating principle is to extinguish the fire by suffocation. In fact, the normal oxygen concentration in the environment is approximately 21%, and most of the fire is extinguished when the oxygen concentration in the drops to a value of less than 15%. The inert phase discharge extinguished the fire by reducing the oxygen concentration in the residue to a value of about 12.5%, parameter for human life tolerable for short periods without causing asphyxiation. The aggregates are suitable for use in automatic shutdown, provided that the discharge of 95% of the gas takes place in a time of 60 seconds, with time delay to allow users to leave the premises in order to avoid adverse effects on 'man. These gases do not damage materials, leave no residue electrically conductive and environmentally friendly with parameters of GWP and ODP virtually nil.

Water Mist System

The finding that the water sprayed into fine particles, less than 100 microns in size, had an excellent extinguishing power dates from the thirties of last century. These micro particles, evaporating, absorb a considerable amount of heat from causing a reduction of combustion temperature, oxygen concentration and density of smoke, thus making them less harmful. Only in recent years has developed this technology to be used successfully within the first vessel and then within the building. Water-Mist Systems today use high-pressure gas with carrier fluid water and the spray nozzles inside, activated by breaking a phial in analogy with what happens to the sprinkler. The Water-Mist system uses a very limited quantity of water, about 0.1 litres per m3 of volume to be protected, the cast does not produce damage to people trying to evacuate the premises, is competent to protect both local and large areas (extinction procured from the water), that small, local, also used as data centres or containing telecommunications equipment (quench gas carrier). The small amount of water used with this system greatly reduces the damage to furnishings and equipment in the rooms. These facilities, thanks to the reduced diameter of the pipe and the capacity of the tanks contained water enough to think that 2,000 litres of water are sufficient to protect an entire building, are having considerable success especially for the protection of buildings for museums, buildings historical archives and hotels. Businesses are moving their research in this technology offering continuous and exciting innovations like the nozzles automatically opening, returning to its home position at power off events, mixing pumps capable of ensuring its long range of low and barriers of fog to prevent the spread of smoke between the different environments. With traditional systems, since the hydrant until the sprinklers, water is used with an efficiency of a few percent. Indeed, if we consider as a percentage, the efficiency of water use with a hydrant it reaches the rate of 3% and 97% of water is not useful from the standpoint of fire hazards and can also cause additional damage . With the water mist systems is achieved efficiencies of 40 ÷ 60%, with 60 ÷ 40% of water flowing away without performing any action but also fire without causing additional damage. The system is called Water Mist by NFPA 750/96 at 913 and IMO A800, A 668 and FM standards for "Light Hazards," which to date are the only standards available on the subject. The system places an upper limit on the size of droplets produced, which must be equal to the weighted average of the size of the drops themselves, and also provides a method to draw the curve represents the distribution of droplet size. In fact the diagram inside the droplet size, which allows a system to classify as Water Mist, and therefore drops substantially all less than 1000 µm, there is a further distinction between systems of class I, II or III characterized turn by a droplet size below 200, respectively, 400 and 1000 microns. Water Mist Systems Class I are most effective in the fires of class B, while the systems to larger droplets, class III are able to control the fires of class A, essentially for the effect of wetting that is more effective with ' increase the size of the droplets. The relationship between the size of the drops and the capacity to control the fire is not as straightforward as many other factors influence the effectiveness of the control, not least the nature of the environment, time and modalities of intervention. This system also relies on the use of a special nozzle that produces a Water Mist spray that meets the definition of the Water Mist, or that meets a specific testing protocol, regardless of the size of the drops, but considering the system's ability to comply than required by the Protocol, and therefore able to perform the action for which the fire extinguishing system was conceived. Therefore also the nozzles that generate droplets larger than 1 mm in diameter can be classified as a Water Mist Nozzle, provided they meet the conditions imposed by the system. The extinction with water mist systems produce water spray in micro drops and exercises on the fire extinguishing action resulting from the combination of three main effects:

- Action Cooling water particles due to their size are subject to rapid evaporation and the consequent removal of a large amount of heat;
- Action for inerting: the water steam generated by evaporation of water during the high temperatures associated with fire and its smoke, it behaves like a true inert gas

that occupies a volume hundreds of times higher than that water shutoff, participates in the control and suppression of fire;

- Action Screen: the particles of water spray, being able to absorb the radiant heat given off by the fire, markedly reduce the likelihood that the materials located in the vicinity of the flame can reach their ignition temperature, thus participating in the fire. This phase of the fire is very important because the combustible material present, although not directly employed by the flame, which is subject to heat radiated, it predisposes to combustion and thus reaches the temperature of ignition, it burns very quickly.

This effect, typically amplifying in the presence of large quantities of combustible materials, causing a large fire. Thus blocking the effect of radiant heat reduces the rate of spread. The water mist systems are the only ones able to combine the effects described in a unique phenomenon which is the off mode in which they operate. Water Mist systems are divided into two categories, namely those similar to sprinkler systems, and those who have nothing in common with them. The first systems used primarily in the marine sector, are based on the criterion of the flood, that is activated by an impulse that causes the download, and consist of a number of cylinders or containers and containers in general which contain water, and a number of cylinders that contain the agent, usually nitrogen, which is designed to pressurize and activate the download. The facilities include sprinkler type plant where the spout is closed by a fusible, typical form of standards related to production technology, which has become operational to attain a predetermined temperature, a distribution system and pumps. This plant comes in fact represent a real sprinkler system, except that the pipes have a diameter smaller. The methods of water supply with water mist systems can be applied to office, when the nozzles are distributed in a specific way around the right to be protected, a saturated environment, where the payment covers the whole of volume to be protected and for application to areas where the payment occurs only in the area affected by the fire. The nozzles used are designed to meet the particular conditions under which the system will have to operate in case of fire, in particular, their choice depends on the type of fire load, the size of local plant and its height. Based on these parameters are determined: the angle of spray, the nozzle flow and the number of holes delivery. The characteristics of the regulator are indicated with a code that is stamped on the nozzle itself. The nozzles used may be of open or closed type with bulb fuse, which is also the function of fire detectors. In the latter case, the nozzles are actuated with the breaking of the bulb temperature sensitive when the temperature reaches the calibration set at 57 ° C. Using nozzles closed, the piping installation, in terms of inactivity of the same, are filled with water (or other fluid) maintained at a pressure of about 15 bar. Upon activation of one or more nozzles, piping occurs resulting in a decrease of pressure that is detected by a pressure switch and / or flow switch. The latter sends a signal control equipment that results in the activation of the pressurization (consisting of a cylinder group or a pumping station), resulting in water supply pressure of the project. Using nozzles opened fire detection is performed instead using conventional detection systems that, if exposed to fire, sending a signal to the central revelation which is planned to handle the task of the pressurization and then power off. The design of equipment to provide water spray can also resort to the use of lines off Unsorted allowing the download to target only the volume affected by the outbreak of fire, and then make it possible to protect multiple environments using a central cylinder or pump features much smaller.

Concluding Remarks

The market has produced various types of equipment and technologies that enable the protection of buildings of special artistic and historical interest in a targeted manner compatible with the needs of individual building or even the individual environment, and content to be protected. Will be the designer with his sensitivity and knowledge of the sites to decide how and by what means to protect the buildings in question. It 'still advisable to carry out the installations, both automatic detection of fire that shut down automatically by companies in the industry and empowered with proven and documented experience. Furthermore, the designer must tell the client the need for scheduled maintenance at least every six months, but according to the data producers, however by following the producers, and following the rule of art.

Notes

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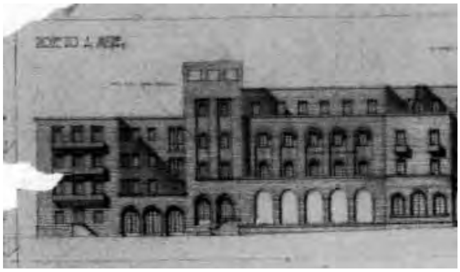
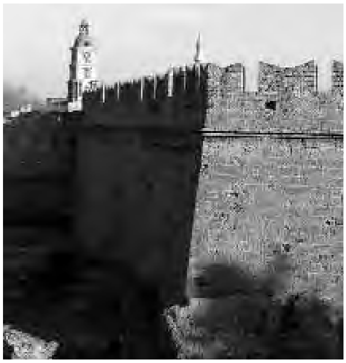




Figg. 1, 2 - View of "Hotel of roses" in Rhodes. First built in colonial style under Lago's governatorate, with exotic and oriental style elements, then "purified" in shapes and language under the governatorate of De Vecchi

Fig. 3 - Historical view of the rural village called "Savona". In front there is the civic centre and the church, on the side of the road between Rhodes town and Lindos. On the back it is evident the alignment of the rural houses along the main road

Figg. 4,5 - View of the Justice Palace (on the left) and a part of the ancient stone walls of the old town (XVI century). Thanks to the reference to the "Knights" medieval period, the use of stone became one of the instruments to express bigness and monumentality

G. L. Pietra [1], C. Turelli [2], I. Delsante [3]

HOUSING AND SUSTAINABLE ARCHITECTURE: THE ITALIAN RESIDENTIAL ARCHITECTURE IN DODECANESE (GREECE)

1.0 The "Italian" architecture in the Dodecanese

Even if the Italian presence in the Dodecanese islands lasted from 1912 to 1943, just from 1923 it started the realization of important urban plans and architectures.

The architectural and urban planning developments were held along all the territories, but the most meaningful realizations were those built in the island of Kos, Leros and Rhodes, Taking into consideration the architectural activities, it is to distinguish two different periods, respectively linked to the Governors: from 1923 to 1936 with Mario Lago, and from 1936 to 1943 with Cesare Maria De Vecchi.

Both historical references and built architectures generally show the deeply different approach of the two governors towards architectural issues. So Lago, thanks to the starting of many civil works and urban transformations, made possible the try for an harmonization with local tradition and vernacular architectural styles. On the other hand De Vecchi went on with the intense building activities but imposed a style, the reference for Fascism, to maintain recognizable the "Italian" references also in architecture.

1.1 Architectural composition and language features in architecture

"Italian" architectures in Dodecanese have very particular features. Even if some of them seems to be referred to other colonial architectures in Libia and Somalia, others show specific and non secondary issues.

This circumstance is probably due to the high quality of works made by architects as Florestano Di Fausto, Armando Bernabiti, Rodolfo Petracco and Pietro Lombardi. Each of them has his own specific experience and professional growth, built through many architectures, dealing with typologies, building techniques, and architectural language in general. The result is somehow evident in some buildings as far as in the urban projects and waterfronts, as in Rhodes and Kos. Also the town of Portolago, on Leros' island, is a remarkable example as the only town of new foundation in the Dodecanese.

The language of Italian buildings, even if influenced by vernacular architecture and local traditions, seems sometimes referred to the modern style contemporary developing in Europe and Italy. It deals with pure volumes and stereometric shapes, white or light colou-

red, sharply perceived in the strong light of the place.
Some other times the design approach brings not to a clear definition of the volumes, but to the sense of decoration and other various influences. It seems to show the will for a language of synthesis between existing architectures and the suggestions from the Turkish heritage, interpreted as both oriental and Muslim culture.
The most various and complex results of the Italian presence in the Dodecanese is for sure that on the island of Rhodes, and of the homonymous town. It was first interested by planning for infrastructures and civil works, public functions buildings and administrative ones. Then followed the realization of various kind of housing, even social and rural, this last ones spread in some villages around the island. This circumstance was for sure be positively influenced by the geographical and morphological features of the territory, with is extension for more than 70 Kms, with large plane areas looking forward the possibility of agricultural use.
Taking into consideration the rural villages, both realized or not, in both cases mainly designed by Bernabiti or Petracco, the one called "Savona", placed in Colimbia, is the only one never completely abandoned after the departure of the italians, also for its lucky placing on a large area useful for agricolture, between the valley of a temporary river and a rock promontory.

2.0 Materials and building techniques

The context in which the architectures of the Italian period were built is very particular for what regards the building techniques. On one side there were the past realizations and buildings of high cultural and expressive value. On the other there was the large amount of buildings with poor architectural and technical values, partially due to the progressive decadence of the island, that became more and more meaningful during the Turkish occupation.
The Italian presence introduced a great innovation for building techniques: for the first time was used on the island the reinforced concrete, that in a certain was linked to the renewed use of local stones. This last material was used also keeping into consideration the traditional techniques, in particular for the poorest buildings.
This last circumstance is evident also in the first years of the governatorate, even if the financial resources were even more. The use of materials took into consideration the amount of resources and in particular of different kind of stones, with different variation of colours in relationship with the provenience from island's caves.
After the economical restrictions and consequently the autarchy measures, the use of natural stone was reduced and substituted by more economical kind of techniques.
The building techniques and the materials used by the Italians in the Dodecanese islands were:
- Natural stone in blocks or in slabs as covering;
- Artificial stone in tiles with mixture of cement and dust of local stone
- The "false" stone as plaster of mortar and dust of stone as imitation of blocks. The result is reached also with incision of geometrical traces
- Wood floors and brick floors with concrete
- Bricks (in Iannadi there was a kiln that, thanks to the features of local clay, made bricks

with light colour)
- Structures in concrete.

Under the De Vecchi governatorate the local stone was identified as the symbolic element of the "italian" architecture in Rhodes. This decision was for sure influenced by the strong and massive presence of the old town's medieval walls: part of the old town was in fact "restored", as the castle.

The reference to the monumentality of the past periods, often re-interpreted in relationship to poor plan traces, was functional to the introduction of the so called "fascist" style. It was characterized by the will of a clear reference to the monumentality of the past ages, in particular the roman ones, and applied mostly in the administrative buildings of Dodecanese and Rhodes town[4].

Taking into consideration this circumstance, it is to underline that, just referring to the island of Rhodes the stone caves of Villanova (Paradissi), Coschinou, Calithea and Lindos were used. The stone of Lindos, in particular, has a strong colour with red and yellow colours. It has been successfully used to built the Prefecture palace in Rhodes town.

The forced autarchy, with of lack of materials and economic capacities, it was a consequence of the sanctions to Italy from the Society of Nations. So the use of natural stone blocks was gradually substituted by slabs of stone, then with artificial stone and even with "false" stone, without giving up the will for buildings as monumental architecture. Starting from the cultural context of the time, it was not considered the coherence between the architectural language and building techniques.

