



## **THEORETICAL CONSIDERATIONS ON CONSERVATION INTERVENTIONS\***

**A. Elena Charola<sup>1</sup> and Fernando M.A. Henriques<sup>2</sup>**

### **Abstract**

The current concept of conservation emphasizes the importance of architectural heritage as both a work of art and a historic document. However, as illustrated in the examples discussed in the paper, this concept may lead to contradictory technical approaches during a conservation intervention. The reason can be found in the fact that conservation is a cultural activity rather than a merely technical one. To find the right approach to conservation, the values to be preserved must be determined a priori, requiring a careful balance between the various disciplines that make up the conservation field. In most cases, resorting to the traditional methods used in the original construction may be the best solution. However, several cultures contributed their technology and expertise to construction in America at different times. Trying to re-capture the traditional crafts that originated the structures that are to be conserved may be problematic in this situation.

### **Keywords**

renders (renderings), sacrificial coatings, protective treatments, lime, conservation, ethics

---

\* © Copyright NLA Building Lime Group 2005

The views presented in this paper are solely those of the authors. The National Lime Association (NLA) and the Building Lime Group assume no liability or responsibility for any errors, omissions, or other limitations in this paper or for any products, services, or methods presented. This paper is intended for use by professional personnel competent to evaluate the significance and limitations of the information provided and who will accept full responsibility for the application of this information. NLA and the Building Lime Group do not intend to infringe on any patent or other intellectual property right or induce any other party to do so, and thus users of this document are responsible for determining whether any method, technique, or technology described herein is protected by patent or other legal restriction.

<sup>1</sup> Independent Scientific Consultant. Lecturer, Graduate Program in Historic Preservation, School of Design, University of Pennsylvania, USA [aech@verizon.net](mailto:aech@verizon.net)

<sup>2</sup> Professor, Universidade Nova de Lisboa – DEC, Portugal [fh@fct.unl.pt](mailto:fh@fct.unl.pt)

## 1 Introduction

The mid-19<sup>th</sup> century industrial revolution and the ensuing social changes resulted in a revised perception of ancient monuments and the development of the concept of architectural heritage as well as the importance of its preservation. The theoretical framework that was eventually developed was crystallized in the 1964 Charter of Venice document (ICOMOS 1965). However, the conservation of historic buildings and monuments is currently perceived as a purely practical problem by many practitioners and scientists working in this field. This rather simplistic approach leads, in many cases, to an erroneous methodology when conservation interventions are being carried out. The correct approach is to remember that a conservation intervention is a cultural activity with technical implications, rather than a technical activity with cultural implications (Henriques 1994; Carunchio 1996).

Conservation is a cultural activity because it follows the notion of heritage developed during the past two centuries, but it is implemented through technical means that need to take into account the perception of the value of cultural heritage. This “value”, however, is not unique and/or immutable. On the contrary, “value” is a complex concept that needs to be carefully analyzed and understood before a technical decision can be made. Therefore, the definition of the value of the “object” to be intervened is fundamental in determining the type of intervention that is required.

While the notion of safeguarding the “object” for future generations is clear and generally accepted, the methodology of achieving this safeguarding is far from clear. For example, Article 3 of the Venice Charter specifies that *“The intention...is to safeguard them no less as works of art than as historical evidence”*. But the multiple intentions may lead to contradictory requirements in a given intervention. Because this is probably the most critical point of a conservation intervention, the conservator responsible for the intervention must have a clear notion of the values that should guide the conservation.

## 2 Historic background

Traditionally, that is, prior to the romantic movement of the late 18<sup>th</sup> century, buildings merely had a practical value and their conservation was conceived from a purely economic or social point of view. Monuments were limited to those that served to remind people of someone or something, as the word monument literally signifies. Conservation of monuments was important only as long as the memory value was considered important.

The industrial revolution changed this pattern by disrupting the values that had remained fairly constant for so many centuries. In one of his novels, William Morris (1920), describes the value disruption as follows: *“...the great achievement of the nineteenth century was the making of machines which were wonders of invention, skill, and patience, and which were used for the production of measureless quantities of worthless make-shifts.”* This achievement constituted a break with tradition, and cultural continuity was consequently interrupted. Modern society thus started to view architectural heritage as a unique symbol of past times.

