Contributi per il patrimonio rupestre: da una piccola esperienza di rilievo alcune questioni di metodo.Research for rupestrian heritage: from a little survey experience to methodological

Education and Culture DG
Culture Programme

CRHIMA - CINP
Programma Cultura 2007/13
CULTURAL RUPESTRIAN HERITAGE
IN THE CIRCUMMEDITERRANEAN AREA COMMON IDENTITY, NEW PERSPECTIVE

International seminar in "Terra Ionica"
Rupestrian settlements in the mediterranean region
From archaeology to good pratices for their restoration and protection

RESEARCH FOR RUPESTRIAN HERITAGE: FROM A LITTLE SURVEY EXPERIENCE TO METHODOLOGICAL ISSUES

NOVELLO, Giuseppa [(1)]

SCANDIFFIO, Alessandro[(1)]

(1) Dipartimento di Ingegneria dei Sistemi Edilizi e Territoriali, Politecnico di Torino
Torino, Italia
pina.novello@polito.it
alessandro.scandiffio@polito.it

Abstract

The current research aims at investigating some topics related to the ancient neighborhoods of Matera called Sassi, starting from the knowledge and the survey of a typical building. The urban area of Sassi represents the natural extension of the surrounding rupestrian landscape, proposed as original human settlement, in the spontaneity of its shapes and its architecture. The research shows the results in the field of survey and proposes a fast method to indentify geometrical aspects (shape and measure) of building consistence, but at the same time, the historical evolution and the different visual representations of the building, in order to represent the specific nature of the architectural. It is interesting to propose a critical evaluation of results, that represents a valid working experience, based on limited resources and basic tools. Part of the work focuses the attention on the identification of significant milestones that have concerned the progressive development of the original cell and the future building, with the aim of retracing the transformation from *"rupestrian cave"* to typical *"lamione"* of Sassi. The exploration of a single building, located in a complex urban system, temporarily removes it from the surrounding context and allows us a direct analysis of the building, but it must keep alive the relationships with the context which it belongs. Therefore, the work fits to the field of rupestrian environments, with the aim of showing the validity of methodology and its application to a real case study.

Keywords: Fast survey, Rupestrian buildings, Methodology, Visual representation

1. Introduction: the cheapness of a survey developed on a living cell in the ancient neighborhoods of Sassi of Matera

This paper describes the assumptions that have led the work experience with the aim of joining the operating procedures applied to a survey on a typical living cell in Sassi of Matera, to the methodological aspects that have controlled the conceptual approach. The critical analysis of results, developed with a fast methodology and made with basic tools, aims at showing the evaluation of a *"light"* survey method, that allowed, at the same time, to gain good results and achieve the working goals. Therefore the current research fits with studies in the field of analysis and visual representation of complex buildings, in order to understand the results obtained through digital tools and, in a broader view, their informative capability.