The strong materiality expressed by stone was represented in a scenographic way: the real nature of "stone blocks" is revealed only with very close view, and it can become as covering with slabs of natural stone, or even as plaster in "false" stone[5].

3.0 Detached residential buildings

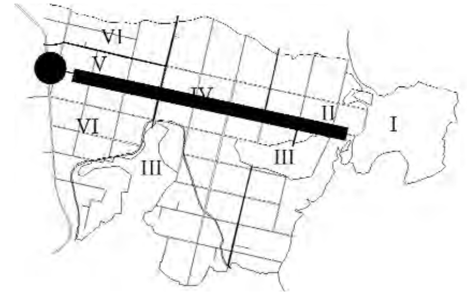
The most spread and then most representative among classes of residential buildings is the one intended for workers and farmers. For this reason the research identifies and develops its study cases in this field. The range of employed materials is basically not so different from the one previously described for public functions and administrative buildings, except for less accuracy in building techniques, as concerns both Italians made buildings, both existing ones, or erected by locals during the Italian governatorate, as well as in recent buildings up to nowadays. Traditional detached building typologies are quite various, as reported in "Aegean Mediterranean architectures" [6], which can be considered the most detailed study related to that period. Prevailing island house typology up to the end of the XIX century has a floor plan that deals with its basic main area: almost squared, with services addicted out of any scheme as "secondary rooms", including the kitchen, the stove and the stable. Sometime we can recognize in a floor plan a neater L development, while sometime, as in a variation of the previous building typologies, we can recognize patio solutions, also obtained by the L, with the closing of the hedge walls of the lot. The employed materials are mostly stone, clay, lime and wood. Housing follow isotopic lines, prefer heliothermic orientation and deal with the surroundings by proportions and volumes.

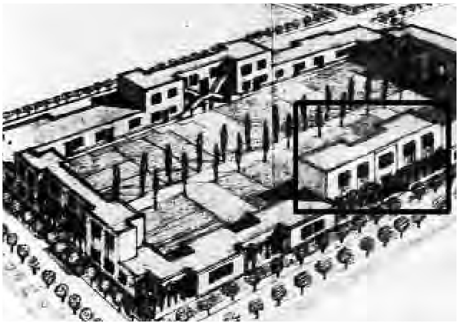
Detached residential buildings designed by Italians in Rhodes, which volumetric composi-

tion appears closer to local traditions, are certainly located in rural areas and especially in the "Savona" rural village in Colimbia. In the settlement structure, public funcions are located in proximity to the connection road to Rhodes, while inside, almost in the middle of the plain, the tree-line avenue runs and orders the landscape settlement rule, as a centuriation, to which colonial houses face: *"without representative ambitions, [...] (in which) the mediterranean component is prevalent. [...] The projects provide for different typologies, as variations on the same main theme. This is get with different position of pergolas, the exterior stairway or the chimney pots. The buildings refer to the vernacular kind of houses, that fit the local exigencies concerning climate, and protect against hot, cold and strong winds. The building techniques and some structural features, as small windows dimensions, white plastered walls of stones or pergolas, refers to Florestano di Fausto's indications for type-projects committed by the Libia's government in 1934"* [7].
Secondary elements standing next to the main volumes, such as the chimneys, the railings of balconies and terraces, are made by different techniques, often with concrete and stone dust tiles. Raised in shortage of available resources, houses are built with local materials; reinforced concrete is mainly employed for multiple housing and solely for structural frames. Due to an almost rough workmanship, reinforced concrete design is often bended to constructional reasons and concrete structural elements are retained in shuttering-walls made of binder and stones, also built on the site of assemblage.
In Colimbia remains a sole example of house that maintains an agrarian destination, and keeps unaltered the typological setting. Some are unemployed, others has been radically modified in the morphological type and in constituent-linguistic aspects, to be adapted to existing housings, and others has been re-adjusted for new purposes, in most cases touristic ones, with changes in the internal distribution as well as with volume extensions. Compared to the original project, the more visible variances consist in the absence of pergolas, in the replacement of doors, windows and shutters, volume extensions and in the addiction of technological elements such as panel heating for warming water.

4.0 Houses in multilevel buildings in the city of Rhodes

The variety of residential building typologies in Rhodes is complex, considering the needs of the different social classes included in the governatorate staff. Many buildings, in particular two-storey buildings designed by outstanding planners, retained the housing disposition and have been carefully maintained in order to preserve the original features.
Council houses, assigned at that time to poor people, were various and located on the outskirts of the city centre. They were designed by public technical offices, frequently recovering general layouts from previous experiences, or sometimes drawing from model plans realized in Italy or in colonies. After Italians leaving, these buildings have been occupied by Greeks with similar living conditions. Having chosen one of these examples, both for meaningful and presence on the territory, allow to verify the suitability of the design with the local climate, by a typological point of view, as well as by technological-structural point of view, also noting possible volumetric changes. Finally, the modest architectonical language of buildings can better absorb interventions launched to sustainability. The target is to improve thermal comfort through the implementation of bioclimatic design concepts,

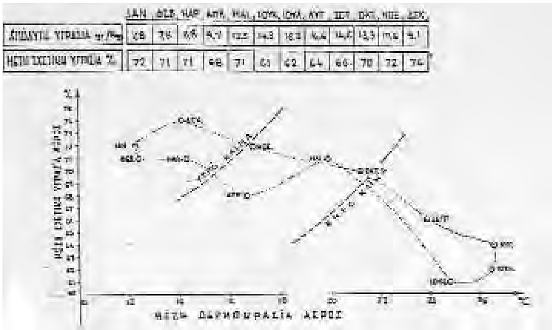


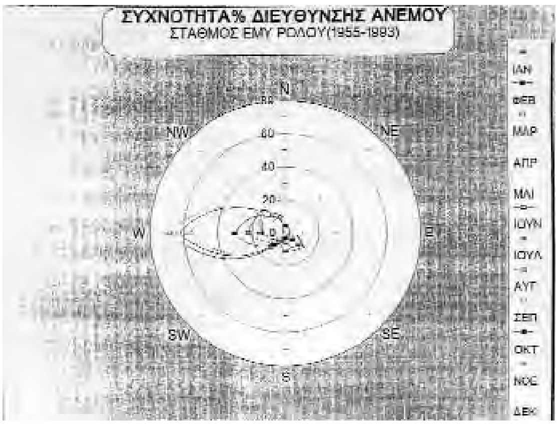


Figg. 6,7 - Roads and land alignments. The rural division designed is still evident. The point indicates the civic center with the center. The line indicates the avenue with trees (on the left). Façade of the rural house in Colimbia (on the right)

Figg. 8,9 - Two different rural houses in Colimbia nowadays. In some cases they have kept the exterior architectural features, even if sometimes they are used just at the ground level as housing, instead of original destination to storehouse (on the left). In some other cases a big volume is added on the back (on the right): the two floor are used independently for housing

Figg. 10,11 - Two examples of social housing complexes still present in Rhodes town (on the left, an historical photo): building case study in evidenceon the right figure





Figg. 12,13 (top) - Social housing close to the stadium in Rhodes town. Façade on the street, with some light modifications in comparison with the original project (on the left); view of the inner courtyard, with pergola, volumetric variations and other more recent changes (on the right)
Fig. 14 (centre) - Relationship between temperature (abscissa) and humidity
Fig. 15 (below) - Wind bounds and intensity in the different months

saving the thermal performance of buildings and increasing interest in renewable energy sources. The selected case concerns a double level building complex, placed around a great rectangular courtyard. The plan layout is taken from patterns tested by INCIS: (Istituto Nazionale Case per Impiegati dello Stato) it admitted just little changes to the architectural composition, with some variations on central or lateral facades. At first floor, separate entrances, through different lateral or street front stairs, guarantee the independence of each apartment, composed by two/four rooms and services. During the years, the block passed through deep changes, such as demolition and re-construction of whole parts of the buildings, renovations that modified radically the original plan. In spite of these changes, the typological setting of that period is still visible in some sections and the poor constituent-linguistic aspects can still be quite clearly noticed, although with some variations: addition of objects above the openings; additional volumes and addictions at ground level; sun-screens, pergolas and glass volumes on balconies on the upper level.

5.0 Meaningful features of local climate

The Dodecanese archipelago is set along the coast of Turkey. Even if the etymology refers to twelve islands, there are much more. These islands have a Mediterranean climate, with hot and dry summers and mild winters. This climate can be defined subtropical with dry summer, and classified as Cs in the Köppen system[8]. A research from University of Athens[9], found some interesting climate parameters for Rhodes:

- wind speed (and in particular the high valued of the June – September period, with an average speed of 9,3 m/s);
- cloudiness (with very low values in Rhodes as 0,9/10[10] in the summer period);
- sun exposure (year average of 3041 h/year).

It is important also to underline as the compass-card shows that the “meltemi” wind is west-bound in the months of June, July and August.

6.0 Sustainable solutions and renewable sources

The optimisation of micro-climate into housing building, with hot and dry summers and mild winters of Dodecanese, can be achieved in different ways. The main use of active captation with machines (actually often with solar panels) has just partially solved the comfort problems; much effectively the results can be reached with passive systems, to take advantage from temperature differences, thermal inertia, winds and breezes, sun exposure and shading.

Data from Hellenic National Meteorogical Service, Direction of Climatology, make evidence of persistent wind and low cloudiness in Dodecanese and in particular in Rhodes island. These conditions bring to consider solar energy and wind as factors of strategically importance for architectural design, both in new buildings and recovery interventions, even in case of up keeping. A partial confirmation of this evidence is set into the sun and wind orientation of local vernacular architectures.

Whenever the “Italian” intervention followed these indications, for example in most simple buildings, late modifications and changes are measured, limited to satisfy particular or new exigencies.

Other situations show more changes and in general a less respectful approach. Variations in architectural features sometime contributed also to worse the internal comfort; this situation may have encouraged the need for comfort-control machine, with consequent increasing of energy consumption. Following the climate data and the information collected, some indications can be given, in particular for what concerns passive techniques:
- natural day-time ventilation, along the direction of Meltemi; and night ventilation based both on wind and chimney effect for thermal range;
- solar control and shading through variable shield systems of windows; pergola to reduce let possibilities for winter captation;
- evaluation of materials' thermal inertia, in relationship with their inner features and the dimensions of construction elements. This is useful to get a correct captation and release of energy with opposite tendency to daylight thermal range;
- openings orientation to increase direct solar captation;
- heat insulation to contain loss of heat;
- opening position to increase natural ventilation.;

For what concerns active techniques for renewable energy captation, mainly the reference are: thermal with sun, photovoltaic, wind energy. Some more indications can be given, taking into consideration that the research is referred to existing buildings with well defined architectural and morphological features, even of historical value, as follow:
- to respect the original architectural composition and language features, with adequate architectural solutions;
- to comply with the use changes of spaces;
- to evaluate the real need of consequent volume changes, making them readable with different materials and/or colours;
- to complete each kind of intervention with a double kind of evaluation: the first concerning the adequacy to architectural features, the second in terms of effectiveness of environmental features[11].

7.0 Application and case studies

The indications given have the aim to improve comfort into housing, thanks to architectural oriented solutions. These last have to preserve original architectural features, even in respect of new exigencies and use variations.

It is difficult to propose, anachronistically, that rural housing in Colimbia should still be used for agricultural uses. It has to be taken into consideration both the turistic development with its risks, in terms of exploitation of land resources and architectural heritage. The aim is not to oppose indiscriminately to the most recent tendencies, but to guide as much as possible the new use of land and architectures, in respect to environmental issues and architectural values.

Starting form this point of view, some situations are definitively compromised for many reasons: uses too much different from the original ones, internal distribution radically changed, massive interventions in term of maintenance or restyling that have modified and cancelled the previous architectural language and composition features.

Taking into consideration these cases, it is difficult to propose or impose kind of solutions to restore original architectural values, definitely lost. It has to be underlined as the responsibility is both in charge of private activities and public administrations that should have preserved the architectural heritage.
After all, some kind of interventions can be proposed, for that cases in which it is important to preserve the architectural features and the environmental values, as follow:
Rural village of Colimbia
- heat insulation of walls and roof;
- restore / re proposal of pergolas;;
- use of natural ventilation;
- placing of technological elements of active captation in designed and different place from building.

Social housing in Rhodes town
- brise soleil for openings and windows, architectural volumes between indoor and outdoor;
- use of natural ventilation;
- placing of technological elements of active captation to be designed, both integrated or separated from the existing building.

Notes

1. Gian Luigi Pietra, Full professor in Technical Architecture, Department of Building and Territorial Engineering, University of Pavia
2. Chiara Turelli, Master Degree in Building Engineering / Architecture at University of Pavia.
3. Ioanni Delsante, Ph.D. Building Engineering – Architecture and Post-Doctoral grant holder at University of Pavia.
4. "The use of local stone would have contributed to make buildings magnificient, impressive, durable, as marble was for those of the ancient Rome. […] the use of more durable materials, as marbles and stones, of traditional techniques, of impressive structural walls, belong to the myth of a pure monumentality, without economical or functional problems, destined to last for centuries" (L. Patetta, La monumentalità nell'architettura moderna, Milano, 1982, p.31).
5. The "technical dossier for the execution of works in representace of the Italian Governatorate of the Aegean Islands" describes the details of construction techniques.
6. Fasolo Furio, "Architetture mediterranee egee" disegnate da F.F. architetto, Roma Danesi s.d. (1943)
7. Simona Martinoli, "La vocazione delle isole: agricoltura o turismo?", in Simona Martinoli, Eliana Perotti (1999)
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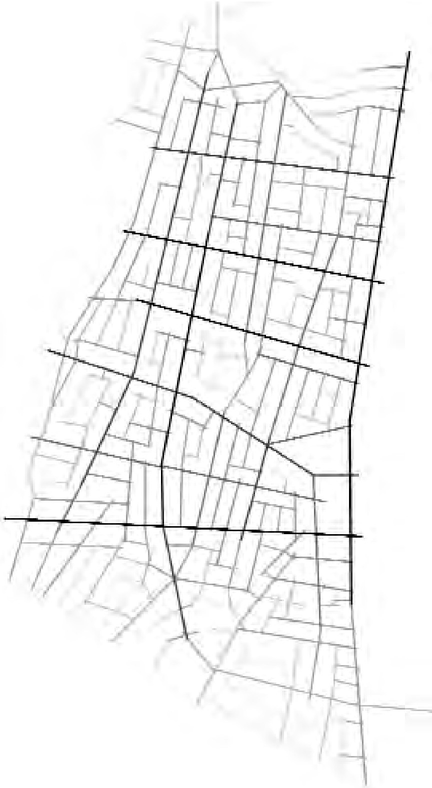
9. Santamouris M., Asimakopolous D., a cura di, Passive Cooling of Buildings, James & James, Londra, 1996
10. This value is expressed in decimal fraction of covered sky. It refers to summer period. This method provides for: taking into consideration the difference between covered sky (cloudiness) and clear conditions; measure the daylight hours of cloudiness into a certain period; define a fraction between the measured cloudiness time and the total amount of daylight time.
11. The proposal of evaluation takes into consideration both the architectural values and the environmental ones. Concerning the architectural values, it can take into consideration the typological and morphological conditions, the respect for original language, the general coherence of the interventions, the adequacy of the project to the context and to the architecture. For what concerns the environmental issues, it can take into consideration the link between exigencies and specific solutions, the innovation in technologies, the relationship between cost and effectiveness.