The change in perception of the value of architectural heritage led to the development of different approaches in conserving this heritage. Two main approaches can be identified: the one championed by John Ruskin, based on the preservation of existing fabric and accepting its eventual loss in the future; and that developed by Viollet-le-Duc, which would have a building take on the ideal image it might have had at its inception. Ruskin’s writings inspired the 1877 Morris Manifesto (Denslagen 1994:71-73), and eventually led to formulation of the widely accepted Venice Charter.

### 3 Conservation interventions

Although the Venice Charter is the most recognized document that guides conservation interventions, one must understand that this document was written at a time when “restoration” rather than “conservation” was in practice. As early as 1906, Thomas Hardy, who was a restoration architect turned novelist, considered that preservation of the architectural form alone was insufficient, for the building material itself was the source of historical associations (Denslagen 1994:81).

The notion of “conservation”, as currently accepted, emphasizes the concept that architectural heritage is not only a work of art but also a historic document. Obviously, a historic document must be kept intact and cannot be adulterated by any change. Therefore, the objective of a conservation intervention is that of retarding the inevitable deterioration of the building so that the document can last as long as possible in time. Furthermore, the intervention should not “change” the value of the building as a document.

In a written document or in a picture, the main value resides in the writing or the drawing and painting rather than the actual materials. However, a building’s value as a document is not as clear. For example, in a historic building that has lost part of its render, is the building to be kept as is, in spite of the fact that failing to protect the remainder of the building with a render will accelerate the loss of the whole building? And if the materials themselves, such as the render, have to be kept as documents, won’t a consolidation of that render to prolong its life change the nature of the render and hence its value as a document?

Part of the problem is the assumption that the values to be preserved through conservation interventions are obvious, but this is far from being the case. The ideal conservation intervention should not be visible, since it should not distort the document value of the building. But if the material of the building and the construction technology are also considered as having a document value, then any treatment to prolong the life of this document will inevitably affect its value as such. Thus a paradoxical situation is created, similar to those depicted by Pirandello in his novellas. From a theoretical point of view, the concept of “conserving” the document in its “present state” appears logical. In practice, however, compromises or changes must be introduced to achieve conservation of the “present state”. Herein lies one of the main difficulties that conservation interventions have to address. Because of this difficulty, practitioners generally tend to avoid considering the theoretical framework that, in reality, should guide any conservation intervention.

Perhaps the best way to fully understand the relevance of the theory of conservation is by analysing some examples of real situations and identifying the problems and dilemmas that will inevitably arise when trying to find the best possible approach to achieve the final conservation objectives. For the first illustration, consider the problem posed by conservation of tabby. Tabby is a concrete that is based on lime mortar and shell aggregate. It is poured into wooden forms, about a foot high (30 cm) and 2 inches (5 cm) thick, in step-wise fashion. It is pounded for compaction. Layers of shells are added between layers of lime mortar, which already contain some shells. Tabby was developed along the south-east coast of the U.S.—from South Carolina down to Florida—where middens, or mounds of shells left by native Americans, provided a good material ready to use. The lime used for the mortar was obtained by burning the same shells (Sickel Taves 1997, Sickel Taves et al. 1998).

The structure, built up step-wise by this pouring and setting method, was eventually white-washed or rendered with a lime mortar, depending on the importance of the building. Over time, and given the significant changes that affected this area in the 18<sup>th</sup> century, many of these houses were abandoned. The lack of regular up-keep resulted in significant losses of surface coatings, as well as roofs, thus leaving the concrete mass exposed. The concrete mass is characterized by the exposed shells, since

they are more resistant to weathering than the mortar mix. The local population identify this construction as “tabby” and consider it as their own particular heritage. This heritage is so valued that newer buildings use prefabricated cement panels with shells pressed into them to obtain a faintly reminiscent appearance of weathered tabby structures. These newer buildings are referred to as “neo-tabby” by those eager to preserve the original tabby constructions.

Thus, there has been some resistance to having historic tabby structures—particularly the remnants of buildings in many of the historical sites along the coastal areas—re-rendered as they were originally because this would change their present appearance. Keeping structures in their “present state” actually coincides with recommendations resulting from a strictly conservative approach and is primarily relevant to archaeological heritage. Clearly, this is one of the paradoxical situations previously referenced. The conservation of tabby requires that these structures be rendered to preserve them. But this intervention would change their appearance, by introducing a new element that diminishes the “document” value of the structure—principally if they are just remains of structures—as well as the currently perceived “identifying” value.