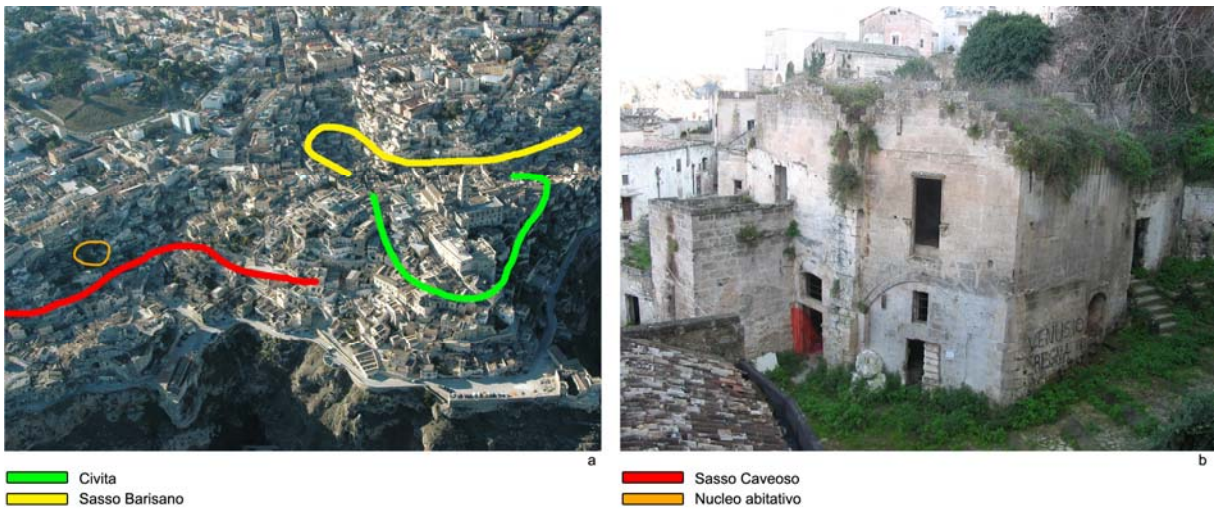

Fig. 1. Localization of the living cell in the urban districts of Sassi

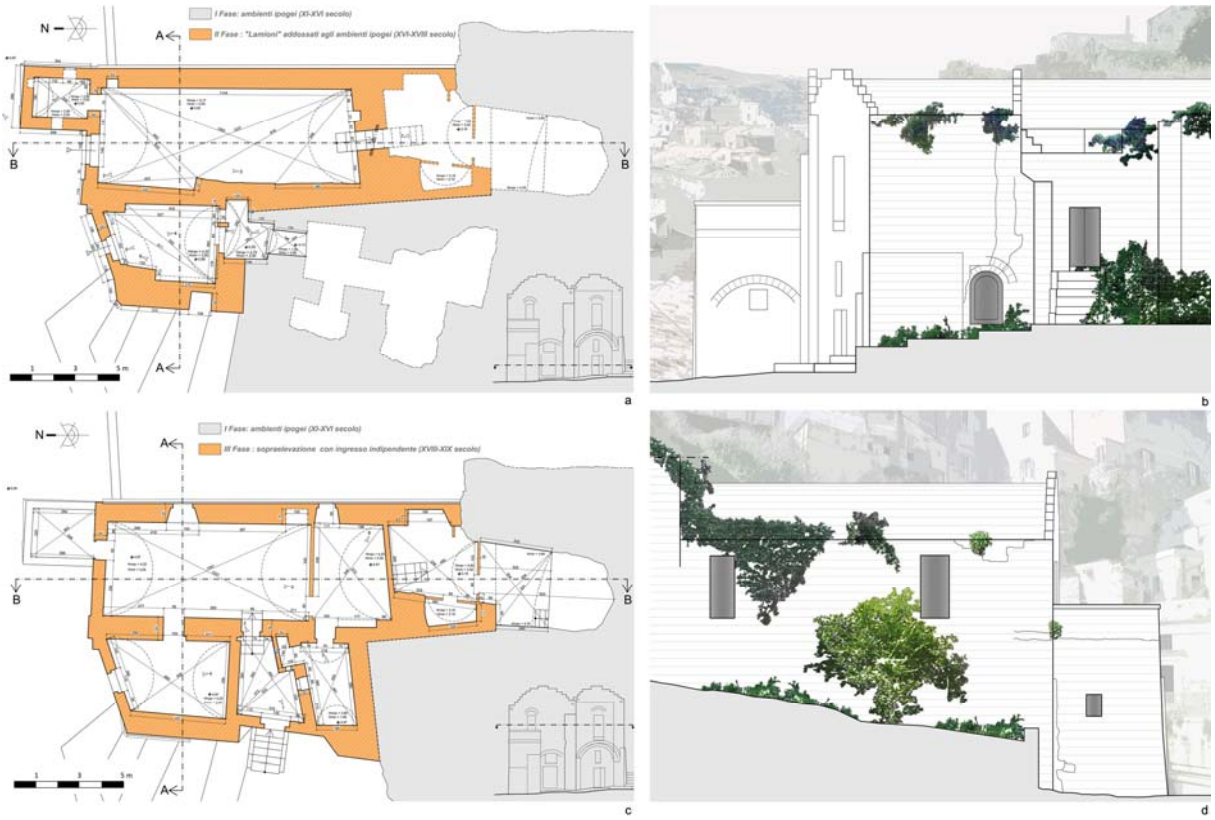

Fig. 2. Drawings related to the survey experience

The brief report essentially focuses on the relationship between the methodology and the working goals, evaluated in terms of resource and tools. The survey, which was the basis for following graphics processing, is the result of a thesis degree program developed in academic field, as learning experience, in March 2007. The survey activities concerned with a typical artefact, located within the districts of Sassi and more specifically in urban areas of Caveoso, which consists of two adjacent buildings along the west side Fig. 1. All survey operations were led with a laser rangefinder and using traditional tools. Considering the complexity of the building and the irregularity of its geometry, the choice to make a *"light"* survey, that allowed to identify shapes and material consistency, was defined by a precision level, suitable to goals achievement and previously set.