Top-left: The Geddes Plan Structure (R. Rappoport and H. Schwartz)
Top-right: Integration analysis of Pre-Geddes Tel-Aviv (Y. Rofè)
Bottom: Geddes Plan integration analysis (Y. Rofè)

Y. Rofè [1], H. Schwartz [2]

VISION, IMPLEMENTATION AND EVOLUTION OF PATRICK GEDDES' URBAN BLOCK IN TEL AVIV

Tel Aviv is an assemblage of past and recent urban utopias, constrained by local conditions, scaled down and transformed, but still identifiable and influential. Partly "collision city" and partly "collage city" – in Colin Rowe's terms[3] – its growth, while chronologically continuous, resulted in a fragmented pattern; each neighbourhood reflecting the urban ideal and historical conditions under which it came into being.
This paper seeks to understand the secret of Tel Aviv's "white city". An area planned by Patrick Geddes in 1925, and built mainly in the 1930's and 40' at a density much higher and in a style different than envisaged by its planner: modern architecture. Today it is still the dynamic centre of the metropolitan area that grew around it, and yet it continues to be a sought after residential location as well. A large part of it has been recently declared by UNESCO a world heritage site. We propose that the key aspect of the Geddes plan was his unique interpretation of the "urban block". This is shown through an analysis and critical appraisal of Geddes' conception, its ideological, morphological and programmatic aspects and the process that generated a juxtaposition of intensive city life with the qualities of a residential environment.

1.0 Background to the Plan

Tel Aviv originated as a new town, an extra-muros extension to the ancient port of Jaffa, and grew up to the mid-twenties by an aggregative process without any urban strategy or plan. However, two of the first neighbourhoods, Neve Tzedek and Ahuzat Bait, were outstanding in their planning as well as social goals.
Neve Tzedek (The Hippodamic Grid) was established as a Jewish cooperative in 1887 with an orthogonal disposition of streets 6 meters wide and two storied houses built as a continuous mass on the street line. No hierarchy existed, except for the allocation of larger plots at the edges. It was a blend of western influences in urban layout and local architectural typologies.
The foundation of Ahuzat Bait (The Garden Suburb) in 1909 marked both the beginning of Tel Aviv as an autonomous urban entity and the first attempt of implementation of the garden suburb concept in Israel. It is based on an orthogonal grid around a main axis

which leads to the main civic monument of the time: the first Hebrew Gymnasium in Palestine, a landmark of orientalist architecture. Crossing this axis was a public garden designed as a boulevard, and which was later extended to become Rothschild Blvd. (see below). The building code imposed setbacks from the street line and lot lines and limitations on height and land coverage, enabling one or two storied houses, surrounded by gardens. The architectural spirit of the houses was neo-classical, with orientalist touches. A number of privately sponsored developments followed and fourteen years after its foundation Tel Aviv had evolved into a burgeoning town of 30,000 inhabitants.

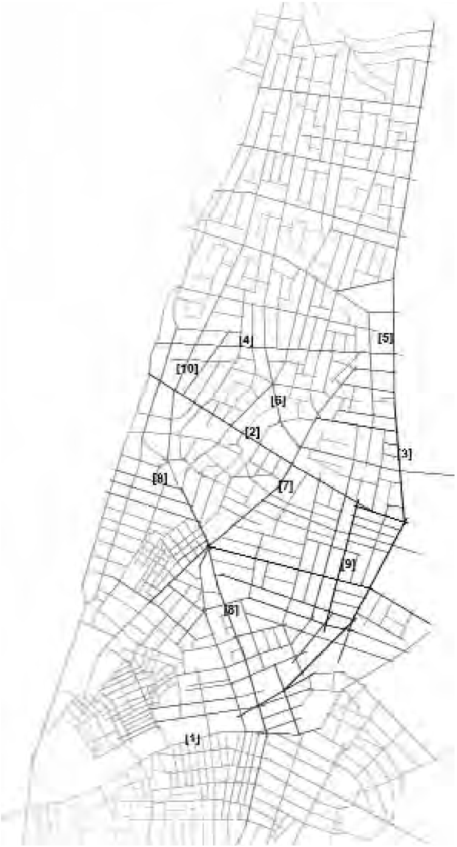
Comprehensive city planning guided by a social vision of the human habitat came with Patrick Geddes' plan. Amongst the considerable work carried out during the British Mandate period, planning Tel Aviv, "the first Hebrew city built since the exile", stands out as an exceptional design. Geddes described his vision as "a new type of civic grouping, at once more beautiful and more health-giving than any previous form of community in human annals"[4].

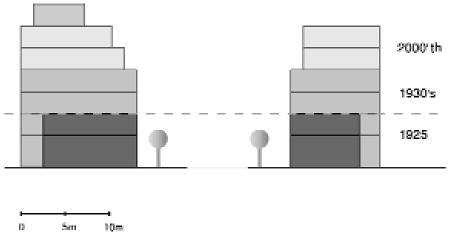
2.0 The Geddes Plan of 1925

The Geddes plan (fig. 1) was remarkable in several aspects: one was the way it established a connection to the existing fabric of the city, and the conditions of the site; a second was its open-endedness, which laid the groundwork for future growth towards the east; a third was the way it structured a diverse gradient of streets with varying degrees of movement and patterns of use allowing for a unique interface of public and private life to develop.

Designed as an organic non repetitive grid of streets running both parallel and perpendicular to the sea, the three north-south arteries and the six east-west major streets (the "main-ways") defined the basic cellular elements of the plan (the "home-blocks"), arguably the most original and humane aspect of the plan. It consists of a single or double enclosure of buildings surrounding a protected internal space; a web of minor streets ("home-ways") and pedestrian lanes lead to a public garden at the core of the block. In its vicinity local level institutions were planned (schools, kindergartens, synagogues, clinics) while commercial activities were concentrated along the "main-ways".

The connection to context was achieved at various levels and scales. On one hand, the major streets of the plan either continued existing streets, or followed existing paths or boundary lines. Thus, Ben-Yehuda Street [10] (see fig. 1) continued an existing main street that led to Allenby Street [8], the city's main thoroughfare at the time. Dizengoff Street [6], the Central Avenue described in the report, was laid out in a curve in order to allow it to connect to the German Colony's cross-axis. Rothschild Ave. [9], already existing at the Southern edge of the plan, was continued up to the main square that was to include the city hall, and on to another public square (today's Rabin Square [5]) where a new boulevard was designed to connect it to the seashore. Today's King George's Street [7], follows the path of the existing Sommeil Road, and its importance is acknowledged in the plan by designating it for a local commercial centre. Bograshov Street [2], the axis of the existing Nordiya Neighbourhood was continued as a dignified Boulevard leading





Top left: Post Geddes Tel-Aviv integration analysis (Y. Rofè)
Bottom-left: The "Tel-Aviv" House (H. Schwartz)
Top-right:The evolution of the street section (A. Nashiv)
Centre-right: The 1990's - a new urban layer is added (H. Schwartz)
Bottom-right: Current tendencies - conservation and high-rise buildings (H. Schwartz)

to the main cultural square (Geddes' "acropolis" and where the National Theatre and Symphony Hall are now located). This square occupies higher ground and affords one of the rare views of the sea from the inner city. Most of the streets in the built area of Tel-Aviv to the South of the Geddes Plan were continued uninterrupted into the new districts. The overall structure of the plan also connected the city to the topographical features of the site by establishing new centres in key locations: the location of the new port of Tel-Aviv, and the area designated for the fairgrounds at the mouth of the river, was given prominence in the plan by making it the terminus for two of the new main-ways; the identification of the boulevard and two major squares with a natural ridge allowing views towards the sea; the gently curving Central Avenue (Dizengoff St.[6]) connecting the plan from Northwest to Southeast; and the location of the main square (later to become Dizengoff Square and the centre of North Tel-Aviv) at low-lying ground where it formed a basin for all the streets surrounding it.Space Syntax Analysis[5] of the plans of Tel-Aviv before and after the Geddes plan reveals the way Tel-Aviv formed up to its planned expansion, the principles of Geddes' plan, and the way the plan both continued and structured the future growth of the city. The analysis of the pre-existing city (figure 2. in this figure and the following one the darker the lines the higher is its integration value) shows the piecemeal growth of subdivisions around an 'integration core' of main streets, which extends in a northerly direction from Jaffa Road [1] and the railroad tracks paralleling it. Some of the older neighbourhoods are unique in having a much tighter grid structure, but aside from the main streets, all others are roughly similar in their integration level and therefore also in their probability of being more active (this is exactly the condition criticized by Geddes in his report)[6]. The integration map of the Geddes plan (figure 3) shows the integrating role of the N-S main-ways, and the shorter, but no less important E-W streets. The relative segregation (and resulting quietness) of the "home-ways" is also apparent. However, it is worth noting that Geddes did not completely segregate the residential cells. Most of them are connected to each other by at least one direct street, thus creating a more complex intermediary kind of space that is not integrating the whole plan, but only a small local area. Some lesser main-ways, play a similar role by not crossing the whole plan, but coming to an end at some minor square. When we examine the integration map of the city as a whole after the Geddes plan(figure 3) it is clear that it continued and extended the emerging structure of the city, and opened the path for its further growth. The strongest lines emerging as a result of the plan are: the Bograchov – Ben-Zion axis [2] which connects the major cultural square to the sea, and forms the seam between the Geddes Plan and the existing city; Ibn Gvirol Avenue [3], which defines its eastern border, and thus laid the ground for the future expansion of the city to the east; Frishman Street [4], another E-W axis that connects the second major square on the east (today's Rabin Sq. [5]) with the sea-front and Dizengoff Street [6], between Frishman and King George Street [7], which winds between those various centres, and has become the major shopping and entertainment street of the city. Oddly enough, the Geddes plan had the effect of pulling the integration core of the city from the area around the intersection of Allenby [8] with Rothschild Avenue[9]towards the Northeast, along

Rothschild Ave. and its parallels, an area which in later years developed into the Central Business District of the city.

The detailed structure of the Geddes plan reflects the above mentioned multiplicity of situations created by the local adaptation of the basic urban block to different conditions arising within the whole. Thus, although Geddes refers in his report to three street types: boulevards, main-ways and the home-ways, or four if we include the pedestrian alleys, there are, in fact, six different types of street identifiable in the plan:

1. Boulevards – there are four new boulevards added in the plan. Three of them are East-West, and serve to connect the residential areas towards the sea. The fourth connects two of them to each other and to the pre-existing part of Rothschild Ave.

2. Main-ways – These form the main grid, they are not all the same as we have seen above, as some of them are continuous throughout the plan, and others are more local in character, and connect different areas to each other. 3. Connecting Streets – these usually connect only two or three cells to each other, creating an intermediate scale between the main-ways and home-ways.

4. Residential Avenues – in some of the cells, where the open space is linear in form, it is designed as a short residential avenue, which does not extend beyond the boundaries of the urban block.

5. Home-ways – these are short streets, usually terminated by buildings that form the interior circulation of the urban blocks (see above).

6. Pedestrian Alleys – These complete the spectrum of streets, often serving to increase the number of pedestrian entrances into the urban blocks from the surrounding streets and to give residents of the periphery of the urban block access to its social centre.

The variety of streets, and their close proximity, creates conditions that allow functional and architectural diversity for buildings along them and on the different intersections. Since the streets vary greatly with regard to the amount of through movement along them, they attract different types and levels of commercial uses, and residential preference. This condition was indeed exploited by builders as the city developed.

The overall scale of the city envisaged by Geddes was human, the main-ways are between 25-30 meters wide, the buildings lining them were supposed to be a maximum of three floors, the narrower home-ways are 10-15 meters wide, and were supposed to be lined with buildings up to two stories high. The frontages are rather short (15-25) meters and entrances frequent, the front gardens, were intended to provide shade and greenery to the streets, providing them with a pleasant garden like aspect.

3.0 The (R)Evolution of the plan

Geddes envisaged a city of private houses and duplexes, each occupying a maximum of a third of their fairly generous lots (minimum size of 560 sq.m.). He also approved of the orientalist neo-classical style combining western and local influences. With the approval, in 1938, of the first revision to Geddes' plan, two major alterations - in fact transgressions of his vision – were incorporated: increasing the land coverage ratio to 60% of the lot, and raising the height limit of buildings to four stories. This was the inevitable consequence of the rapid population growth and concomitant land speculation pressures. Thus, the typology of the "Tel Aviv house" and street configuration came into being: 3 or 4 storied, free standing, walk up apartment buildings with 2 to 4 dwellings on each floor (figure 5). Furthermore, the arrival of European educated architects brought with it the ideas of the modern movement in architecture and social housing. The constraints imposed by the building codes confined the modernists to formal architectural aspects: strip windows, sun roofs and later 'pilotis' creating a distinct built landscape. The type and its variations - among them several clusters of larger workers' housing estates - formed the "white city", recently declared by UNESCO. In the process of implementation, parcellation and private ownership of most of the available land encroached upon the areas assigned to public spaces, reducing or altering them. Nevertheless, the basic syntactic structure of the city was established and maintained[7].

