

ARCHITECTURE HERITAGE and DESIGN

Carmine Gambardella

XVI INTERNATIONAL FORUM

Le Vie dei
Mercanti



WORLD HERITAGE and KNOWLEDGE

Representation | Restoration | Redesign | Resilience

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Collana fondata e diretta da Carmine Gambardella

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Conference report

300 abstracts and 650 authors from 36 countries:

Albania, Australia, Benin, Belgium, Bosnia and Herzegovina, Brasil, Bulgaria, California, Chile, China, Cipro, Cuba, Egypt, France, Germany, Italy, Japan, Jordan, Kosovo, Malta, Massachusetts, Michigan, Montserrat, New Jersey, New York, New Zealand, Poland, Portugal, Russia, Slovakia, Spain, Switzerland, Texas, Tunisia, Turkey, United Kingdom.

160 papers published after double blind review by the International Scientific Committee

Preface

In the present era, technologies are becoming increasingly important in helping and supporting man in research, knowledge and production activities, almost as if they were smart prostheses. With the theme of the XVI Forum "World Heritage and Knowledge", I propose to the International Scientific Community to debate and establish a comparison of knowledge carriers to communicate methodologies of good practices adopted and experiences in the use in the protection, conservation and safeguarding of cultural heritage and landscape as well as in the design of the "new," that, adopting in the building processes and building construction Innovative Building Modelling, can realise a non-contemporaneity of what has the same date (Giulio Carlo Argan) respectful of the values of the pre-existing, legitimate because it participated ex ante and monitored becoming all its ethical, aesthetic and performance connotations.

With the Internet of things, for example, sensors that are used to produce data autonomously that widen the processes of knowledge on all levels, from the territory with its infrastructures, to the environment, to the artefacts entering into the body itself of their physicality, or, in the case of the new, building the project as a prediction throughout physical consistency.

Nevertheless, the use of new technologies allows for economies of scale, both temporal and economical, not only for the surveying and representation of the built and the territory in the analysis phase but above all for the management of the resulting data that makes the design activity of the restoration of the historical heritage and landscape or of the newly constructed in a single process no longer divided into steps but also unitary in concrete constructions and the realisation of the works, in the intermediate checks, in the testing, in the monitoring and in the programmed maintenance.

In conclusion, it is indispensable for the scientific community to highlight how technologies, without a responsible attitude that commit man's choices and knowledge in dealing with and planning appropriate responses to the issues and needs of the collective, can create a deception that unfortunately materialises with the subtle persuasion of uncontrolled astonishment that overwhelms the imagination.

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President and Founder of the Forum



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The complex dialogue between contemporary language and preservation of the ruins in the restoration of Paul II's fortress in Cascia

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Abstract

Pope Paul II's fortress at Cascia was erected in 1487. After excavation campaigns, priority was given to the consolidation of the surviving wall fragments, taking care to avoid jeopardizing the particular character the fortress has taken on as a ruin down through the centuries; it was decided to entrust concise, distinctly contemporary marks with the task of suggesting hypotheses for recomposing the fragments; at the same time, environmental cleanup operations made it possible to contextualize the archaeological structure, setting it into the environment.

It seems evident than in the past as in restoration in archaeological areas is manifested today greater attention to debris-formal aesthetic aspects, namely those arising from the architectural language still expressed by the pre-existence.

The interpretation/return of the text, just as an act of preservation prevalent, will therefore inevitably characterized by a formative process, designed to facilitate, in a critical path, the reconnection of the fragments, in an intense and constant dialogue between material signs of the past and language of the present. The parts added, although not directly put in relation to the ancient material, must be arranged in accordance with the pre-existence, within a large conservation project and in keeping with the vocation it expresses through its transformation process and its new space in which the values assumed formal 'insert' is delegated the task to demonstrate the process.

Keywords: Fortress, excavation campaigns, interpretation, architectural language

1. Paul II's fortress

Between the first and second half of the fifteenth century, the concept of fortification understood as a "fortified city wall" was replaced by that of a fortress that stood on its own, also militarily, as in the thought of Francesco di Giorgio Martini – an architecture also marked by its close dialogue with the nature of the places, taken on as an additional element for the city's defence. The defensive system therefore demands a design submitted to rigorous scientific rules: abandoning the practice of making the walls thicker, the more scientific direction was taken towards shaping the walls; the theory and practice of fortified architecture require in-depth analyses that lie outside the tradition of the architectural field, becoming a field that is autonomous and wholly new in comparison with the long-established practices of military architecture.

