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MATERA, TIMES AND EVENTS OF A RESILIENT CITY MODEL

Antonella Guida, Antonello Pagliuca and Antonio Giulio Loforese

DICEM (Department of European and Mediterranean Cultures)

Università degli Studi della Basilicata

Via Lazizzera, snc. 75100, Matera - MT

antonella.guida@unibas.it

antonello.pagliuca@unibas.it

antonelloforese@gmail.com

Keywords: Sassi of Matera, resilient city, typological evolution.

Abstract *The history of Matera is the story of its oldest part, the "Sassi", indicating living cells of stone and carved into the stone. Matera has ancient origins and evolution of the housing model, over the centuries, has been influenced by the course of events, from natural to man-made, social, economic and political events. The Sassi are a spontaneous urban agglomeration, built, over time, by local artisans, adapting the stratification of houses to the morphological context of the plateau, called "murgia". The Sassi of Matera are considered the cradle of the peasant civilization because they were inhabited by the poorest and peasant class of the town, while today it is possible to find residences, hotels, business and luxury restaurants that, very often, compromise the original characters of the places. The living typological evolution of the Sassi is, by definition, the characteristic example of living conditions change, that it's caused by natural changes and by the need to exploit natural resources, of wich main was the water. One of the most traumatic events for Matera was, in 1952, the displacement of the caves and houses of the Sassi declared unhealthy and uninhabitable, abandoning them in a process of inexorable degradation, for over forty years. The long and complex process of recovery and revaluation of architectural heritage began only thirty years later, to the modern static image of the urban complex. But Matera's story is dynamic, adapting to needs, times and events. The aim of research is definition for a new method, a reference model for the sensitive recovery of architectural heritage through congruous, compatible and sustainable restoration works that can give new life in the original vocation, without compromising the original characters. For this, new techniques and technologies must support the original practices for functional reuse of sites, in consequence of identifying, studying, analyzing and defining unique parameters of judgment of the restoration works already made. A qualitative and objective evaluation of restoration works is necessary, based on the careful evaluation of significance and subsequent attribution of the concepts of congruity and compatibility, on their relationship and the various and many declinations. The city of Matera is characterized as an example of resilient city for its ability to react to events, improving its specific conditions every time, re-evaluating and enhancing its characters and essential characteristics that make it one of the World Heritage Sites of UNESCO, since 1993.*

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Antonella Guida, Antonello Pagliuca and Antonio Giulio Loforese

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Via Lazazzera, snc. 75100, Matera - MT
antonella.guida@unibas.it
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Abstract

The history of Matera is the story of its oldest part, the "Sassi", indicating living cells of stone and carved into the stone. Matera has ancient origins and evolution of the housing model, over the centuries, has been influenced by the course of events, from natural to man-made, social, economic and political events. The Sassi are a spontaneous urban agglomeration, built, over time, by local artisans, adapting the stratification of houses to the morphological context of the plateau, called "murgia". The Sassi of Matera are considered the cradle of the peasant civilization because they were inhabited by the poorest and peasant class of the town, while today it is possible to find residences, hotels, business and luxury restaurants that, very often, compromise the original characters of the places. The living typological evolution of the Sassi is, by definition, the characteristic example of living conditions change, that it's caused by natural changes and by the need to exploit natural resources, of wich main was the water. One of the most traumatic events for Matera was, in 1952, the displacement of the caves and houses of the Sassi declared unhealthy and uninhabitable, abandoning them in a process of inexorable degradation, for over forty years. The long and complex process of recovery and revaluation of architectural heritage began only thirty years later, to the modern static image of the urban complex. But Matera's story is dynamic, adapting to needs, times and events. The aim of research is definition for a new method, a reference model for the sensitive recovery of architectural heritage through congruous, compatible and sustainable restoration works that can give new life in the original vocation, without compromising the original characters. For this, new techniques and technologies must support the original practices for functional reuse of sites, in consequence of identifying, studying, analyzing and defining unique parameters of judgment of the restoration works already made. A qualitative and objective evaluation of restoration works is necessary, based on the careful evaluation of significance and subsequent attribution of the concepts of congruity and compatibility, on their relationship and the various and many declinations. The city of Matera is characterized as an example of resilient city for its ability to react to events, improving its specific conditions every time, re-evaluating and enhancing its characters and essential characteristics that make it one of the World Heritage Sites of UNESCO, since 1993.