While the conservation of archaeological heritage requires a different approach than that of architectural heritage, construction that is to be left exposed to the open requires interventions, such as maintaining the renders. Because ruins do not have a roof to protect them, one such intervention may be the application of a capping, changing the appearance significantly. The change in appearance could be mitigated if the “identifying” value is considered important enough to use shells as the finish of the capping. Since the capping itself is clearly not part of the original structure, this shell finish could serve to mitigate the rounded shape generally given to cappings which, in this instance, is at odds with the sharp edges of traditional tabby construction. Figure 1 illustrates a conservation intervention on some of the Retreat Plantation ruins on St. Simons Island, Georgia.



*Figure 1 View of the “conserved” remnants of the Retreat Plantation ruins, now within a golf club, on St. Simons island, GA. At right, a detail of the square left without render to show the internal structure of tabby.*

This contradictory approach was already pointed out by Koller et al. (1996), who compared the approach used for easel paintings with the theoretical framework for architectural heritage developed during the 19<sup>th</sup> and 20<sup>th</sup> centuries. In the former, the periodic removal of varnish and re-varnishing has been unquestionably accepted. In the latter, however, the value of the building materials (stone,

brick) was given priority so that protective renders, usually applied to the less resistant materials, were actually removed in some cases. One classic example can be found in the total removal of the render on the Loggia del Capitanato in Vicenza, Italy, during the intervention carried out between 1984-85 (Marconi 1988). As has been previously pointed out by the authors, surface finishes, including patinas, are most important for architectural preservation (Henriques and Charola 2002).

Protective treatments and/or sacrificial layers have been used since antiquity. The idea is that these treatments or layers applied to the stone surface will protect the underlying substrate while they, being exposed to the elements, will deteriorate. That is, they are “sacrificed” while sparing the original, valuable material of the monument. However, this concept implies that these treatments require re-application. Traditionally, these treatments included renders and/or thick lime-washes that, in some instances, also served to decorate a surface or “beautify” a poorer substrate by giving it the appearance of a more noble material. Such was the case for the original finishes applied to the sphinxes decorating the Belvedere Gardens in Vienna, as well as other decorative sculptures in this city (Koller et al. 1996). These sculptures, carved out of a softer limestone, were traditionally coated with a mixture of oil and lead white to give them the appearance of marble.

Based on this approach, a sacrificial coating (“*Opferschlämmen*”) was developed using lime putty (no powdered hydrated lime should be used) that was carefully sieved to obtain a uniform, adequately small, particle size. A thick suspension was prepared and applied by brushing on a damp surface. Subsequent coats were applied wet-on-wet. This coating diminished the roughness of the weathered stone and provided a white finish that is similar to marble. Although this approach has received criticism within Austria, it attains the objective: sculptures having received this treatment are undistinguishable from those carved out of the Laaser marble used in Austria, unless examined close at hand and by a specialist (Figure 2).

While the previous example demonstrated conservation of the local tradition of applying a sacrificial layer to mimic the appearance of marble (although the formulation was changed in accordance to health regulations), the next example illustrates a problem that is particular to America.

A recent article (Jonsson and Cliver 2002) suggests that the renders applied at the forts in San Juan, Puerto Rico were made by the traditional technique of adding vitriol, the hydrate salt of ferrous sulfate ( $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ ), directly into the mortar mix, or to a lime-water that was brushed onto fresh render, to provide the yellowish-orange color of some of the renders. This idea was discussed during the 1999 meeting of international experts convened by US/ICOMOS to analyse the problems posed by conservation of these forts.

The massive fort walls are made of stone masonry that were originally rendered, but much of the render was missing at the time of our visit. The issue raised by the Puerto Rico Historic Preservation Office and the National Park Service was identification of appropriate technologies for conserving the walls. The recommendation was that the best approach for conservation of the walls and structures would be application of pure lime renders, where needed, following specific formulations to be evaluated locally by small experimental applications. Among these tests was the application of a lime-water vitriol solution to color the render. This was an easier method than using ochre in a limewash, which is an important consideration in view of the extensive walls that need to be maintained. Samples of the original renders were taken at that time, as well as samples of some test panels coated with a lime-water vitriol solution, and subjected to analysis. The results of these analysis (Torres S. et al 2000), as reported by Jonsson and Cliver (2002), “showed a similarity between samples of the old colorant and the new”. However, as is the case in many complex analytical procedures, the results obtained must be considered inconclusive. While they do not reject

the possibility that vitriol was used, they do not confirm it unambiguously. To prove the original use of vitriol, further analyses with other instrumental techniques would be required.