Consolidation of Tel Aviv as the core of a large metropolitan area accelerated after WW2, driving its expansion eastwards by a variant of the Geddesian pattern with larger plots and larger but more conventional and rigid urban blocks. By the mid 1960's the population reached 400,000, instead of the original goal of 100,000. Demographic changes and economic expansion generated four significant developments:Further loosening of building regulations. Along the main-ways and at specific points, six floors are now permitted – three times the original limit. Since this includes many of the listed buildings, a whole new urban layer is being gradually added to the entire district (figure 6).Diversification in land uses and programs. After a period of decline due to emigration of residents and business activities to suburban areas, renewed growth pressures led to adaptation of residential buildings for mixed uses. Retail uses and professional offices have filled the lower floors and the gaps between buildings, creating a streetscape of continuous frontages.A policy of ceding publicly or institutionally owned plots interspersed in the urban fabric to private entrepreneurs, and allowing increased building rights in these areas, has resulted in randomly located projects of residential or office towers on commercial podium typology (figure 7).Intensification of city life reflected both in increasing development pressures and a growing awareness of the importance of the public domain. The paradox of implementing Geddes' social vision through mostly private initiative always in a precarious equilibrium, has reached a crucial point.

4.0 The Limitations of the Plan

The Geddes plan for Tel-Aviv was truly remarkable in its achievement: the creation of an urban structure which allowed the city to grow and expand through war, independence and economic and social changes. The city quickly outstripped the cosy "urban village" vision of its planner. Rather than complementing Jaffa and serving as its suburb, it soon surpassed it, battled it and later vanquished and absorbed i[8]. In later years it became the centre of economical, cultural and political power that drives the Israeli economy. Israel became a city-region with Tel-Aviv at its centre.

Throughout all this, Geddes' essential vision of the "urban block", an island of calm within the hustle and bustle of the city was sustained. It allowed the city to have a continuous homely charm, and intimacy of scale, right next to its busiest streets full of cafés and luxury shops. A minute away from Dizengoff Sq. and street lies Ruth's Garden, a tiny quiet residential square, where children can play, old people muse and the singing of birds can be heard. Moreover, the open-endedness of the plan has facilitated the expansion of the city and its centrality for a host of suburbs which were established contemporaneously or even previously.

The Geddes Plan, did however, have its limitations, which have all become problematic in later years. First among them is the lack of resolution of Tel-Aviv's relationship with the sea-front. Obviously, Geddes could not foresee the development of the seashore as an active waterfront. In fact, the topographical conditions seemed to preclude it. His vision was the conservation of the sandstone cliff which forms a large part of the sea front in the area of the plan. Geddes described a seashore drive that veered inland as it climbs the cliff, and a trail that remains near the sea. This has essentially been done, but the area between the two paths was used in later years to build a series of large hotels that block the view of the sea from the city and the seashore drive (today's Hayarkon St.). Only in the 1980's was a promenade constructed in the southern, and flatter, part of the sea-front, and only recently was it finally connected to the Tel-Aviv Port and Fairgrounds area and the mouth of the Yarkon River.

The second limitation of the plan is a result of the introverted aspect of the public spaces and gardens found within the urban blocks. Tel-Aviv is not a city of squares, but of streets. Its main centres of social life are the sidewalks and the cafés along its three major North-South streets. Dizengoff Square in its heyday was the major centre of entertainment and night life, with 5 cinemas surrounding it. It was the place to meet and "hang out", but its design was still more of a traffic circle than an urban square. The other main squares of Tel-Aviv are also lacking in daily public life: the orchestra square was used until recently as a parking lot, and Rabin Square is more a political arena for demonstrations and large events. The other possible social spaces – the boulevards – also remained homely and residential, as commercial uses were not allowed to locate along them. Thus Tel-Aviv lacks the Mediterranean tradition of small public squares as centres of community. It oscillates between the exhibitionism and extrovert street life of the main-ways and the private nature of the home-ways.

The third limitation may have been, perhaps, the salvation of Tel-Aviv's "White City." Geddes, working in the 1920's, when cars were already becoming available, and his followers, adjusting the plans at the end of the 1930's, paid little attention to cars. The relatively small lot size and the narrow frontages do not easily allow for parking spaces within the lot. The narrow streets, expressly desired by Geddes to accentuate the residential scale of the home-ways, limit the number of parking spaces in the streets. This may have been sufficient for the two or maximum four units per lot as envisaged by Geddes, or for the low car ownership rate in pre-1948 Palestine and Israel in its first two decades. But due to the increase in non-residential uses, the change in function to an urban centre, the change in family structure and the prevalence of singles sharing apartments, and the increase in car ownership rates (particularly in relatively wealthier Tel-Aviv), a "parking problem" ensued. This parking problem is in fact the symptom of the occupation of urban space by cars, which has led to the deterioration of conditions for pedestrians. In recent years there has been a shift in policy towards restoring streets and sidewalks to pedestrians, but Tel-Aviv still lacks a coherent parking policy that will confront the problem at its source.

All three limitations are inherent in the very nature of Geddes' vision of Tel-Aviv as an "urban village". To this vision belongs the seashore as a nature conservation area, and the concentration of activities more to the south, where Allenby Street, the city's major street veers towards the sea. The large hotels, befitting a modern metropolis, have no place in this cosy vision – at best a few bed and breakfasts and pensions would have lined the seashore drive. The very nature of the urban block, with its stress on quiet residential repose, public life in the form of communal gardens rather than truly public squares is the source of the second limitation. Dizengoff Sq. is the exception that proves the rule. However, the city found ways to compensate for this lack in its famous café life and active streets. The third limitation, together with the fragmented nature of ownership, contributed to the character of the "White City". It stopped the large scale unification of lots and redevelopment in the 1960's and 70's, when conservation was still in its infancy in Israel and no one saw any value in the plan, or in the modernist buildings built in the 1930's and 40's. It allowed the area to survive until its 'rediscovery' and popular appreciation and more recent official recognition. The only buildings built within the plan that break the scale were those built on the few institutional and public areas that were vacated and redeveloped.

5.0 Conclusions

The essential feature of the Geddes plan was to create a city, or an "urban village" that combines the best in urban and rural life, and allows interaction and repose in close proximity. This vision, although the city when built more than quadrupled the original plan in population, essentially retains this feature. It allows it to be both a residential neighbourhood, as well as a central city at the same time.

The flexible open-endedness of the plan, and its plugging into the existing city and site features, allowed it to transform and expand while maintaining its essential features. The plan included enough variety to allow for a good mix of residential, office, commercial and public uses – all enhancing its livability and economic viability.

While the street widths and plot sizes allowed easy transformation from the original 1-2 story buildings conceived by Geddes to the 3-5 story condominiums which make up the bulk of the area, they seem to be reaching the edge of their capacity to allow further expansion of the buildings. Another story may be added along the main-ways, but the home-ways are in danger of becoming narrow canyons. With difficulty, and involving the loss of front and side gardens they can accommodate all the cars generated even by today's modest density. This flexibility has allowed the area of the plan to remain largely intact so far, but in the future it will be necessary to deal creatively with high development pressures already working at the edges of the declared conservation area.

Lastly, the Geddes Plan, together with the rich legacy of modern buildings is the justification for UNESCO's recognition of Tel-Aviv's "white city" as a monument of humanity. The plan was admired and highly regarded even at the time of its conception, and emulated in the plans made for the eastern expansion areas in the late 1930's. Unfortunately later expansion to the North of the river used the more cellular and less complex formula of the Neighbourhood Unit, and the tenets of anti-street urbanization originating with the CIAM. In recent years there has been a return to the values inherent in the Geddes plan, and recent plans claim to use a similar concept of the "urban block." However, it remains to be seen whether the magic that worked at the intimate and pedestrian scale of the Geddes Plan, and which was already diluted and weakened in the Eastern Extensions, largely in order to accommodate the automobile, still will work at the gargantuan scale and bulk of today's residential development.

Notes

1. Man in the Desert Department, J. Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev.
2. Department of Architecture, Wizo Academy of Design, Haifa, Israel.
3. Rowe C. and Koetter F., *Collage City*, Cambridge, Mass. MIT Press, 1995
4. Patrick Geddes, Town Planning Report – Tel-Aviv, manuscript, 1925.
5. Space syntax analysis was developed by Bill Hillier and his colleagues at University College London. The measure of integration used here measure the degree to which each straight street segment lies on the most direct path between every teo other street segments in the plan. It has been shown to correlate well with pedestrian and vehicular movement. See Hillier, B. Space is the Machine, Cambridge: Cambridge University Press, 1996. The analysis here reported was performed using Depthmap 5.05r software available from Space Syntax Limited.
6. Patrick Geddes, Town Planning Report – Tel-Aviv, manuscript, 1925.
7. Rapaport R., Schwartz H, "On the Urban Orchard: Patrick Geddes plan of 1925",.The Man made environment conference. University of Edinburgh, 2003
8. In the months leading to Israeli independence in 1948, armed violence broke out between Arabs and Jews in Tel-Aviv and Jaffa, ending in May 1948 with the surrender of Jaffa, and the refuge of most of its population. In 1952, Jaffa was annexed to Tel-Aviv, and the city became officially Tel-Aviv – Jaffa.

R. Sansosti [1], D. Vuono [2], B. J.Nagy [3], A. Nastro [4]

USE OF CELLULOSE FIBRES IN THE PRODUCTION OF CERAMIC BRICKS

1.0 Abstract

The main objective of this study is to investigate the potential use of cellulose fibres residues in clay brick production. One way to increase the insulation capacity of the brick is generating porosity in the clay body. Combustible organic pore forming additives are most frequently used for this purpose. Due to the organic nature of fibres residue, pore-forming ability in clay body was investigated. For this purpose, increasing amount of residue (0%, 1%, 3% and 5 wt%) was mixed with raw brick-clay. This study also follows the regular phases of brick production, preparing by extrusion the product to be cooked in the second phase. Effect on shaping, physico - chemical and mechanical properties were investigated. The additions of residues were found to be effective for the pore forming in clay body with acceptable mechanical properties. All the characteristics satisfy the Norms.

2.0 Introduction

Ecological construction materials have become more and more popular thanks to an increased environment-oriented way of thinking. There are two main functions that can be allocated to these products, the so called building biological and the building ecological benefit. From the building biological point of view products with cellulose fibres can be perfectly processed and resist even extreme climate conditions. Cellulose and paper making industry generates important amounts of waste material.

The chemical pulping process produces several residues. By-products and residues from mechanical pulping include wood, straw and reed residues, fibres rejects, excess sludges from external biological waste water treatment[5]. These products are managed using several approaches including land filling, incineration, use in cement plant and brickworks, agricultural use and composting, anaerobic treatment, recycling and others[6,7]. Due to the high organic contents and calorific values of these residues, incineration is favoured. The main objective of this study is to determine the usability of the cellulose fibres residues in clay brick production and, in particular, to study the possible realization of alveolate. The ceramic material are generally very heterogeneous, because they are prepared from

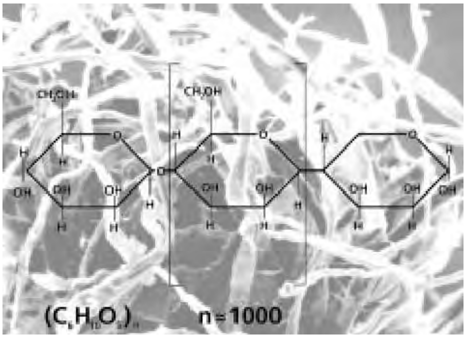


Fig. 1 - 3dimensional fibre framework of TECHNOCEL

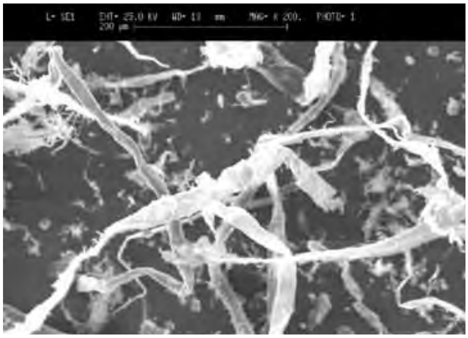


Fig. 2 - SEM picture of waste cellulose fibre

natural clays of a large variety of composition. For this reason, such materials may tolerate the presence of different types of reject, also in a considerable percent. The thermal conductivity is a decisive factor for the heat-engineering concept of thermal insulating material. Apart from the molecular composition of a material, it also depends on the air pore content and its structure. For building practice therefore the body density determines the thermal conductivity[8]. Most frequently used pore formers, which are used in clay brick manufacturing can be classified into two groups: the organic pore formers: sawdust, paper sludge, coal and coke; the inorganic (mineral) type pore formers: perlite, diatomite, lime flour, pumice and vermiculite. Organic pore formers are generally cheaper than inorganics and also when they are burnt, it gives over supply of heat to the firing furnace. However, CO_2 emission is the main drawback of the organic pore formers. Inorganic pore formers have less environmental problems but they may change the plasticity of the clay system negatively and may increase the water demand for the plasticity[9,10]. Organic process residues are extensively used as a pore former in brick industry[11].

3.0 Experimental

This study also follows the regular phases of brick production, preparing by extrusion the product to be cooked in the second phase. The so-obtained material is in a tape form that is cut in pieces of uniform length. Following this step, the product is dried in a ventilated oven at 110°C and it is cooked at 1000°C during 3h30'.

The clay used as primary material is extracted from quarries of the South of Italy (Calabria).

The cellulose material (TECHNOCEL) is produced in Germany (Fig.1). Currently, these fibres are used for the realization of high resistant asphalt binder layers, water-poof asphalt, modified asphalt for special applications , mastic and porous asphalt. TECHNOCEL-fibres are obtained through a special manufacturing process and are offered in a wide range of grades from finest powders (25µm) to long fibres (2500µm). TECHNO-

CEL-fibres produce a self-supporting fibre skeleton in all three dimensions. Made from natural cellulose the fibre is temperature resistant up to approx. 200 °C. The wide range of grades offers numerous application possibilities. The surface adhesion between TECHNOCEL-fibre and medium as well as the integration in the three-dimensional fibre skeleton improve the processing properties and the characteristics of the final products. The water bound in the TECHNOCEL-fibres is subjected to a reduced freezing point of down to -70 °C. TECHNOCEL-fibres for the construction industry are produced with very low energy consumption and spare our precious resources already during the manufacture of the product.