1. INTRODUCTION

The research, theoretically based on the attribution of meaning of "resilient city" definition, analyzes the history of the places, the contextual conditions intervening on the architectural heritage of the Sassi of Matera, the social and economic development linked to the territory, up to the most modern attributions of aesthetic and historical value that merit the term of "cultural asset".

The different phases of research are essential and closely related in a consequentiality aimed at the development of new forms of protection, recovery and development of the historical architectural heritage of the Sassi.

Research phases:

- archival and iconographic research,
- historical analysis,
- documentary and bibliographic analysis,
- typological and functional analysis,
- morphological urban analysis,
- "resilient city" characterization,
- definition of the evaluation method for asset recovery interventions,
- multicriteria analysis for historical and / or aesthetic attribution value,
- identification of parameters and strategies for development and usability of the Sassi,
- application hypotheses and new technologies for the improvement of historic centers.

2. HISTORICAL INFORMATION AND TYPOLOGICAL DEVELOPMENT OF THE SASSI OF MATERA

The city of Matera, despite its ancient roots, in the southern landscape didn't stand out for urban quality, civic conditions and social development, its history is the clear confirmation and definition. Although very often there is a complex historiographic summary for historical documentary deficiencies.

Attention is needed to the recovery and analysis of the sources, archaeological and monumental, as an indispensable tool of knowledge, however, lacking and dispersed especially in the Late Antique, Early Middle Ages and Medieval periods. Understanding the urban development phases of the city, explaining the reasons and describing the main features is very complex, according to approach of the archeology of the city and the archeology of the territory, as transversal and intersecting research fields. Considering the city as a geographically isolated phenomenon and concluded temporally, it would be wrong and misleading, because what contributes to the birth and evolution of an urban center is also outside its borders. Its characterization is in its urban articulation that sees it divided in the nucleus of the civita, inhabited by the noble and bourgeois classes, and that of the Sassi,

inhabited by the poorest people, dedicated to agriculture, crafts and later to the building. This part, today the beating heart of the city, is divided into the Sasso Barisano, facing Bari, and Sasso Caveoso, facing Montescaglioso to remember a Roman cavea.

The Sasso Barisano, which extends to the north west of the town, along via Fiorentini, at one of the two old grabiglioni, is almost entirely built in the superficial part and dug into the underlying part, facing the inside of the houses or artisan shops.

The Sasso Caveoso extends to the south of the civita, crossed by via Bruno Buozzi, in correspondence of the other main grabiglione, mainly represents the excavated part of the Sassi of Matera. The current structure is defined in the Middle Ages, using the rock substrate as a starting point freed from predefined patterns and meshes with orthogonal matrix, of military inspiration.

2.1. Typological analysis and functional living development.

Matera is the symbol of the typological evolution of settlement and housing models, derived from the anthropological characteristics of its inhabitants and the environmental conditions of the surrounding territory, from prehistory to the eighteenth century. An evolutionary process from the excavated cave leads, over millennia, to the entirely built noble palaces, but always respecting the environmental and natural conditions and characteristics.

The Sassi morphology develops on the front of the murgic plateau, crossed by two riverbeds which give it a particular horseshoe shape, excavated in the calcarenitic rock that allows the settlements of the first dwelling models in natural or excavated caves. Over time the Gravina of Matera slopes were excavated, pierced and sculpted to make tunnels, cisterns, environments and elaborate underground architectural complexes.