*Figure 2 View of the entrance to the Hofburg in Vienna (Austria). The sculpture group that decorates one of the two fountains is carved of Laaser marble (seen at left), while the other sculpture groups are carved in a soft limestone and have received a lime-based sacrificial coating.*

The traditional use of vitriol is described in the Swedish literature, as mentioned by Jonsson and Cliver (2002), as early as 1743. In 1774, German literature mentions vitriol as a long-time approach to color renders (Ziegler 2004). Although reference to its traditional use in Italy has been found (Marconi 1988), none were found with regards to its use in the Iberian Peninsula. Whether it was used in the Spanish forts in the Caribbean has yet to be established. In the particular case of the San Juan forts, this is not an issue, because whether the color was applied as vitriol or mixed in as an ochre pigment, the end result would be hard to differentiate, as already shown by the analysis that was carried out.

The point to be considered is whether it is valid to “import” a traditional approach to apply it to a historic structure that had not originally used that technology. While in the case of color application, as discussed above, the end result would be extremely similar, there are other construction techniques in which a change in approach will have an enormous influence. For example, the way mortar joints are pointed may vary between the traditions of the English in Boston and that of the

Swedish found in areas of Pennsylvania. To further the problem, these areas have subsequently been taken over by other immigration groups. Is it reasonable to expect that the original construction technology be respected? How can these crafts people be trained to repair and maintain structures using different approaches?

A last example will serve to illustrate some of the difficulties encountered when having to define the actual intervention procedure. The National Palace of Sintra, located some 30 km to the west of Lisbon, is a historic building whose first references appear in 1281. The building is characterized by extensive rendered walls, with stone and mortar simulating stone pilasters at its corners. The most characteristic features of the building are two large conical chimneys that constitute the landmark for the palace (Figure 3). The damp climate of Sintra creates excellent conditions for biological development. As a result, most facades have extensive grey areas produced by vast biological colonization, creating a negative visual impact. For this reason, an intervention aimed at replacing all the existing renders by new cement-based mortars, regarded as more durable and efficient, was considered by the authorities-in-charge in 1995. Nonetheless, by the time work was to start, an entirely different approach based on the use of traditional technologies had been developed and was ready to be applied.

The revised approach was based on the philosophical principles referred to previously, and took into account the fact that the existing renders were really in very good condition. Actually, there were several layers of superimposed mortars applied throughout the centuries. Thus, simple removal of the biological colonisation by brushing and application of a fungicide were the only steps needed to achieve the main objective: conservation of the existing materials and removal of the poor visual aspect of the building. In areas where the render required some patching, the application of a pure lime-sand (1.5: 4) mortar was used. This traditional formulation achieved an excellent performance in terms of adhesion, strength, dimensional stability and with no significant cracking. The application was completed with a surface finish of a thin “*marmorino*” layer, based on a lime putty and marble powder mortar (1:2) to which a final limewash coat was applied to correct any minor cracking that might occur (Figure 3). This two-step finish served to give the final white color to the surface. In



*Figure 3 The large conical chimneys at the National Palace of Sintra are its landmark feature (left).  
Detail of the final appearance of the cleaned and patched render (right).  
The traditional lime formulation showed excellent compatibility with the original render.*

those areas where the existing final coating was in good condition, only the limewash was applied to provide a uniform appearance to the building (Henriques 1999).

This successful intervention served to establish a new paradigm for the conservation of renders in Portugal, breaking the vicious circle of the use of cement mortars. For the first time, it was possible to maintain the existing renders while only using traditional repair solutions for a building of such magnitude and importance. The intervention was a landmark in architectural conservation in Portugal and served a pedagogic role for future projects of this nature.

## 4 Conclusions

The examples presented clearly illustrate the fact that each situation is unique and different from any other one. Hence, each project requires a careful and thorough evaluation of the local cultural conditions, since only these will allow the definition of the correct approach to be followed. Not only the traditional materials, but also the traditional methods of their application should be preserved wherever possible. While this problem is not yet an issue in Europe, it is already a question that America needs to consider seriously, if the diverse cultural heritage that can be found across the country is to be preserved as such. In Europe, this problem is expected to develop in the future, with increased migrations from other continents with significantly different approaches.