In line with these new tendencies, the Cascia fortress (fig. 1) was built starting in 1487 by Francesco da Pietrasanta and Antonio da Settignano; According to historical sources, the works were supposed to go on for a short amount of time, bearing effective witness to the real attention Pope Paul II, who commissioned the fortress, devoted to this project. The design showed an irregular trapezoidal configuration, delimited by highly scarped cylindrical towers at the corners (called "*rondelle*") with the function of ensuring defence of the section of wall between them. The towers' particular resistance was a result of their rounded shape, which meant that the only effective blows were those directed normally at the diameter, as other blows were deflected by the rounded surface. A bull-shaped stringcourse ran the entire defensive perimeter with the aim of deflecting the blows reaching the tower along the scarp wall; at the top was a jutting structure where the *chemin de ronde* was placed, from which molten lead could be rained down on the enemy.

To the west, a deep moat protected the city wall; the main entry was through a corridor “flanked” between the two southern bastions, from which it could be defended by grazing fire; on this side, the wall shows a considerable convex contouring, patterned after the San Leo fortress in the Marche region, a construction built by the Sienese Francesco di Giorgio Martini, the first to theorize this defensive work.

The fortress’s downward defence was entrusted to artillery pieces placed in the towers; along the perimeter wall, round arquebus slits notched at the top for aiming, similarly attributed to the fifteenth century, may still be seen.



Fig. 1: The fortress of Paul II. View from west.

After repelling an initial uprising in 1505, about a decade later, in 1513, following the fortress’s occupation by exiled Ghibellines, Leone X, having declared the Cascians to be in rebellion, ordered lawfulness to be restored to the municipal territories, and the fortress to be torn down: a military expedition commanded by Spoleto’s Pietro Ridolfi was sent to siege the castle which, according to the sources, was “demolished and destroyed... from the foundations”; more likely, the destruction went no further than to dismantle the defensive works and to transfer the guns.

2. Survey, archaeological investigations, restoration

The geometrical and constructive aspects of the architecture and its arrangement of openings were examined in a survey of the surviving masonry structures, done with the aid of stereo photo rendering; this enabled greater speed in carrying out the survey campaign, with no appreciable reduction in the descriptive effectiveness of the discovered elements, and maintaining margins of error in line with the tolerances established in the adopted representation scales.

The complexity of the data obtainable in the study of this architectural construction made the analytical approach essentially interdisciplinary.

All the data found through direct observation were sequenced, and inserted into study chapters relatable with one another; a multi-level analysis was then performed: an initial level of investigation consisted of the detailed recording of any element found on the structure of use for identifying the construction phases or bearing witness to some suffering (alignments, changes in elevation, differences between apparatus, cuts, collapses); a second level of investigation involved the structural nodes, whose assembly phases were identified through the mutual relationships between the parts; lastly, a third level consisted of the mapping of the masonry apparatus, whose texture, interpositions,

and breaks were studied. Along with the excavation activity carried out between 2001 and 2004, a sampling was done of the masonry apparatus and of the finds discovered, organized in accordance with the documentary sequences, on the strength of sample analyses.

Diagnostic surveys were also prepared, aimed at ascertaining the chief characteristics of the materials brought to light, and their state of conservation; dynamic surveys, repeatable over time and comparable with one another, aimed at providing a diachronic interpretation of the phenomena.



Fig. 2: The fortress of Paul II. View from the south.

The use of georadar equipment made it possible to compare the excavation hypotheses formulated earlier and at the same time to reconstruct the state of the locations prior to the nineteenth- and twentieth-century arrangements that irremediably modified the prior conditions; in particular, research cast light on the presence of “man-made structures of considerable size,” clearly underlying a historical presence that was highly articulated over time (fig. 2).

3. Construction techniques and decay

The fifteenth-century masonry apparatus consists of a “sack” system with cortical elements in opus incertum made with blocks of hewn limestone of different sizes, placed, in accordance with pseudo-horizontal levels, on beds of coarse mortar composed of lime, sand, gravel, and sparse brick fragments.

The masonry apparatus presents irregular repetitions with a prevalence of orthostats on the diatonas – a characteristic that partially compromises the features of adhesion between the septa, especially given the places’ high seismicity.

Cascia’s fortress in fact rises on a terrain marked by high seismic risk, and earlier seismic events had generated, in the masonry apparatus, a series of stresses that, due precisely and above all to the construction’s structural incoherence (amplified by a diminishment of appropriate adhesion/cohesion characteristics) had consequently determined a widespread process of discretization into minute elements with a tendency to disaggregation, a symptom of a clear structural incapacity to sustain thrusts – mainly transversal ones.