1.1. The survey experience on changing shapes

The actions, undertaken during the survey, must be interpreted in terms of resources and results and represent the reflection of the attention directed to the analysis of the building with the aim to identify the extension steps that have characterized the transformation from *"rupestrian cave"* to *"lamione"* typical building of Sassi. Moving from this assumption, it has been carried out a series of discussions and studies related to visual representation methods, in order to reproduce different reading systems with the aim to describe digital processing capability, interpreted as aid to manage *"neutral"* data and produce critically finalized graphic representations. In this sense, the interpretation of figures is carried out through a sequence of three-dimensional images in order to show the different steps related to the growth of the living cell. The use of a computer model, starting from data source, allow establish a variable range of filters for the interpretation of the building and, in this case, it allowed to represent, in a virtual sequence of images, the extension of the living *"cave"* and its changes. As selected frames from a set of multiple records, the series of images shown in Fig. 3, is just one example of n-possible scenes hold in data and attributes of three-dimensional model, allowing, in the different case, more improvements and new visual representations.

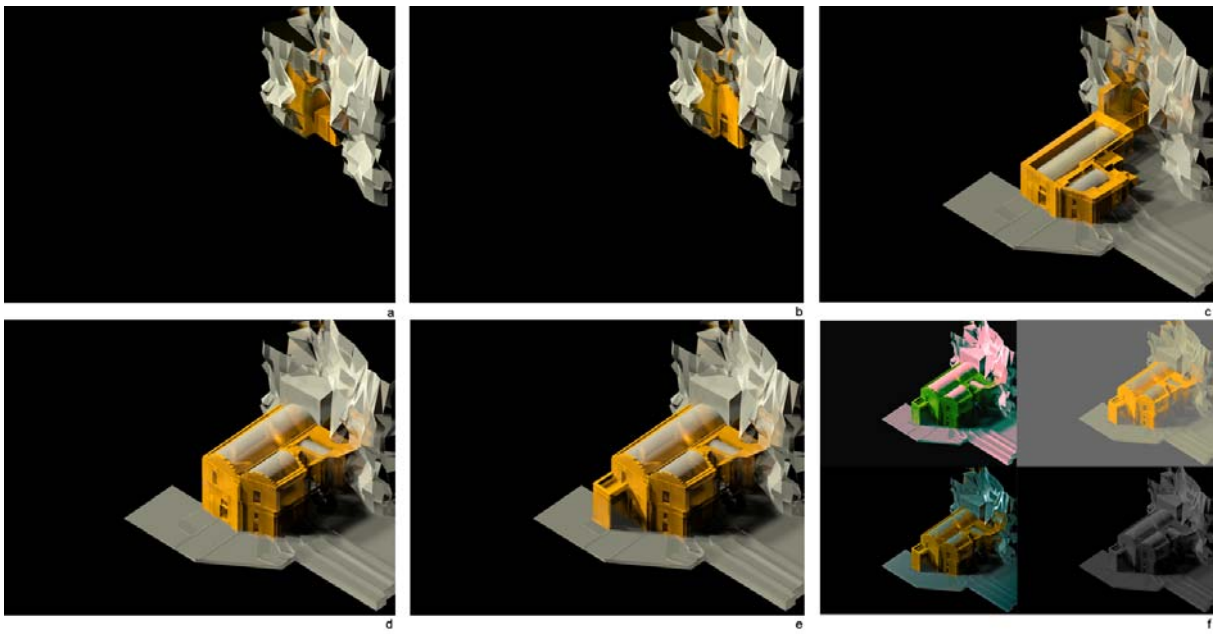

Fig. 3. three-dimensional simulations related to expansion of living cell

The complex transformation of the space created from the rock and subsequently expanded through new constructions, from a rocky cave configuration to the realization of a living cell, following the natural growth process, typical of the construction, according to the rules established by spontaneous local culture. In fact, from the primitive *"negative architecture"* [1] starts new spatial configurations, that outside rocky cave, change the landscape through recognizable patterns but also very interpretative: a chorus of voices that articulate the space and change during the time [2]. Following this metaphor, it seemed natural that the exercise on the visual representation of such dynamic shapes was supported by the use of expressive techniques, suitable to show its variability; the flexibility attributes, offered by digital elaboration, are particularly able to manage the system of consistencies that, although static, nowadays a mediation develops, through a series of dynamic adjustments, able to improve the characterization that distinguishes these *"changing shapes".*