The excavation materials, cut into quadrangular blocks (tufi), have been used to build dry stone walls, terraces, streets and stairways of an architecture that responds perfectly to the climatic conditions and is composed in an original urban fabric. The vertical development of the city is a direct consequence of the site morphology and of the original agricultural activity, for which is necessary a progression by terracing. In this urban development in which winding walkways alternate with different types of housing, neighborhood units, or urban chambers, symbolize the solidarity and spirit of sharing of the inhabitants of the buildings that formed a court, and in the center was often located a large rainwater tank used as a water resource for the entire neighborhood. The settlement capacity of the populations in the Murgia territory and later in the Sassi, were strictly related to the indispensable ability to adapt to the natural and climatic conditions of the places as well as the ability to wisely exploit the few natural resources available. It is necessary to refer to the Palaeolithic as a starting point for the analysis of the housing typologies, precisely because the artificial and natural caves provided a useful shelter from bad weather during a very rigid climatic phase.

With the improvement of the climatic conditions, life in these natural cavities was no longer indispensable, so these places became useful for worship and burial. In particular, the life and culture model, was the result of an intelligent and parsimonious spirit of adaptation and management of the available natural resources. It can be said that the evolution of the housing model is a direct consequence of the population needs.

During the Neolithic period the same areas were affected by a favorable climate change to the

housing conditions of the places, leading to a population increase and an ever increasing development of agriculture. From here it was possible to derive, especially in Matera, a new settlement model for stable villages, where new agricultural techniques could be developed, such as the conservation of products in excavated underground pits or the creation of bell tanks for water, as a progressive horizontal enlargement of a vertical hole used in the subsoil. The first village housing structures were developed around these ditches, which had not only a specific function but constituted an evocative symbol of worship, to become over the centuries the identity symbol of the same settlement type of the Neolithic village, evolved from nomadism of the Paleolithic. Subsequently the Neolithic will develop in this land so dry and lacking in natural resources, which will significantly characterize, anthropologically and culturally, the history of Matera, thanks to its religious rock architectures. The residential models are the direct derivation of the primary needs of man, caves and ravines responding to the need to find a shelter, the terracings instead responded to the agricultural needs while the characteristics of the land that made it friable and easily excavated responded to the need to create cisterns and wells for water supply. The action of man had in nature a clear reference of the structures based on the model of living and its evolutions, in the course of rock civilization this was the key to organic interpretation of the existing, integrating new structures excavated, based on the always new and growing functional needs, mainly of worship.

The rock architecture has a generating principle in material subtraction, due to a vertical excavation, proper to the Neolithic funerary structures, which extends shape a well court, from which laterally branches, in tunnels dug into the rock.

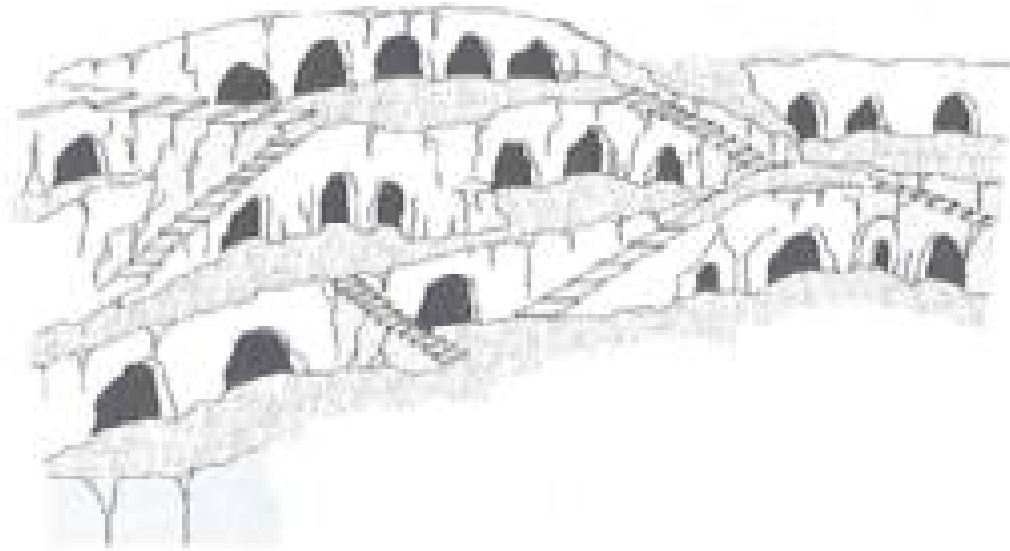


Representation of the evolution of the type of housing from underground cistern a hypogeum.
LAUREANO P., 1997, pg. 118.