4.0 Results and discussion

In order to measure the structural properties and feasibility of using cellulose fibres residue in brick production, the materials and methods are explained in this section.
According to SEM investigations, cellulose fibres thickness is ca. 200 μm (Fig. 2).
The primary material was characterized by X-ray diffraction (XRD) using a Philips PW1830 diffractometer with CuKα radiation in order to identify the various crystalline phases. The scanning rate was 0.02° s-1 in the range of 5-70° 2θ.The chemical analysis of the samples was determined by EDS ZAF 4/FLS analysis.
Chemical composition of the four types of clays used is given on Table 1, and according to the XRD investigation it was found that quartz, illite and calcite exist in clays mineral structure (Fig.3).
The TG, DTG and DSC curves are shown in Fig. 4 and the corresponding data are reported in Table 2. Three weight losses characterize samples a and b and only two samples c and d. All the weight losses are endothermic. The peak at ca. 100°C is linked to the loss of humidity of the material. The second loss at ca. 500°C is characteristic of the loss of network water. These losses are similar in all four samples. Samples a and b show another endothermic peak at ca. 700°C due to the degradation of Calcite (Table 2).
The TG, DTG and DSC curves are reported in Figure 5 and Table 2 gives the maxima of DSC curves together with the weight losses.
The cellulose fibres sample presents two exothermal DSC peaks. The first peak at 87.4°C is due to water loss of humidity. The second peak at 325.2°C is due to combustion of material. The third peak at 426.6°C ,is probably due to degradation of other cellulose compounds. The total weight loss is ca. 90 wt%.
Table 3 shows the results of the tests carried out on the bricks having various amounts of cellulose fibres.
Water absorption, apparent porosity, modulus of rupture and imbibitions were measured by using the method of the Norm UNI 8942.
It can be seen that the amount of water adsorbed increases with increasing cellulose fibre content being however similar to the limit admitted in the norm (15-40%).
The amount of imbibition water also increases as a function of increasing TECHNOCEL-fibres, remaining however in the amount admitted by the law (12-30 g/dm2). The samples measured for the limestone inclusion do not show any craters on their surface.

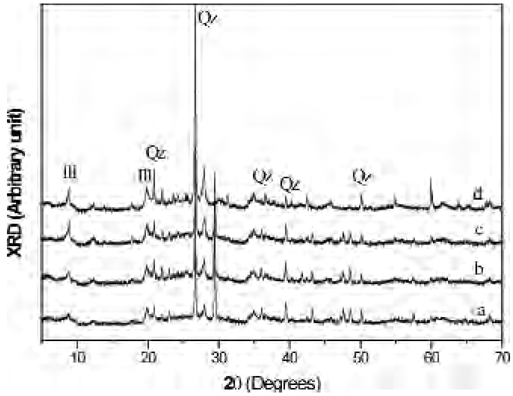


Fig. 3 - XR diffractograms of the four types of clay used in this study

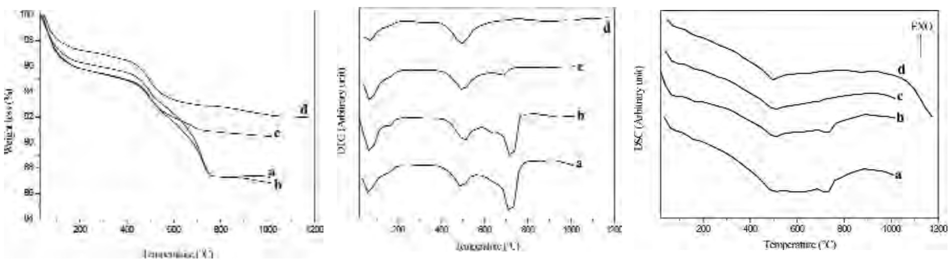


Fig. 4 - TG, DTG and DSC) curves of the four types of clay

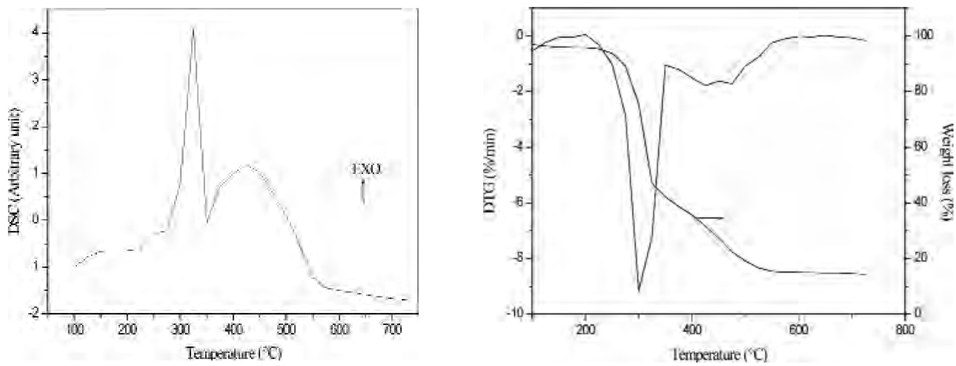


Fig.5 - TG, DTG and DSC curves of TECHNOCEL-fibres

Samples	Na_2O	K_2O	SiO_2	MgO	Al_2O_3	CaO	Fe_2O_3	MnO_2	L.I. (*) (%)
Clay a	1.43	2.22	46.60	2.28	17.46	8.09	6.85	0.72	14.35
Clay b	1.92	2.11	50.12	2.28	16.44	5.75	7.32	0.64	13.42
Clay c	1.47	2.37	50.29	2.68	18.72	3.74	8.76	0.00	11.97
Clay d	1.55	2.94	55.67	2.15	19.14	1.26	6.62	0.96	9.71

(*) **L.I.** : loss of ignition

Table 1 - Chemical composition of the four clay samples

Samples	I DSC max (°C) (Loss in %) Endo	II DSC max (°C) (Loss in %) Endo	III DSC max (°C) (Loss in %) Endo	IV DSC max (°C) (Loss in %) Endo	V DSC max (°C) (Loss in %) Endo
Clay a	71.3 (4.04)	—	—	492 (3.30)	723.4 (5.31)
Clay b	75.1 (3.55)	—	—	505.9 (3.66)	725.2 (4.53)
Clay c	80.1 (4.23)	—	—	505.7 (2.96)	687 (1.27)
Clay d	7 1 (1.87)	—	—	500.8 (3.68)	930 (0.87)
Cellulose fibres	87.4 (3.75)	325.2 (6.28)	426.6 (49.53)	—	—

Table 2 - Thermal analysis data - maxima of DSC curves and weight loss in parenthesis- of the four clay samples and cellulose fibres

Temperature = 1000°C; Time of the cooking = 3h 30min

Mechanical properties	Sample series			
	A	**B**	**C**	**D**
Cellulose fibre content (wt%)	0	1	3	5
Apparent porosity (%)	30.42	33.25	33.38	33.71
Water absorption (%)	13	15	16	18
Imbibitions (g/dm^2)	7.97	12.79	13.91	14.7
Limestone inclusion		Not present		
Modulus of rupture (Kgf/cm^2)	113.35	133.77	143.41	145.51
Saturation coefficient	0.86	0.9	0.93	0.96

Table 3 - Results of the tests following UNI 8942

Similar to apparent porosity and modulus of rupture values were also increased with increase in residue addition amount. The values, also in this case, are in conformity with the UNI 8942.

5.0 Conclusions

Based on the experimental investigation reported in this paper, following conclusions are obtained:
1. Fibrous nature of residue does not create any problem during shaping at used addition levels. There was not any extrusion failures observed.
2. The addition of cellulose fibres residue increases the bending strength of the clay samples.
3. TECHNOCEL-fibres residue is easily burnt out from the clay body during firing. There was not any black coring and bloating was observed after firing.
4. The cellulose fibres can be used as organic additive to produce bricks alveolate without any detrimental effect on the other brick manufacturing parameters.

Usage of small quantity of TECHNOCEL- fibres together with other pore formers may enhance the apparent porosity of the brick, obtaining alveolate with good characteristics. However the reuse of cellulose fibre residues in brick production provides an economical contribution and protects the environment.

Notes

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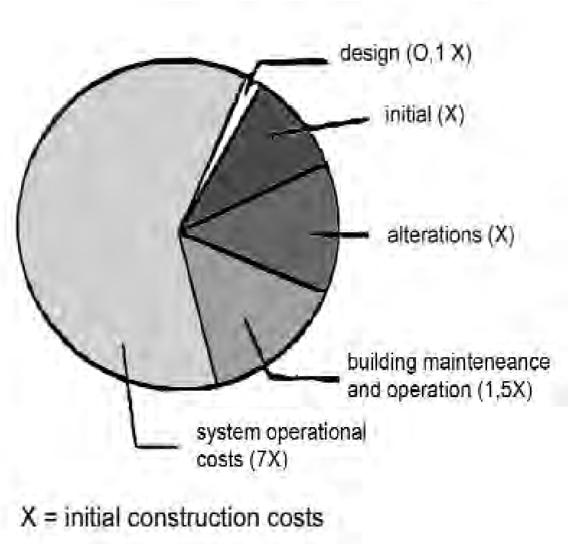

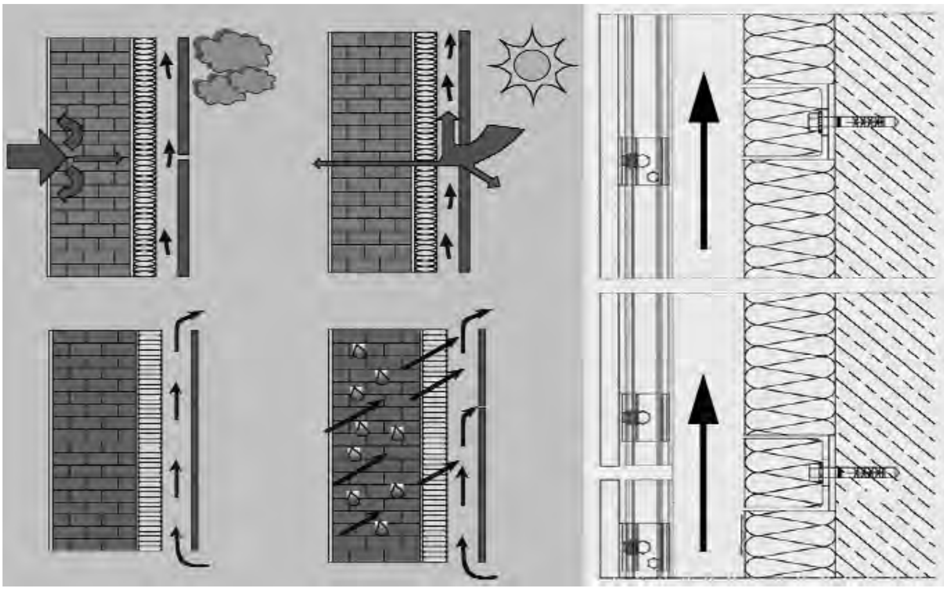

Fig.1 (top) - life cycle costs for 50 years
Fig.2 - the back ventilated façades

L. Secchiari

THE BACK VENTILATED FAÇADES IN TRADITIONAL MATERIALS AS CONTRIBUTION TO THE SUSTAINABILITY IN THE MEDITERRANEAN AREA

1.0 Introduction

The theme of the sustainable urban design is more than ever central in the international debate and one of its most important issues is the energy saving during the entire life cycle of the buildings in which, in fact, considering a duration of fifty years, the energy's costs are the higher: up to seven times the construction ones (image 1).
In this panorama, the approach to the envelopes and the façades, the extreme interfaces with the environment, is one of the main elements of a correct way of re-thinking the whole design of the building and has a fundamental importance, especially in the Euro - Mediterranean area.
The current technologies in order to achieve interesting results towards this direction are the solar and the photovoltaic panels and especially the back ventilated façades because they offer good reliability and several advantages, enhanced also for the non secondary possibility to be utilized in a large scale in pre-existent buildings.
They are today well-established systems, but they are also constantly updated with new details and can be realized using a lot of materials, also the most traditional ones like the stone, the cotto and the wood, that can allow a correct insertion into the environment and the historical context.

2.0 The back ventilated façades

The back ventilated façades (image 2) are the most innovative and efficient among the single skin envelopes and have been evolving through the years reaching high technological standards, and today they present themselves at the state of the art of the research.
These systems, with the air space between the structure and the cladding naturally or mechanically moving from the bottom to the top, give very good performances to the buildings with suitable dimensional characteristics.
Their main advantages are the capacity to compensate the dilatation of the claddings, the protection of the insulating layer and of the structure, the good sound proofing and especially the better thermal insulation.
These types of façades, besides, are generally independent and advanced from the struc-

ture and so they are also the best solution for the recovery of the existing buildings, in order to change their look without neither dismantle the old cladding, nor interrupt the activities running into them.

The best scientifically tested and efficient situations of work of these façades are the ones in the summer or however in temperate climatic conditions, exactly the ones of the Euro - Mediterranean area in which these relatively simple systems can grant a very good behavior.

In order to reduce the energetic consumption of the buildings in this geographical area, they can also be used with other more advanced technologies like the solar and the photovoltaic systems, which can also provide for the energy to run the possible mechanical devices to improve their performances.

This aspect is very important in order to respect the new legislation as the Italian D.Lgs. 192/2005 which accepts the European directive 91/2002 about the energetic efficiency of the buildings and has three principal aims: to improve the performance of the buildings, to valorise and integrate the renewable energy sources and to obtain the objectives of the Kyoto protocol.

In particular it introduces the concept of FAEP or FEP (Primary energy annual consumption), in KWh/(m2 year), that is the main value for the Energetic Certification.

The back ventilated façades also offer a wide possibility of use of materials for the claddings, from the more hi-tech ones to the more natural and linked to the building tradition, which allow a wide and interesting possibility of application in the different situations and especially in the more complex and delicate ones, such when operating in contact with the historical and environmental heritage.

3.0 The traditional materials

In the back ventilated facades, for the exterior claddings can be used natural or traditional materials deeply rooted in the building tradition such stone, cotto and wood.

The stone materials (images 3 and 4) are the most diffused in the Mediterranean area and they are suitable for interventions in the historic centers of every dimension, from the small to the large one, because they represent the ancestral memory with their references to the tectonic and stereotomic aspects.

These materials are also very well distributed all over the area, and each locality has its own stone which, more or less precious, tells its history and individuates a specific cultural and building tradition.

The cotto (Image 5) is another common material, the modular one for excellence, and can be used to create surfaces with classical texture also using innovative forms and volumes, making easier to insert them in a consolidated reality.

The cotto represents, as well as the stone, also one of the main common elements of all the history of this vast area that is the Romanism that unified it all and left a deep sign on the territory.