This led to adopting widespread consolidation interventions or supports suitable for “binding” the construction in order to increase its stiffness, while at the same time reducing the possibility that significant detachments might take place among the masonry elements that, consequently, should have resulted in disastrous collapses.

4. Archaeological research and restoration

Documentary historical study and stratigraphic investigations conducted on Cascia's fortress have led to some considerations on the relationship between archaeology, restoration, and the collateral spheres of analytical discipline.

The hermeneutical approach typical of archaeology, or, more specifically, of stratigraphic analysis, allowed the study object to be revealed in its material reality, including the signs left by decay – an indelible sign of the passage of time: both loss and increased value at the same time; matter is understood, then, as the chief testimony of history, given that, albeit only in part conservable and transmissible, it still constitutes “much of our cognitive experience” (Bellini, 576).

Archaeology, then, changes its role as (research) (object) to “study method” capable of extending its validating force, in this sense, even beyond the historic confines already defined for becoming a privileged instrument to investigate segments of history that appear less documented through written sources (fig. 3).



Fig. 3: The fortress of Paul II. Eastern sector of the excavation.

Here, a specific aspect of archaeological restoration is consolidated: the relationship between excavating and restoring the structures that have re-emerged, from which it appears that research and analysis cannot proceed hand in hand with conservation: “if, then, the end is conservation, the means is knowledge – a complete, in-depth knowledge that finds precise correspondence in the definition of the prospects for intervention” (Vassallo, 163). The main objective (and, at the same time, the limit) of reconnaissance investigations and of stratigraphic excavation thus lies in orienting, along with the data emerging from archival research, the process of revealing the investigated historical text.

On the other hand, it is to be stressed that the design direction must, in an absolute sense, be derived from a deepening of knowledge rather than from a value judgment; otherwise, by radicalizing the terms of the question, a line might be affirmed according to which, once the data are archived with the process of stratigraphic analysis, the permanence of said matter becomes superfluous. By conserving what survives, with no tampering, the information recorded in its stratigraphy, in its structures, and in its stratigraphy survives, too. The activation of a selective process on the monument, (a set

fragmented, in archaeological research, into chronologically circumscribed sectors) involves the risk of definitively precluding the possibility of reconsidering the monument in its contradictory nature and of certifying an interpretation of it as authentic; this may give rise to a line of methodology (which we might call “ostensible”) that reduces restoration to the formulation of a descriptive and evocative language in which, as A. Bellini states, “a romantic idea of the artwork, to which one ends up attributing values of meta-history, justifies every choice” (Bellini, 272); the contemporary image of discovery will, rather, have to conserve the traces of time, and those induced by the factors of deterioration: “The unit of the whole... if physically shattered, must continue to exist potentially in every one of its fragments, and it will be possible to demand this potential in direct proportion to the formal trace surviving in the fragment” (Brandi, 1963, *ad vocem*). On the other hand, the reading of the stratified matter offers a precious way to grasp an organic, diachronic vision of the monument: interwoven in the “restoration of the ‘material remains’ capable of historic/testimonial, documentary, and evocative value” (Carbonara, 1992, 28) are conservative functions and revelatory perspectives; this means a sort of a vivid “active memory” that becomes interpretative memory, substantiated by a solid mastery of the documentary data.



Fig. 4: The fortress of Paul II. The reintegration of the north wall

5. Lines of methodology

The consolidation of the fortress’s masonry apparatus was preceded by a large-scale excavation work conducted mainly on the northern front and at the base of the northwest tower, aimed at restoring the perception of the monument one had until the mid-twentieth century (in its original blend of nature with architecture in ruins) when the desire to enlarge the space in front of the Rutiloni gate, as well as the collapses of large summit portions of masonry that took place on the occasion of the seismic events that struck the region in 1964 and 1979, had determined the filling of the late-fifteenth-century moat and concealed the western front in the fortress up to the stringcourse.

The disconnection of the stone elements required the refilling and pointing of the joints using lime mortar, as well as a consolidation work done by means of low-pressure injections of fluid binding mixture based on hydraulic lime, making sure of the operation’s successful outcome by means of thermographic instruments; this intervention made it possible to restore the masonry’s initial continuity while at the same time guaranteeing a considerable increase in its mechanical characteristics.

Operating in this seismic area, the consolidation project was aimed at identifying, within the original structural vocabulary (also investigated in the prior interventions and in the consequent reduction of the initial capacity for resistance), completions and additions that might lead to an “improvement” of the monument’s own anti-seismic effectiveness. Work was then done by introducing “minimum” interventions aimed at a point-by-point structural consolidation, by exploiting the interaction among the parts, and by verifying or reconstructing the effectiveness of the links by means of modest ligaments and the injection of mixtures containing a high index of elasticity.