The construction type of the central court structure is determined, archetypal of the Mediterranean house on the patio, in the Malve district in the Sasso Caveoso there are perfectly preserved examples of well cave rock courts. This type of structures excavated in the calcarenitic terrain of the murgic plateau and the Sassi of Matera constituted the starting point for the underground construction evolution that still characterizes the heritage, a work of undisputed engineering and hydraulic value, if updated.

The subterranean articulation in cisterns and tunnels, connecting the underground environments, was used, if practicable, for storing food supplies, or, it was built specifically to channel and connect a complex rainwater collection system and the most superficial layers that they intersected the excavated structures. In the typological evolution of the housing

model, the type of the well court was soon abandoned to exploit the natural morphological characteristics of the rocky walls at the edges of the Gravina, which already offered natural caves and vertical cuts from which to articulate the excavated system of underground chambers.

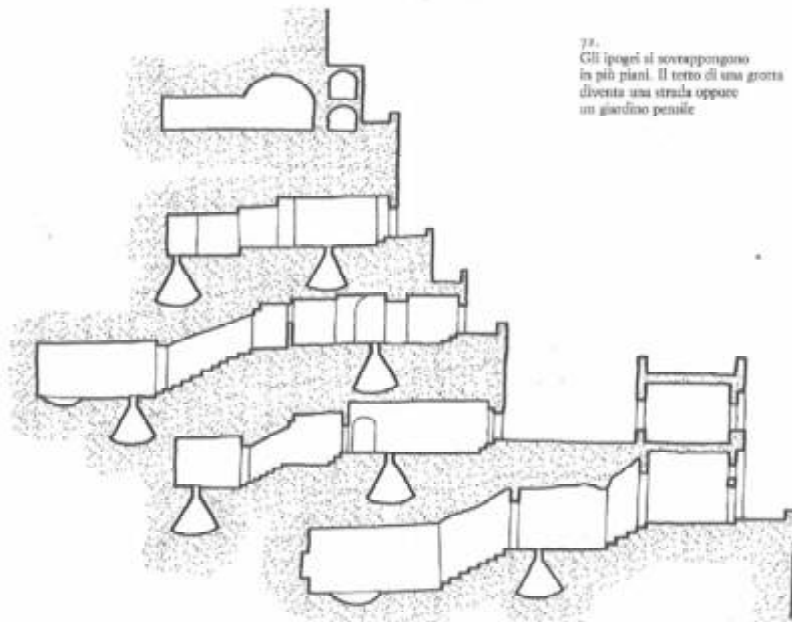


Axonometric representation of the front openings of the hypogean houses in the Sassi.
LAUREANO P., 1997, pg. 122.

The court model was superseded by an integration model between terracing that faced directly into the Gravina and hypogeous structures on several levels. The art of building in the Sassi of Matera has distant origins and refined over the centuries, wise in subtracting material according to a form that incorporates the image of natural and intelligent structures in the reuse of the stolen material to build, above ground, useful structures to different housing models during the entire evolutionary process of the same model.

Hypogean spaces are not only places for daily living but are the primary source of extraction of the tuffaceous material used at first to consolidate the terracing and raise dry stone walls and later used to build the houses of the Sassi. This construction model lasted until the opening of the first tuff quarries, which made it possible to recover construction material, more standardized than the previous one, extracted from small quarries in the urban context of the Sassi, such as the one that today is called "Casa Cava".