The wood (Image 6) is the natural material for definition, perhaps more than the stone because is live, with a high flexibility of application in the construction field, now even

Fig. 3 - Rectorate offices of the New University, Lisbon, Aires Mateus & Associados

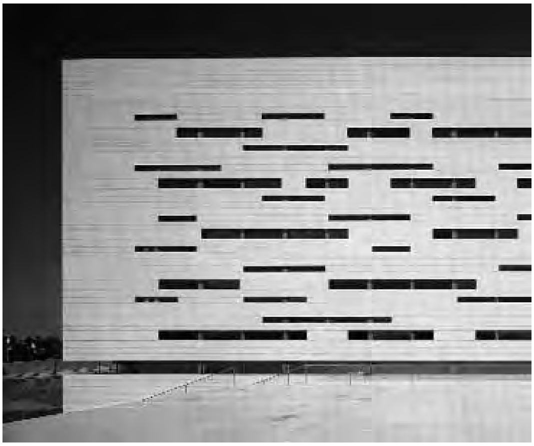

Fig. 4 - Municipio, Murcia, Rafael Moneo

Fig. 5 - Museo della ceramica Leeum Samsung, Seoul, Mario Botta

Fig. 6 - Peninsula House, Melbourne, Sean Godsell

amplified with the large diffusion of the lamellar wood, which also enlarges the technical potentiality of the designers.
It is quite perfect for the insertion in high value natural areas, for its mimesis with the environment without loosing the possibility of expression with contemporary signs, finding out all the different souls of this material.
The possibility to use all these traditional and ancient materials, eventually also mixed together and with the more innovative ones, with a common technological platform and changing only the mechanical anchorages between the bearing structure and the cladding, gives to these system probably the greatest flexibility among the contemporary building solutions.
The dry assembling of these façades allows also to change the cladding and so to vary their surface in the time without great problems, creating a sort of replaceable skin and adding another interesting chance to these systems.

4.0 Conclusions

The back ventilated façades are then very interesting, but not so well diffused as their advantages would suggest.
They can really contribute to contain the energetic consumption with a large facility of application and of integration with the pre-existences and so they have not to be considered merely as a technological trend, but as an effective tool to utilize the natural potentialities, very often neglected, of the whole Euro - Mediterranean area.

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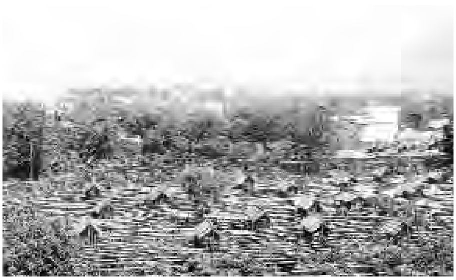
Working laying of pagliarelle



Piling up of pagliarelle on trellis works (Piano di Sorrento)

Typical view of Amalfi coastal landscape: trellis works arranged on terracing

E. Sicignano [1], G. Di Ruocco [2]

BOWERS, PAGLIARELLE AND WINDBREAKS: ELEMENTS OF THE RURAL MANUALITY IN THE LANDSCAPE OF SORRENTO'S PENINSULE

1.0 Historical notes

The cultivation of the citruses has recorded, towards the first half of the XIX century, a remarkable increment, both thanks to the spread overseas of the citrus product, and the works of transformation of the territory stimulated by the tax rebates granted by the Bourbon government: "… the areas on the foot of the hills are cultivated, as well as the areas on the bottom of the Walloons adjacent the short rivers, where there is good possibility to pick up and to channel the water for the irrigation. … The agrarian landscape changes face, kilometers of control walls form wide terracing (…) the aqueducts are upgraded... Everything is arranged to the service of the new orange groves on the plan and of the lemon groves on the hills, set instead of the old and promiscuous planted areas."
With the spread of the citrus products on international scale, techniques were experienced to the protection of the plants from the rigors of a not always adapted climate, delineating slowly Sorrento agrarian landscape. More and more often, in fact, wind, hail and ices prevented the fruits to reach the just maturation with obvious consequences on the commercialization of the products. The citruses were initially protected by a `close set of plants', technique that allowed also an intensive exploitation of the reduced cultivable land of the peninsula. This provoked that effect of forest noticed since the first travellers who reached Sorrento: `Forest of citruses', Alexander Dumas had defined Sorrento garden. The image of the forest is evoked also by Corrado Alvaro, in "Itinerario Italiano" (1933): "Vines and citrus groves form a deep forest, with the luminous green of oranges". "Such a system", according to Antonino De Angelis, "will very soon reveal negative for the good maturation of the fruits of the lower-middle part of the plant, with a serious delay of the maturation and damage for the quality of the product. Moreover the plant is subordinate, for the excessive development up, to an advanced effort to its own vegetative possibilities". The system involves the premature plants aging and the easy rooting of diseases such as the radical rot and the gummosis". Manlio Rossi-Doria told about the widespread prejudgment "that in order to obtain good productions it is necessary to maintain very close plantations" and reported the popular saying which "the oranges are to be close like the sheep". Another protecting technique was the alive windbreak `': rows of

olives planted to protect the citrus groves set close the sea. As Giulio Savastano reports, "… the citrus-fruit grower, since the commonest transformations until a few years ago were from olive grove in citrus grove, was worried to keep some rows of olives in the most defenseless points from the wind". The alive windbreak is already documented in 1858 by the story of one of the many travellers who admired Sorrento landscape: "a narrow path shated by olives, some of which had reached the size and the strength of oaks, and which had been planted there to shield the orange-trees against the winter wind, wound by the side of the sea". Beyond the olive, at the beginning of the century, the Japanese medlar was used as an alive windbreak too. Savastano thinking that the system of the rows of medlar with this purpose had already been introduced in Vico Equense, in the fraction of Saint Vito, exhorted the citrus-fruit growers of other regions to imitate Vico example. It testifies us also the use of artificial windbreaks, "formed by a lot of lists of wood or circles of chestnut tree each one fixed at a short distance from the other, on a frame constructed by poles of chestnut coppice, whose uprights are fixed in the land. The so-called `died' windbreaks were realized by braches of holm oak, chestnut tree or of oak, and, then, with a manufactured element, the "pagliarella", a straw mat that in the definitive elaboration will be in straw of saw, with dimensions of m. 1,30 x 2 and of the weight of approximately ten kilograms. The peculiarity of Sorrento citrus cultivation is, however, the winter cover, in order to reduce the effects of the frost and the hail. Since the middle of the 1870s the techniques became more and more complex: initially the protection was supported on the crown of the plants, subsequently on trellis works of chestnut tree poles. The drafter of the Monography about the Province of Naples for the agrarian Inquiry known as "Jacini Inquiry", De Siervo, refers to the introduction of pagliarella in Sorrento agriculture already during the second half of the 1870s: "The true and more powerful enemy of the plants in word is the cold, against which using any shelter is not usual, though the minimal temperatures, that are recorded in the ordinary seasons, do not reach to be prejudicial to the cultivation in word. The lemon is less resistant; the orange follows, as the last one, there is the Mandarin, which, therefore, is cultivated in the least repaired places… Now, especially in the commune of Massalubrense, some owners have suffered the heavy expense of the straw mats in order to guarantee the lemons, persuaded that the anticipated expense can be widely compensated by the avoided damages of the cold. The wage of this cultivation can be deduced by the renting amount which is risen until £ 1,700 each hectare…". In a successive phase the cover was realized with a fixed structure: the trellis work in chestnut tree poles, adopting and adapting a technique already in use on Amalfi coast. Just about this matter the agronomist Camillo Mancini writes that "the system of protection used in the cultivation of the lemons in Amalfi coast deserves to be reminded. Here hills and also the mounts degrading towards the sea reduced themselves in lemon groves, arranging them in terraces or the buttonholes of variable width, opened from the side of the sea that is between the South and the East and protected to the North-West by the banks of the advanced buttonholes. An armour of chestnut tree wood is built up as a trellis work where the lemon coppers are tied. During the winter the trellis work is covered with branches of holm oak, protecting the fruits and the plant from the winter rigors…". Probably Sorrento cover technique resumes Amalfi one, readapting it with the insertion of an independent structure, the trellis work. To such a purpose Savastano describes: “In the first years after the system the trellis work is covered by small plants, forming a pyramid on some poles, around which some wattles or little straw looms or also some mats are fixed. During this period some cover jobs will be arranged, building the general scaffolding. Developing itself, the lemon tree emits some long and flexible branches, that are attacked to a secondary scaffolding, supported by the uprights of the general scaffolding. The cover is realized by some straw little looms (cm 1x2), fixed to the general scaffolding in November, and removed in april, stacking them on the same scaffolding each one on the other, except the last two that are placed in a drooping way, each one against the other, in order to make the water of some summery rain can flow down without remaining on the straw for a long time, damaging it. The straw little looms (whose distance is of 10-15cm in order to favour the aeration and the exposition to the sun) are fixed to the scaffolding with string threads; since a short time ago the withes skewed ones of hollow were used, but because of the high price they have assumed… the cheaper string has been preferred. The uncovering, in april, is executed gradually, trying to accustom the citrus grove to the change”. Already towards 1920 (as Savastano writes) the trellis work had caught up the definitive structure, even if at the beginning it had to coexist with protective techniques in use on Amalfi coast (the cover allowed the fruit to stay longer on the tree, permitting a market offer till the advanced summer). “Regarding the production, the orange groves with cover produced until 100 quintals for 22 are, 80 of them approximately exportable. The uncovered production of citruses was smaller, but also the quality was worse: only the produced half was exportable. The cover therefore increased the value of Sorrento’s citrus groves, like testified by statistics conducted at the beginning of the XX century. In the holdings “where the frost often ruin the plantations” the renting prices pile not more than 400 Liras; “in Formia the good gardens are also rented for more than 500 . The Administration of the Real House, near Caserta, rents irrigated gardens for 600 - 900 Liras each hectare. Sorrento’s peninsula’s citrus groves can reach till 2000 and 2500, and in some rare case till 3000 – but the good average is from 1500 to 2000. The citrus groves of Salerno area (Salerno, Montecorvino, Eboli) reach, if optimal, until 600-650-700 to come down from 250 to 300 - for the least good”.

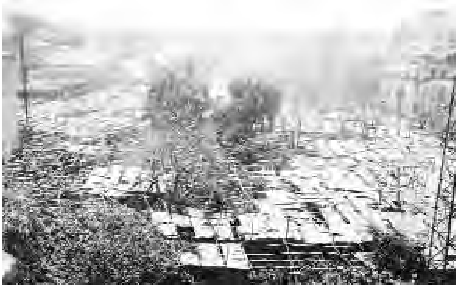
Thisnotwithstanding the practice of the covering didn’t receive the agronomists’s consent. Savastano considered it temporary, induced by the breathtaking increase of the demand: “With the cover the life of the plant is highly shortened (...)” that is a system finalized to the commercial speculation, wishing that these only remained “some occasional facts”. Some years later, Manlio Rossi-Doria shows the same distrust towards the cover of the citruses, expressing appreciation for the orange groves in Francesco Saveri or Ciampa where no covering system was adopted and the plants were very airy: (in them) “there are no covers but rather than 120-150 plants to Sorrento bushel, like in the common citrus groves, there are only 60, the plants, rather than to carry the fruit to the top, exposed to the wind, to ices and to sunlight, carry it inside the cupola, and the production exceeds that one of the orange groves of an area in the same climate and land conditions”. However, although the agronomists’s negative opinion, the cover of the cit-

ruses diffused quickly, until becoming the characterizing element of the landscape: "To all people running along the Sorrento-Amalfi coast - Ermanno Guida writes - does not escape picking the presence of extended and articulate structures that the local peasants elevated to protect the cultivations of citruses… They are structures realized with a fitto space reticulum of thin chestnut tree little trunks, tied each other, hardened from diagonal bracing elements or connected to trees of greater consistency and stability with pylon function, surmounted, in the warm season, by peculiar little cabins. This landscape results constituted of an evocative image of a myriad of piling villages, arranged as far as the eye can see bonded among them by a connecting weaving of other kinds of trees that recalls to the memory the fantastic image of the aerial town described by Italo Calvino in his well-known `Barone rampante'". The trellis work of chestnut tree poles represents the definitive milestone of the experimentations of Sorrento's cultivators. A publication of the Commune of Massalubrense learns us that: "The largest and most straight poles (*'mpieri*, but also *allirti*) are planted in the earth, forming a square mesh grill of 2,80 meters of side, for a depth of approximately a meter leaving outside 6-7 meters. More than a meter lower than the tops a grill of thinner poles is created, whose poles have various names depending on their position: the *currienti* hold up the horses and with them they form the squares having the vertex in the *allirti*; perpendicular to the *currienti* and leaned on them, among the horses, the *curreje* spread dividing the squares into two halves. Therefore, the pagliarelle spread between *currienti* and *curreje*. In order to avoid twists and to confer greater solidity to the whole structure of the trellis work some diagonals were joined, using for each of them two or three *lieveni* chosen among the most crooked and irregular. At last another level of *currienti* was created more or less to the half of the height of the uprights".
As a cover of the trellis works, pagliarelle have been lately replaced by a metallic net (a more long-lasting and economic system than pagaliarelle) which guaranteed the same requirements of sun exposition and protection from the hail, also letting - by a sudden lowering of the temperatures - the formation of a thin superficial ice film that determined a sort of greenhouse effect inside the trellis work. Moreover it has been tried to replace the poles of chestnut tree of the trellis work with a structure "… of linear segments in vibrated concrete, a system with a cubical matrix composed of squared elements tied each other by means of a kind of capital, whose same pillar one is fortified up with two rabbets disposed orthogonally each other for the beams lodging, according to a constructive logic typical of the building prefabrication". Such a technical solution has not had, evidently, any continuation.