In this perspective, static consolidation is not configured as an operation distinct from architectural restoration and, as a consequence, must by necessity be subjected to the careful critical assessment underlying it.

The reduction of the masonry section of the north wall and the northwest tower, which may be ascribed to the collapse of a large portion of the cortical wall, had led to a state of suffering in the structure; as a consequence, the masonry face had to be redone, through the installation of ashlars of regular, squared stone, with open, rough face (bush-hammered, or quarry level).

Integrations, done only where absolutely necessary, have left unaltered the balance struck between the monument and its natural environment, without in any way compromising the special nature of the ruins that the fortress has taken on over the centuries (fig. 4); the “additions” are in harmony with the pre-existing elements, repeating the same language (through the use of stone recover elements placed in accordance with a similar *ductus* of construction).



Fig. 5 - 6: The fortress of Paul II. Phases of the construction of the corten path.

The “distinguishability” of the current intervention is entrusted to the laying of the mortar in the interstitial joints, arriving, in the integrated parts, almost flush to the outer facing of the stones, in such a way as to reduce its natural shading due to the consumption of the binder, which the action of time has impressed upon the original face – and leaving to synthetic, distinctly contemporary signs the task of suggesting possibilities for completion: reconstructions contained and supported by rigorous scientific acquisitions characterizing the restoration project, not as “restitution of the past, but rather mediation, done [mainly] by thought, with present life” (Carbonara, 1999, 146).

The same line oversaw the careful work of pointing of the stone elements constituting the masonry crest, a solution deemed less invasive than the more common interventions with screed in conglomerate of lime and pozzolan (“capping”). Restoration therefore also aimed at maintaining unaltered the upper profile of the fortress, now fully inserted into the natural setting, without excessively weighting its sign, but not hindering a clear interpretation of the whole, either.

The broad excavation work performed on the northern and western faces led to the discovery of the vault, built in 1571 to bridge the moat and allow the nearby Madonna delle Libere church to be reached; the level of the road accessing the fortress was placed to rest on top of on the ancient structure built using well-squared ashlar put in place practically with no mortar placed between them; its general conditions of stability required an urgent consolidation intervention that was done using a co-operating hood in reinforced concrete anchored on the extrados using stainless steel bars. The reconnaissance and archaeological excavation campaign aimed at the unveiling of the fortress’s fifteenth-century structures also necessitated the preparation of a pedestrian and vehicular path near the access archway, on the fortress’s internal face, done by means of a “light” frame in weathering steel; this, with the interposition of Teflon “cushions” (in order to limit the effects of any earthquakes), was rested upon concrete supports, in order not to weigh – by its own load and by the greater load of operation – upon the historic walls (fig. 5 – 6).

The project aimed not to neglect, to the extent possible, the conservation of the symbiotic relationship established over time between architecture and environmental context; the passage of time, and natural and manmade factors, have in fact transformed the original morphology of the places, delivering to us a new image that has become consolidated in memory.

The conservation intervention, like the introduction of new “signs,” was carried out responding to the substantial need (inherent, in some way, to restoration in an archaeological setting) to reconnect and provide continuity to spaces and history, taking on the idea of monument as something that does not have a value “in and of itself,” which implies reference to a broader historical, cultural, and aesthetic context (fig. 7).



Fig. 5 - 6: The fortress of Paul II. The corten path.

Parallel processes of environmental restoration have allowed the archaeological find to be contextualized: interest in the landscape therefore rose to become an essential element of continuity between past and future; in this perspective, conservation was shown to be the privileged instrument for achieving this persistence of time and of actions, in the search for an “authenticity” of the monument that is to be understood as the “sum of its initial formulation and subsequent stratifications” (Carbonara, 1999, 145); a “path” through history that could not exclude that phase, more close up, marked by the integration between the built and the surrounding landscape. Reliance on integrations with the use of plant elements, to guarantee the necessary and absolute reversibility, thus suggested (or, better, guided) the reconstruction of lost architectural elements.

This perspective did not determine the development of a romantic idealization of a nature that reclaims and reabsorbs architecture etched by time; rather, it guaranteed the activation of a project experimenting with an alliance of skills: restoration as an amalgam – critical, organic, and of design – working together as a unit towards recovering architectural form and at the same time a territory’s historic identity.

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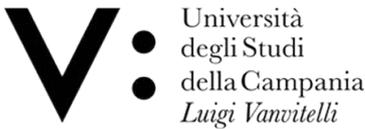
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