Furthermore, the current conservation approach is based on the “present” evaluation of a monument and it is conceivable that this evaluation may change in the future. Although much thought has been given to this issue (Baer and Snickars 2001), no alternative solution can be found for a better balance between present and future preservation at this time.

## References

- Baer, N.S. and Snickars, F., Eds., 2001, Rational Decision-Making in the Preservation of Cultural Heritage. Dahlem University Press, Berlin
- Carunchio, T., 1996, Dal restuaro alla conservaciones. Introduzione ai temi della conservazione del patrimonio architettonico. Edizione Kappa, Roma, 20
- Charola, A.E., 2002, Architectural Heritage: Some Thoughts on its Preservation. Jubileum Publication for Prof. Domaslowski (*Księga Pamiatkowa ofiarowana profesorowi Wieslawowi Domaslowskiemu*) B. Soldenhoff, Ed., Nicholas Copernicus University, Torun. pp. 37-45
- Denslagen, W., 1994, Architectural restoration in Western Europe: Controversy and Continuity. Architectura & Natura Press, Amsterdam.
- Fawcett, R., 2001, Stirling Castle: The Restoration of the Great Hall. Council for British Archaeology, York.
- Henriques, F.M.A., 1994, Algumas reflexões sobre a conservação do património edificado em Portugal. in 2º ENCORE, Proceedings of the Encontro sobre Conservação e Reabilitação de Edifícios. Laboratorio Nacional de Engenharia Civil, Lisbon, 67-86
- Henriques, F.M.A., 1999, The conservation of the rendered walls of the national palace of Sintra (Portugal). International Journal for Restoration of Buildings and Monuments 5 [5], 487-498
- Henriques, F.M.A., 2003, A conservação do património: teoria e prática (*Architectural conservation: theory and practise*), in 3º ENCORE, Proceedings of the Encontro sobre Conservação e Reabilitação de Edifícios. Laboratorio Nacional de Engenharia Civil, Lisbon, 7-19.
- Henriques, F.M.A. and Charola, A.E., 2002, The Theoretical Approach of the Conservation Intervention at the Cloister of the Jeronimos Monastery in Lisbon. Internationale Zeitschrift für Bauinstandsetzen 8 [5] 429-446

- ICOMOS 1965 International Charter for the Conservation and Restoration of Monuments and Sites.  
[http://www.international.icomos.org/charters/venice\\_3.html](http://www.international.icomos.org/charters/venice_3.html)
- Jonsson, M. and Cliver, E.B. 2002. Coloring Historic Stucco: The Revival of a Past Technique in San Juan, Puerto Rico. APT Bulletin 33 [4] 31-36
- Koller, M., Nimmrichter, J., Paschinger, H. and Richard, H., 1996. Opferschichten in der Steihkonservierung —Theorie und Praxis. Restauratorenblätter 17 143-150
- Marconi, P., 1988, Dal piccolo al grande restauro. Colore, struttura, architettura. Saggi Marsillo, Venice, 99-100
- Morris, W., 1920, News from Nowhere on An Epoch of Rest. Longmans, Green and Co., London, 112
- Sickel Taves, L.B. 1997, Understanding Historic Tabby Structures: Their History, Preservation, and Repair. APT Bulletin 28 [2/3] 22-29
- Sickel Taves, L.B., Sheehan, M.S. and Rovner, I. 1998, Computer Assisted Optical Stereology in Historic Preservation: Tabby, a Case Study. APT Bulletin 29 [1] 30-33
- Torres S., A.L., Ruvalcaba S., J.L., Torres, L. and Cliver, E.B., 2000, Caracterización no destructiva de pigmentos de aplanados del sistema defensivo de San Juan, Puerto Rico. Instituto de Física e Instituto de Investigaciones Antropológicas, UNAM, Mexico
- Ziegler, C.L. 2004. Zusatz zur Abandlung von dem Tarras, der Puzzolana und deren Substitutionsarten. International Journal for Restoration 10 [2] 153-162 (reprinted from Hannoerisches Magazin 21 (14<sup>th</sup> March) 1774