The living cells, adjacent to each other, circumscribe a courtyard space, usually around a large cistern, connected through underground tunnels to the smallest cisterns contained within the houses.



Representation of a cross section of a sector of the Sassi di Matera. It can be note the underground articulation of excavated rooms, wells and cisterns.
Da LAUREANO P., 1997, pg. 125.

The neighborhood is still, today, the most important housing model in the history of urban development of the UNESCO heritage, not only for its constructive characteristics but above all for the economic and social model based on solidarity and sharing the daily life of the population of the Sassi, the neighborhood model is the "foundation of collective life". From these assumptions, in an evolutionary process of the housing type, lasted centuries, it takes shape the urban and construction structure of the Sassi of Matera as they appear today, in a perfect integration between nature and built, art and science, technique and experience.

3. EVALUATION METHOD OF RECOVERY INTERVENTIONS IN THE SASSI DI MATERA.

The definition of a methodology to identify and evaluate interventions in the Sassi of Matera is the fundamental point of the entire research. Starting from the recognition of the values that characterize the architectural heritage of the Sassi of Matera to reach their protection, through the various congruous, compatible and appropriate recovery hypotheses.

The restoration can not be defined as determined, self-contained and self-referential, but it must reinterpret the formal, material and substantial characteristics of the architectural structure respecting its aesthetic, historical and psychological appeal, in an organic integrated process between the different restoration disciplines.

In the good design practice, for restoration interventions it is necessary to establish rules, univocally aimed at the protection of architectural artifacts, in their formal, aesthetic and functional integrity, which can be extrapolated from the same "Code of Cultural Heritage and Landscape". It is necessary that every restoration intervention favors the reading of the

historical stratification and of the growth of the buildings, of the monuments and of the whole surrounding environment, avoiding, for pure subjective aesthetic taste, to prefer, with the restoration intervention, a stratification to the other .

The definition of the method begins with the multicriteria recognition of the values attributable to the architectural good, to be understood as a cultural asset. The main values, such as the typological and morphological value, the historical value, the aesthetic value, the environmental landscape value, the symbolic value, the economic value (derivative and / or derivable), the social value, the value in use, the artistic value and the archaeological value, must be recognized because these contribute to the substantial characterization of the good.

The recovery intervention must consider the specific needs, from new forms of use of the asset, such as performance (plant engineering) and functional (internal distribution characteristics), in compliance with current regulations (accessibility, safety, fire protection, ventilation, indoor comfort). Considering the premises to evaluate the opportunity to perform the recovery intervention, or the essential starting characteristics, at the basis of the recovery project, it is necessary to proceed to a phase of subsequent qualitative analysis and verification of the intervention, evaluating the congruence , compatibility and appropriateness with respect to the original architectural structure. In this phase the validity of the evaluation methodology of the intervention becomes concrete, on the basis of the knowledge of the architectural heritage of the Sassi di Matera, texts, manuals, regulations and studies and research conducted over the years, it is possible to define an objective multi-criteria synthesis. Defined the non-discretionary design sensitivity of the recovery interventions, it is possible, not only, to express a value judgment, consolidated in the organic framework of knowledge, but to make sensitive design choices, with particular attention to the principles of restoration: compatibility, congruity, reversibility, recognition, minimum intervention, durability and readability.

In the recovery intervention it is necessary to proceed to the substantial verification of the characteristic elements of the recovery intervention, as integration of the new in the old, such as the compatibility of behavior, management, operation and duration. At this point, the verification of the intervention may be negative, decreeing a formal and/or philological alteration of the original architectural artefact or could always be positive affirming the procedural continuity with the initial values, which are unaffected and valued. If the recovery intervention is verified, it is possible to notice how the valorization of the characteristics of the cultural good, within a cyclical path, is such only if it is coordinated with the safeguarding of the original values and identity characters.