2. The digital management of model and the flexible use of data

The evaluations about the efficiency of survey data processing, that led to the creation of a digital three-dimensional geometric model in the first step of work, can be deeply understood if we consider the choice of a particular system that include information categories relating to geometry, stock attributes, kind of construction, state of decay. During the acquisition-storage data step, such as at the return-processing step, there was a working hypothesis, which aims at critically considering the significant role that can put on the use of computer technology and some of digital systems; the observation was realized in order to exploit data processing and to reflect on the management system of information flow, with the aim to estimate the flexibility level, implementability and editability, which made possible the construction of visual representations from post-production processing, with a different satisfactory content [3]. The opportunity to test a digital model previously created, in order to obtain new explicit informations, represents a huge potentiality for the user. In this experience the use of that digital model, has allowed its *"recovery"* to create new visual representations because of new study needs, proposing new interpretive filters. In this perspective, the quality of the data source, their correct storage and the accessibility for their flexible use, have actually confirmed the methodological value of data formats, providing a set of minimum requirements that can guarantee the reliability.

2.1. Interoperability and/or integration between software

The current experience considered some issues related to the possibilities of dialogue between different software, their features (suitable to describe data process) and their performance according to knowledge requirements. The survey experience had made available a finished amount of data, depending by tools, that through a series of procedures have been used to define the geometric characterization of the building. In this step the need to convert different information, which might come from the survey, into a coordinated set of knowledge, has required adaptation measures in the use of software according with a principle of subsidiarity and complementarity to improve the quality of process. Different software were selected according with basic processing, future activities, knowledge goals, kind of research and their specific functions in order to create a repeatable system using standard criteria.The experimentation has evaluated: the application of Autodesk AutoCAD, a software for *Raddrizzamento Digitale Fotogrammentrico* (RDF), a component of Microsoft Office package Excel, for rendering 3D Studio MAX produced by Autodesk, and the image editor Adobe Photoshop CS. In some cases, data flow, software by software, has been directed, in other cases, it has been made a data conversion to realize an efficient network of knowledge. When you move from AutoCAD to 3D Studio MAX, the data of three-dimensional model has been the same, in the transition from RDF to AutoCAD, data flow makes through processes that include a number of subsequent treatments (Fig. 4). This is the case of building areas affected by degradation that have been analyzed from numerical point of view through the following CAD processing. The application of different software makes more difficult to transfer data between different systems than using a single one, but at the same time, allows to customize data processing and representation path according with specific research goals, creating free opportunities to manage data.

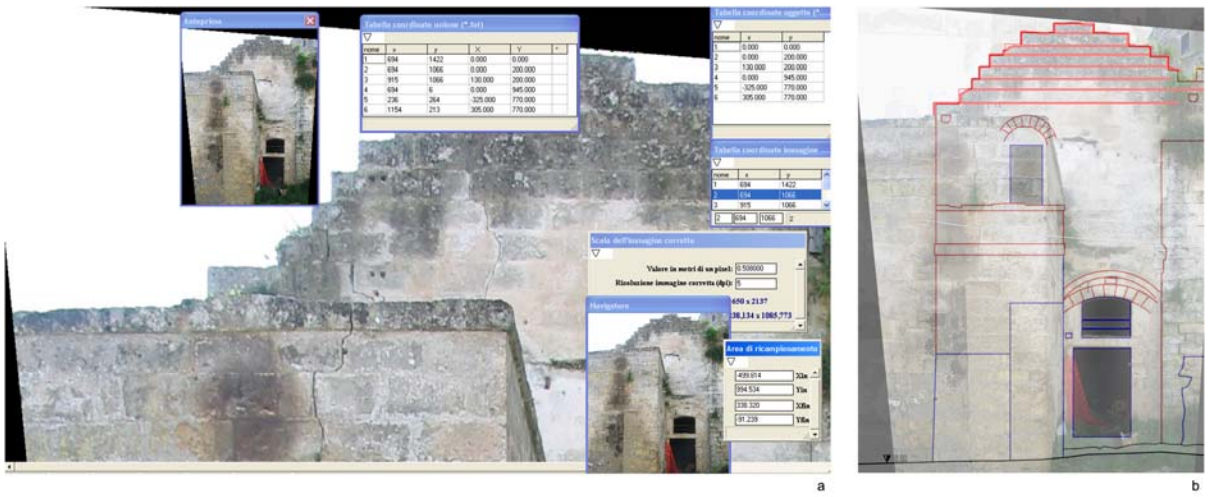

Fig. 4. Survey data can represent a renewable knowledge source: from photo-straightening to survey