2.0 The constructive techniques

The construction of pagliarelle (approximately 200x120cm) was, and is still, completely manual and demands a specialistic ability.
The construction of the pagliarelle (of approximately 200x120cm) was, and is still, completely manual and demands one specialistic ability. A rectangular chassis (*telariello*) of splints of chestnut tree - cut longitudinally into two halves (*chierchie*) - was prepared: the

Windbreak in Meta di Sorrento



Snow on an orange grove
(Sant'Agnello di Sorrento)

Sky-line typical of the coast

four long ones (*perecuni*) were gained from the thickest and sturdiest part and the four short ones (crosspieces) from those ones with some irregularities. The crosspieces were nailed on the *perecuni*, both with the curve part outside. The telariello was then leaned on a sort of table, made by wood aces assembled on two supports, and over them two grain straw layers were spread, the one opposite to the other, in the sense of the crosspieces. Therefore the straw was fixed with other four splints of chestnut tree (*cimme*), thinner than the perecuni, nailed on these last ones face against face so that all the curve parts were left outside. For this last operation a bit longer nails were used; after crossing the three splints they stock out of several millimeters from the other side, then the pagliarella was turned beating again the tips in order to fix definitively everything to avoid to create any dangers. By appropriate long blades (*curtielli*) the straw in excess was cut to obtain a straight edge, sticking out only a few centimetres from the chassis; currently using some large shears is more common. In order to complete the pagliarella the sticking out parts of cimme (effectively the tops of the chierchie) had to be cut. In fact these were the only splits not cut on scale, being the remaining part of the whole chierchia after cutting the other pieces. For this reason they usually exceeded the measure of the pagliarella and the sticking out part was demolished by the *serracchio* (ripsaw). The pagliarelle produced during the summer were arranged in high batteries (stacks). After the first winter spent on the trellis work, they were not brought back to earth, but they were stacked on prevola and covered by four of them as a flowing roof forming the so-called pagliarelle's cupolas (*cupole e'pagliarelle*). Towards November the citrus grove was covered (*accommogliato*), that is the pagliarelle were stretched out on the trellis work, and at the beginning of spring it was uncovered (*scommogliato*) and the pagliarelle's cupolas were reconstructed appearing like strange small houses to the most of people. For the construction of the trellis work (prevola) chestnut tree poles (lieveni or levene) are used. The largest and straightest ones (*`mpieri,* but also *allirti*) are planted in the earth, in a square mesh grill 2,80 meters long, about a meter deep leaving outside 5/6 meters. More than a meter lower the tops of the poles a grill of thinner poles is created named differently depending on their position: the *currienti* hold up the horses and with them they form the squares having the vertex in the *allirti*; perpendicular to the *currienti* and leaned on them, among the horses, the *curreje* spread dividing the squares into two halves forming some rectangles. Then between *currienti* and *curreje* the pagliarelle were spread. In order to avoid any sideslips and to give a greater solidity to the whole structure of the trellis work some diagonals *poze* were added (the "o" is acutely stressed), using for each of them two or three lieveni chosen among the most crooked and irregular ones. Finally, another level of currienti was created more or less in the half of the height of the uprights. *Currienti, curreje and horses*, to be coupled in their extremities and to give a certain continuity to the structure, had to be attenuated in their base. This operation was called *spalettatura* and it was carried out by a hoe shaped axe after blocking the pole, set diagonally, against a wood base. The implantations were carried out manually, without nails, only by iron wires. In the traditional lemon grove in the middle of each square (therefore among four 'mpieri') there was a tree surrounded by a lowered circular little square (source), in order to withhold the water for a longer time.

3.0 Conclusions

The citrus groves, characteristic elements of Sorrento-Amalfi peninsula's landscape, have scarcely resisted to the onslaughts of the building speculation. Moreover, the traditional cover by `pagliarelle', nowadays, is often replaced by plastic elements. Massalubrense and Sorrento on Napoli depositor, Amalfi, Maiori and Minori, on Salerno one, are the common exemplifiers of such phenomenon. In conclusion a more careful safeguard of such an exceptional landscape is wished, also through a punctual census of the most representative examples, as well as through the writing of a specialistic handbook that can hands on our descendants the traditions and the characterizing techniques a rare example of 'landscape architecture'.

Notes

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2. PhD Student at the University of Salerno, Department of Civil Engineering

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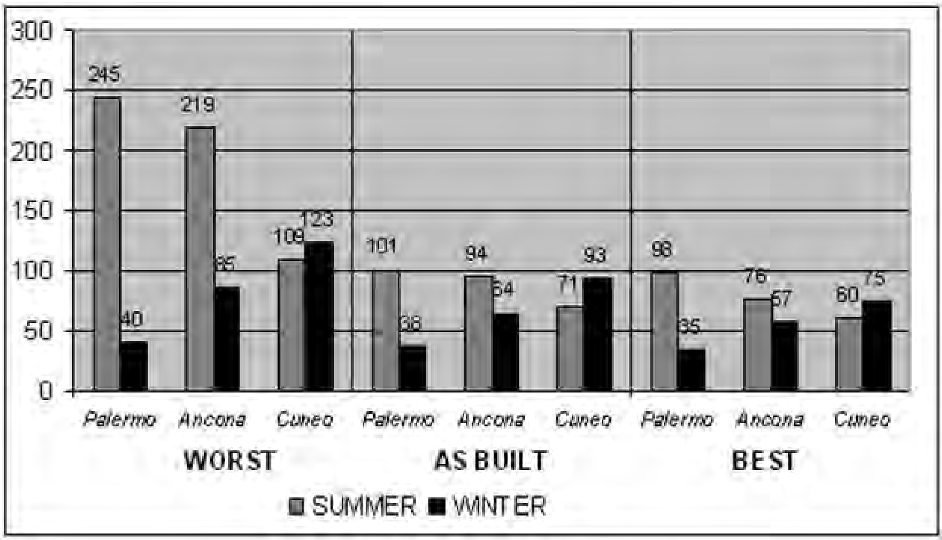

Fig. 1 - Graphical representation of the consumption of the as-built case in the 3 climatic zones (central) and the parametric variations that gave the lowest and the highest consumption values (best case on the right and worst case on the left)

VARIABLE	WINTER_CONS	SUMMER_CONS
DD	0,693	-0,14
INERTIA	0,027	-0,02
K_OPAQUE	0,104	-0,03
GLASS PERC.	0,511	0,52
K_WALL	0,5	0,50
TYPE_GLASS	0,126	0,02
BALCONY	0,239	-0,45
ORIENT_	-0,148	0,26
USE	-0,172	-0,26
SHAPE	0,01	0,08

Fig. 2 - Pearson correlation matrix that shows the impact of each variable (from 0 to 1) on winter and summer consumption. The variables studied are: Degree Days (climatic zone); INERTIA (thermal inertia); K_OPAQUE (type of opaque surface); GLASS PERC (glass percentage); K_WALL (average transmittance of the wall); TYPE_GLASS (type of glazed surface); BALCONY (presence of balcony); ORIENT_ (orientation); USE (type of use); SHAPE (shape of the building)

F. Stazi [1]

TRADITIONAL MASSIVE BUILDING OR "PASSIVHAUS"? CONTRADICTIONS BETWEEN TRADITIONAL ARCHITECTURE AND INTERNATIONAL STANDARDS

1.0 Introduction

The deep relation between the regional traditional architecture and the specific climate was highlighted by several researchers (Givoni[2], Grosso[3]). Today this relation frequently fails. The new European Standards focused on energy saving in the winter phase are driving Europe and therefore Italy to the construction of light buildings with thermal super-insulation and low inertial mass, i.e. the so-called “passivhauses”.

Moreover the new super-glasses[4] coming from the northern regions caused the spreading of completely glazed architectures in the Mediterranean areas too.

The aim of the research is to study the behaviour of buildings with various kinds of outer envelopes for different temperate climates in the Mediterranean regions during the summer, the winter and in the intermediate seasons. In particular, the studies are aimed to deduce the performance of the various envelopes in terms of both energy consumption and internal comfort.

In order to study those problems we carried out various monitoring activities and parametric analyses of 5 different case studies.

The results from said studies enabled us to work out early proposals for a summer energy certification strictly connected to climatic and usage conditions as well as guidelines for carrying out a designing activity in temperate climates that considers both the summer and the winter issues.

In particular, we tested the inadequacy of the completely glazed buildings and we demonstrated that the “passivhauses”, slightly better from the energetic point of view, turn out to be unsuitable from the comfort point of view, because in temperate climates the mass plays a fundamental role especially during the middle seasons.

2.0 Reasons and aims

The exclusive attention paid to energy saving in the winter phase brought about envelope-related open problems:

- Passivhauses unsuitable to the specific climate.

European standards, focused on energy saving in winter heating systems, are bringing Europe and Italy towards the adoption of envelopes having very low transmittance values5- often difficult to achieve in traditional envelopes.
These buildings with super thermal insulation are called “passivhauses” and they behave as thermos flasks, which trap heat. While this is advantageous in the winter, in the summer the overheating of indoor environments makes the buildings unsuitable to our climates.

- The need to consider energy saving in the summer phase.
Summer consumption in temperate climates is at least the same as winter consumption in the North. Also, it prevails in the South, where the ratio between summer climate-control consumption and winter heating is as much as 7:1, as this study shows. Thus summer consumption can no longer be neglected.

- The need to consider environmental comfort.
The influence of the envelope on indoor comfort can no longer be neglected either. From the point of view of heating and climate-control consumption, a lightweight super-insulated envelope behaves better than a massive envelope (super-insulation limits outwards dispersion and the mass reaches full capacity in a shorter time). On the other hand, this is no longer true if environmental comfort is considered too. Inertia plays an essential role on the stabilisation of internal temperatures.

The aim of the study was to define the characteristics of a WELL-DESIGNED ENVELOPE in the temperate climates of the Mediterranean area from the points of view of both comfort and consumption.

In particular, 3 specific aims were determined:

- To understand (in terms of consumption and comfort) what the choice of one of the characteristics of the external envelope entails and to finally determine the best or the worst one in different climatic zones. The comfort and consumption characteristics were consequently quantified in a case study and in many copies of the same building by giving each of them a different characteristic (orientation, glazed surface, type of opaque envelope etc). The comparison between the different cases and the reference case made it possible to determine which characteristics positively affect temperatures and consumption.

- To combine said characteristics in order to determine the worst combination (higher consumption) and the best combination (lower consumption) according to the different climatic conditions.

- To develop guidelines and recommend an energy classification suitable for the summer phase in the light of the results.

3.0 Methods and innovative features in the study

The literature showed the presence of similar research aimed to determine guidelines in cold or extreme climates that were carried out on ideal models, i.e. square or rectangular cells used to simulate rooms that were easy to reproduce in the laboratory and made generalisations possible without being affected by the peculiarities of the real cases.

The innovative feature of the research lies in the study methodology, which starts from real cases (an office building and a residential in-line building) to carry out both monitoring and simulation activities on them. This makes it possible to overcome the limits of experimental-only or analytical-only research, since all the complexities of a real case study are considered.

- The monitoring of the as-built state gave us a good approximation of boundary conditions, which are believed to considerably affect the reliability of the results. In particular, environmental (indoor and outdoor) and surface temperature and consumption values were monitored by two acquisition systems BABUC, several probes used to detect environmental parameters and one calorie counter. The as-built real case was subsequently simulated with different software programs in a steady state (ECOTECT, HVAC-CAD) and in a dynamic state (ENERGYPLUS, FEMLAB) by changing the inputs until we achieved temperature and consumption output values the same as the values detected during the monitoring activity. This made it possible to calibrate the software and develop a tuned-up reliable model.

- In the second step we generalised the study by using the models developed in order to foresee the effects of either incremental changes to the initial project or an entire redesigning of the system. The parametric analysis thus made it possible to explore a wide range of parameters (materials, geometry, boundary conditions). Such exploration would not be possible by an experimental-only approach and simple empirical relations owing to the high non-linearity of the processes involved. In particular, we changed the following: climatic zone, orientation, shape of the building, type of opaque surface, glass percentage, screening, materials, thermal inertia, use profile of the system.

This made it possible to derive summer and winter consumption values (by setting Tmax 26°C and Tmin 20°C, respectively) and temperatures from many different case studies for one single characteristic (or parameter).
Thanks to the comparison between the different cases we deduced in quantitative terms how the various parameters affected energy consumption both in summer and winter in the different climatic zones.
The combination made it possible to determine the best and the worst case and to develop guidelines.

OFFICE BUILDING IN ANCONA. worst case= 219 KWh/m2 anno	KWh/m^2 anno	energy saving %
screenings	-77	-37
glazed perc. from 100% to 70% -complementary opaque wall with outside coat	-30	-15
glazed perc. from 100% to 70% -complementary opaque wall with thermal super-insulation	-35	-18
glazed perc. from 70% to 30% -complementary opaque wall with outside coat	-81	-36
glazed perc. from 70% to 30% -complementary opaque wall with thermal super-insulation	-114	-51
orientation from N-S to E-W	-23	-10

Fig. 3 - Ggraphic of the energy savings achieved thanks to the improvement of the envelope

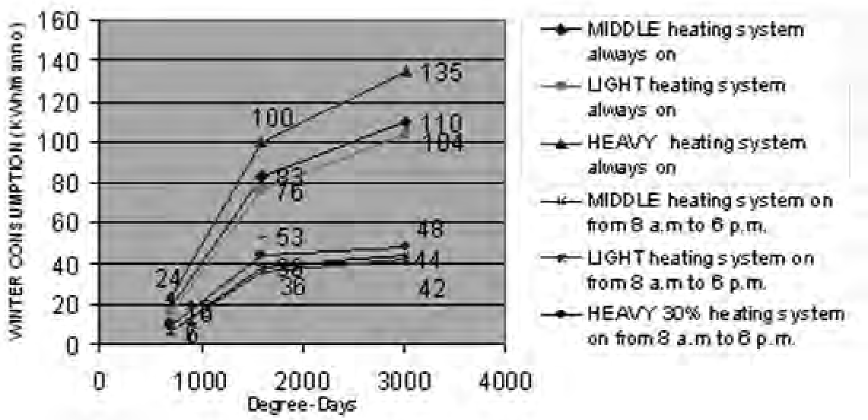

Fig. 4 - Graphic of the winter consumption of the 3 envelopes according to the different day degrees (i.e. the different climatic zones) and for different uses of the heating system

4.0 Results

4.1 Prevalence of summer consumption and summer energy certification

280 case studies were derived from the parametric variations with the relevant summer and winter consumption values. The graphical representation (Fig. 1) of the consumption of the as-built case and the parametric variations that gave the lowest and the highest consumption values (best case and worst case, respectively) in the 3 climatic zones shows that:

- Summer consumption vales are the same as winter consumption values in northern Italy (ratio 1:1 in Cuneo) and they prevail in southern Italy, where the ratio is 6:1 in the worst buildings.

- A good designing of the envelope especially affects summer consumption. That is why from the worst case to the best case the ratio between summer and winter consumption in Palermo goes from 6:1 to 3:1 without affecting winter consumption much.