4. COMPARATIVE AND MULTICRITERIAL ANALYSIS OF RECOVERY INTERVENTIONS.

The recovery interventions represent the technical design compromise for the original features and the unique historical and aesthetic value of the architectural artifacts, often representing a formal alteration of the elements and surfaces. The transformation of the architectural heritage must, instead, be controlled, silent, respectful of the past and projected towards social progress, as denoted by the important title of "European Capital of Culture in 2019", in which the city adapts and transforms into a slow and inexorable process of social, economic and

environmental change. The specific assessment is, therefore, the conclusive indication of the extensive analysis process, summarized through a series of intervention technical data sheets, illustrating the most recurrent cases, referring to the wide range of interventions carried out on the external surfaces and on the building envelope, because object of specific protection, object of landscape constraint.

The data sheets are divided into four categories that concern typological analysis (TP), material analysis (M), technological-constructive analysis (TC) and plant integrations (II). Each data sheet is articulated in a first general framework that defines the nature of the intervention, in the subsequent analysis with a synthesis scheme or a reasoned description of the intervention, its essential characteristics and the materials used. The last part of the data sheet, following a brief indication of congruity or incongruity of the intervention, carries out a global estimate on the specific implementation of the eventual intervention: timing, costs, implementation difficulties, durability, monitoring and maintenance.

TP14
ANALISI TIPOLOGICA

Denominazione intervento:
ristrutturazione muraria.

Tipologia di intervento:
interventi sulle superfici esterne.

Materiali:
calcarenne e tufo.

Collocazione intervento:
superfici esterne dei paramenti murari dell'edificio.

Destinazione intervento:
normale.

Cause del degrado:
- erosione,
- disseccamento,
- infiltrazione.



	SI	NO	NOTE
Poteniale reversibilità		X	
Conseguita con il supporto	X		
Presidi di manutenzione	X		nessuna intervento di paramenti murari originali
Prezzi progettuali		X	
Legittimità normativa		X	
Indicazioni ministeriali		X	
Aderenza formale	X		aderenza dell'intervento complesso
Congruità tipologica		X	
Compatibilità tecnologica	X		
Compatibilità cromatica	X		

INTERVENTO INCONGRUO

Tempi di realizzazione	***	Durabilità	***
Difficoltà esecuzione	***	Possibilità di monitoraggio	***
Costo intervento	***	Manutenibilità	***

Descrizione intervento:
Questo intervento di recupero consiste nella sostituzione massiva dei corsi di tufo degradati da fenomeni erosivi come l'infiltrazione, la decolorazione superficiale o il distacco. È stata diligentemente impiegata la tecnica dello "scuot e ricuc" per i corsi dei paramenti murari e la ricomposizione degli elementi di abaco come le cornici marcapiano.

Letture critica de' l'intervento:
La tecnica impiegata per il recupero del manufatto architettonico ha avuto un ruolo di rilievo rispetto all'aspetto complessivo e quello di un edificio che nel corso del tempo non ha subito alcun processo di degrado, come se fosse di nuova costruzione.

Specifiche sui materiali:
I corsi di calcarenne e tufo hanno caratteristiche analoghe agli elementi originali della muratura preesistente e la loro connessione è data da giunti di malta di calce.

5. CONCLUSIONS

The research path leads to the elaboration of an instrument of an interpretative synthesis ordered and systematic structuring of the different, new and renewed, methodological approaches. They define and suggest possible guidelines, in the multiplicity of methods of recovery of the ancient heritage, according to new design approaches, contextual and contextualized, aimed at the sensitive integration of modern in the ancient, through the use of techniques, materials and technologies able to preserve the formal originality, the material integrity, the structural technological functioning, for a new chapter in the history of the protection, conservation and recovery of the Sassi of Matera.

The research is an essential strategic program for the creation of a new reference text for the protection and recovery of the heritage of the Sassi of Matera, which can develop the technical design definition, starting from the analyzed and proposed methodology. Intuition is born from the objective and demonstrated need to protect the architectural heritage, its facets and the complex casuistry of essential characters, typological, material and technological of the Sassi, for a totalizing determination of architecture.

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