3. The *"new drawing"* as media to represent complex systems

The relationship between the *"drawing"* model and the complexity of the architecture, who lives in different and changing attributes, shows how the combination of some kind of visual representations is very useful to overcome to the inevitable differences that occur among the representative configurations, related to the cognitive analysis, and the real shape of the building. In this sense, the visual representation have to gain the ambitious goal to become, increasingly, a rigorous and flexible means, suitable to communicate, as an *"active media",* very different contents, for which it is necessary to operate a series of checks at several levels. The proliferation of specialized software in three-dimensional calculations allows to achieve virtual images that simulate the real consistency of the building, with the possibility of editing a template and make new views; only if you have made visual images with other cognitive means, you could, approximately and with different levels of definition, describe the complexity of the investigated systems. In the case you have to face with more complex and sensitive architecture, as in the rupestrian environment of Sassi of Matera, and more generally when the research refers to a cultural heritage, it is essential to chose which tools are properly suitable for the investigation. The drawing which is required, is a *"new drawing"* that fits easily to become a filter, through select, among the multiplicity of data, information and visual representations that you want, in order to support hypotheses for following testing. If the methodological process is explicit and accessible, open and declared goals, at that time its results could be evaluated and revised.

Fig. 5. In order to develop a knowledge it is essential to mix the information: photos, drawings, 3d simulations

4. Conclusion: a proposal to keep the memory, through the sum of the experiences method

The considerations that have emerged during the activities of this work were sum up in the previous sections, which are the contribution from direct experience, strongly focused on the exploration of digital methods and visual representations but that activities related to graphics representation should be only one among the things to be considered when you study an architectural or environmental heritage. A first conclusion considers that the exercise, although limited, has brought us to think that the research outcomes in cultural heritage should not be dispersed and beyond the very important role that it is for superintendents and other institutional stakeholder (national and international), there is a need to *"store"* and *"share"* in someway the results of the investigations. These study days offer the sharing of single experiences and it will retain memory through the publication of these through the debate, but they can not *"keep the data source"* from which the operation of critical analysis has started. Obviously, for the survey data, nowadays in digital support and therefore more easily storeable, it would be not too difficult, although the validation of the quality of information could create some serious problems on their *"certification"* and *"accessibility"* as *"Carta del rilievo"* update has revealed in our dicliplinary area. The conclusion is open and tries to propose a method: in order to implement the heritage in the field of knowledge about Sassi of Matera (emblatic example of cultural heritage), to support the cultural interest in the world and promote an improvement in the management of safeguard by local community, it is necessary a collaboration between universities, research institutions, local government and cultural associations because the set of cultural resources cannot be wasted, but must grow and become a dynamic heritage for the future.

Reference

[1] RESTUCCI Amerigo. *Matera: i Sassi: manuale di recupero.* Milano: Electa. 1998.

[2] LAUREANO Pietro. *Giardini di pietra I Sassi di Matera e la civiltà mediterranea.* Torino: Bollati Boringhieri. 1993.

[3] NOVELLO Giuseppa. Nuove forme e modelli per la conoscenza dell'ambiente e del territorio: metodi e pratiche di rappresentazione. *Nuove Tecnologie.* Dicembre 2002, N°4.

[4] GIUFFRÈ Antonino. CAROCCI Caterina. *Codice di pratica per la sicurezza e la conservazione dei Sassi di Matera.* Matera: La Bautta. 1997.

[5] CONTE Antonio. *Comunità di disegno: Laboratorio a cielo aperto di disegno e rappresentazione nei Sassi di Matera.* Milano: Franco Angeli. 2008.

[6] PONTRANDOLFI Alfonso. *La vergogna cancellata. Matera negli anni dello sfollamento dei Sassi.* Altrimedia. 2002.

[7] CHIAVONI Emanuela. Matera: struttura,forma e colore. *Disegnare.* 2010, N°41, p.52-65.

[8] SCANDIFFIO Alessandro. *Nel rilievo di un fabbricato, la storia antica di una civiltà rupestre.* Tesi di laurea triennale. Politecnico di Torino. 2007. Relatore: prof.ssa Anna Osello.