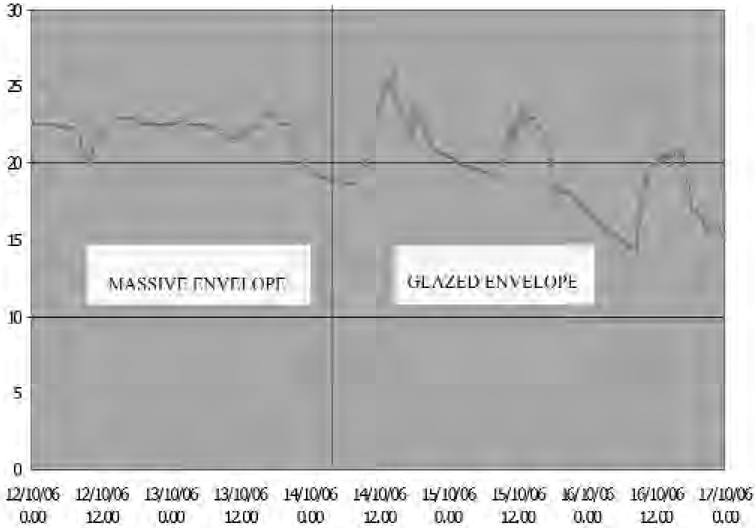

Fig. 5 - Grafic of the internal temperatures(°C) in an environment with a massive envelope and with an entirely glazed envelope

By certifying the summer consumption derived from the parametric variations according to the method recommend by Bolzano's Casaclima (developed for winter heating consumption), all the envelopes - even the most efficient envelopes - are classified into disqualifying categories, as summer consumption is always higher than winter consumption.
This method cannot be used for the summer phase. We consequently proposed a classification that is valid for the summer phase and varies according to the different climatic zones[9].

4.2 Impact of each project choice on consumption

The consumption values achieved as project parameters are changed were processed by statistical analysis tools. For instance, we derived the Pearson correlation matrix (Fig. 2) in order to study the impact of each variable (from 0 to 1) on winter and summer consumption. The result was that the climatic zone affects winter consumption more, while summer consumption is considerably affected by the glazed surface and the average transmittance of the wall (related to the glazed percentage too). We also compared the consumption achieved thanks to the subsequent improvement of the envelope (from the worst to the best) and derived the saving percentages for each step in both the residential building and the office building (Fig. 3). Once again we saw that the choice that affected the summer phase most of all was the reduction in the glazed percentage from 70% to 30% and that more energy is saved if the complementary opaque wall had good transmittance characteristics.

4.3 The importance of considering comfort together with consumption

The parametric changes concerned the study of 3 walls (with high, middle and low mass, and with steady thermal transmittance) in order to understand which was the most suitable for the different climatic zones.

The comparison amongst the consumption values alone seems to show the low-inertia envelope to be the best. We studied the winter consumption of the 3 envelopes according to the different day degrees (i.e. the different climatic zones - Fig. 4) and saw that, if the system is always on, the consumption in a lightweight structure was always lower than the other two.
If the period when the system is on is optimised intermittently, large differences are no longer seen amongst the 3 structures.
If the system is optimised, there does not seem to be any difference amongst the different walls.
This is no longer true if indoor comfort is considered too. The comparison between the comfort level in an environment with a massive envelope and the comfort level in an environment with an entirely glazed envelope shows that the massive envelope considerably affects the stabilisation of indoor temperatures, while in the latter environment temperatures tend to follow outdoor variations.

5.0 Conclusions

The study of two real cases with monitoring, simulations and parametric analyses made it possible to quantify the prevalence of summer consumption and the impact of each project choice on consumption.
We also showed the importance of considering environmental comfort, besides consumption, in Mediterranean climates.
In particular, we were able to determine that a massive envelope is to be preferred to the passivhaus with lightweight envelopes in our climates.

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APPENDIX

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best Operation of Urban Renaissance in a sub-urban city
Plessis-Robinson, Ile-de-France

Project Name: PLESSIS ROBINSON
City and State (or Region): ILE-DE-FRANCE
Classification: TOWN CENTER

Masterplan: FRANÇOIS SPOERRY
XAVIER BOHL
MARC & NADA BREITMAN

Design Date: 1993
Construction Begun: 1996
Status: COMPLETED
Site Area: 17,5 ha
Built Surface: 200000 m²
No. of Inhabitants: 6000
Public & Civic Program:
public buildings, public realm,
schools, sport facilities, streets, squares

A. Bucci [1], D. Diolaiti [1], L. Mollo [2], G. Tagliaventi [1]

EUROPEAN PRIZE 2008
THE BEST URBAN NEIGHBOURHOOD
BUILT IN THE LAST 25 YEARS

The European prize is one of the rare prizes to reward works that respect the European tradition of town planning. It seeks to break the isolation and the silence that surround a large part of contemporary architectural production that does not find its way into pages of architecture journal or into the exhibitions halls.
The European Prize promotes the characters of excellence in the designing and building of new urban neighbourhoods and aims at enhancing the European genius of building the fundamental matrix of the traditional city: the mixed-use urban neighbourhood.
It aims also at encouraging the creation of new mixed-use urban neighbourhoods conceived and designed according to the principles of Sustainable Development and the EU Green Paper for the Urban Environment.
In order to be eligible, proposed interventions should organically fit within the traditional urban morphology of the city and present an architecture that improves and enriches the regional character.
Awarded every three years and created by the architect Philippe Rotthier in 1982, this prize acknowledges contemporary works, which respect the architectural and urban principles which formed the basis for the creation of Europe's most beautiful cities.
The Prize was awarded for the eighth time in June 2008.
Among the 250 entries, the Scientific Committee of the Philippe Rotthier European Prize has selected the 88 new urban neighbourhoods.
The 88 selected neighbourhoods (www.avoe.org/prixrotthier2008.html) cover sections as:
new towns and cities, new neighbourhoods, new villages, new town-centers, new neighbourhood-centers, new village-centers, new faubourgs.
These built projects come from 30 European countries and from big cities such as Lisbon, Bilbao, Paris, London, Glasgow, Bruxelles, Berlin, Dresden, Bologna, Palermo, Tirana, Istanbul, etc., as well as from beautiful medium size cities such as Santiago de Compostela, Hammamet, Gladbeck, Alessandria, Hoje Tarstrup, Knokke, Dorchester, Brandevoort, etc.
Right in the same moment when the United States of America re-discover the virtues of the European compact urban neighbourhood as the sustainable alternative to the sub-urban pattern of sprawl-skyscrapers-malls-highways, the 10 Prize Winners showed in the next pages as the 88 new European neighbourhoods selected, demonstrate that today a new option is available for municipalities and citizens: to build eco-compatible compact cities and neighbourhoods without polluting European cities with obsolete suburbs, skyscrapers, and malls.

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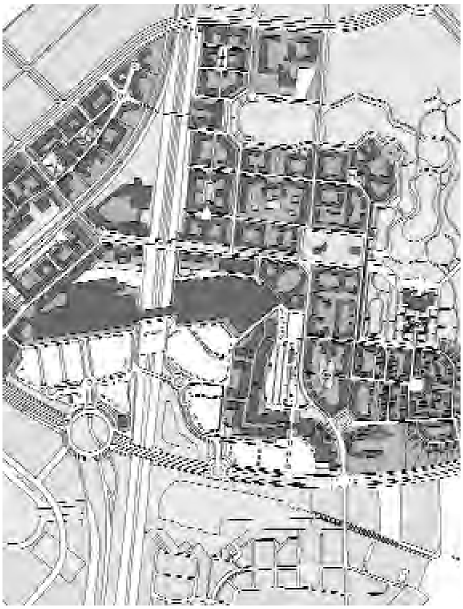
2. Researcher at the Second University of Naples

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best New City
Val d'Europe, Ile-de-France



Project Name: VAL D'EUROPE
City and State (or Region): ILE-DE-FRANCE
Classification : NEW TOWN
Masterplan:
DISNEYLAND PARIS IMAGINEERING
with COOPER, ROBERTSON & PARTNERS
as consultant
Developer: EURODISNEY

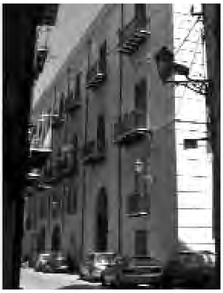
Design Date: 1996
Construction Begun: 2000
Status: UNDER CONSTRUCTION
Site Area: 180 ha
Residential: 700.000 m²
Office: 70.000 m² (2008) 300.000 m² (2020)
Retail: 110.000 m²
No. of Inhabitants: 50000 (2020)
Public & Civic Program: streets, squares, parkings, parks, railway-station, schools, university campus, hospital, municipality offices, fireman department

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best Reconstruction of an Historic Center
Historisches Gesellschaft Dresden, Neumarkt, Dresden, Deutschland

Project Name: NEUMARKT
City and State (or Region):
DRESDEN, GERMANY
Classification: CITY CENTER
Masterplan:
GESELLSCHAFT HISTORISCHER
NEUMARKT DRESDEN

Design Date: 1999-2001
Status: LARGELY COMPLETE
Site Area: 30 ha
Built Surface: about 600.000 m²
130.000 commercial / 110.000 public buildings / 360.000 residential
No. of Inhabitants: 10.800
Public & Civic Program: Theaterplatz, kath Hofkirche, Standehaus, Schinkelwache, Frauen kirche, Kunsthochschule, Polizei Prasidium, streets, squares

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best Reconstruction of a City Center
Municipality of Palermo, Italy



PALERMO HISTORIC CENTER, ITALY
Classification: TOWN CENTER

Masterplan: MUNICIPALITY OF PALERMO
Consultant: L. BENEVOLO, P. L. CERVELLATI, I. INSOLERA, UNIVERSITY OF PALERMO

Design Date: 1993
Status: LARGELY COMPLETE
Site Area: about 200 ha
Built Surface: about 50% m²
No. of Inhabitants: 55.000 in future, actually 30.000
Public & Civic Program: 2 great theatres,13 churches and convents, 15 public palaces,3 urban public gardens, Municipal library, Historical civic archives, 40 public dwelling blocks, 3 university students dwellings, streets and squares paving

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best New Village
Municipality of Poundbury, Dorchester, UK

Project name: POUNDBURY
City and State:
DORCHESTER, DORSET, ENGLAND
Classification: NEW TOWN

Masterplanner: LEON KRIER

Design date: 1988
Construction begun: october 1993
Status: phase II UNDER CONSTRUCTION
Site Area: approximately 40 hectares
(7.5ha in the phase I and 13.5ha in phase II)
Residential (n° of units): 730
Houses: 730 (196 phase I, 534 phase II)
Rowhouses: 524 (140 phase I, 384 phase II)
Apartments: 206 (56 phase I, 150 phase II)
Office: 4 shops public house, 1 office building

The plane is expected
to be fully completed by 2025

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best Public Intervention
Rathaus Viertel, Minicipality of Gladbeck, Germany

Project Name:
TOWN-HALL NEIGHBORHOOD CENTER
City and State (or Region):
NORDRHEIN-WESTFALEN, GERMANY
Classification : NEIGHBORHOOD CENTER

Masterplan: DEPARTMENT OF BUILDING AND PLANNING DESIGN: CEO MICHAEL STOJAN, MUNICIPALITY OF GLADBECK
Architects: ARCKITEKENGRUPPE OBERKASSEL DUSSELDORF
Developer: HOCHTIEF AG ESSEN

Design Date: 2003
Status : COMPLETED
Site Area: 1 ha
Built Surface: 24000 m²
Public & Civic Program: town hall, public pedestrian piazza, parkings

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best Neighbourhood Center
Municipality of Alessandria, Italy

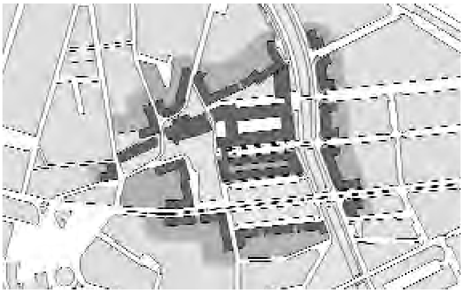
Project Name: CITTÀ NUOVA
City and State: ALESSANDRIA, ITALY
Classification: NEIGHBOURHOOD CENTER

Masterplan: L. KRIER
TAGLIAVENTI & ASS.

Architecture: TAGLIAVENTI & ASS.
with LEON KRIER

Design Date: 1994-1995
Construction Begun: 1995
Status : COMPLETED (in 2002)
Site Area: 8500 m²
Residential : 10200 m²
Office and Retail: 1800 m²
No. of Inhabitants: 300
Public & Civic Program:
3 public pedestrian piazzas

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best Urban Plaza
Ayuntamiento de Irun, España



Project Name:
PLAZA DEL JUNCAL

City and State (or Region):
IRUN, BASQUE COUNTRY
Classification : NEIGHBOURHOOD CENTER

Masterplan: JOSE MANUEL ABALOS
Architecture: JOSE MANUEL ABALOS

Date: 1993-1996
Status : COMPLETED
Site Area: 1 ha
Built Surface: 20000 m²
No. of Inhabitants: 400
Public & Civic Program: 1 square, enclosed central square with arcades, an esplanade, 1 street

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best New Garden-City
unicipality of Heulebrug, Knokke-Heist, Belgium

Project Name: HEULEBRUG
City and State: KNOKKE - HEIST, BELGIUM
Classification: NEW NEIGHBOURHOOD

Masterplan: Leon Krier & Duany Plater-Zyberk
Consultants:
WVI Westvlaamse Intercommunale, Arcas Group, Van Kerckhove (infra)
Developer: WVI & Community Knokke-Heist

Design Date: 1998,
Construction Begun: August 2003
Status : UNDER CONSTRUCTION
Site Area: 26 ha
Residential: (No. of units) 405
Office and Retail: Commercial: 6.600 m², Retail: 26.400 m²
No. of Inhabitants: 1000
Public & Civic Program: a Sporthall, a Tower, a Bridge, a Main Square, four smaller Squares, parkings

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
The Best New Campus
Akroken Campus, Sundsval, Sweden

Masterplan-Architecture:
AKADEMISKA HUS
THE MID SWEDEN UNIVERSITY
T. EINARSSON -ARKEN ARKITEKTER
City and State: SUNDSVALL, SWEDEN
Classification: NEW CAMPUS
Status: COMPLETE
Site Area: 5 ha
Built Surface: 35000 m2

Grand Prix Rotthier pour la Reconstruction de La Ville 2008
Special Mention Prix Rotthier pour la Reconstruction de La Ville 2008
for the Quality of the City Extension to the Spanish Cities

ALICANTE

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