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Hypotheses for a scientific glossary for restoration in the age of new climatic and anthropogenic risks

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Abstract. The proposed contribution aims to foster reflections and considerations on the hypothesis of a scientific glossary for restoration projects in response to new climatic, natural, and anthropogenic risks. The ongoing changes increasingly push for multidisciplinary approaches involving the entire scientific community to define the most appropriate actions for the protection and conservation of cultural heritage. Hence, here is born the study of a common language that allows communication among the actors involved in the restoration project. The contribution specifically analyzes the Italian context from the 1970s with the unique example of the NorMaL Commission. Its multidisciplinary work led to a series of "recommendations" on the study of unified methodologies for the safeguarding of stone materials and architectural artifacts in their entirety, contributing to the development of regulations at the Italian and, subsequently, the European levels. The commission's work shows that, for a better definition of safeguarding actions for heritage, it is necessary to equip oneself with specific tools that allow dialogue among researchers from different scientific fields. This is highlighted in the first document produced by the Commission concerning the definition of a series of lemmas, *NorMaL 1/80 - Alterazioni macroscopiche dei materiali lapidei: Lessico*, subsequently updated. From here arises the question of whether it is necessary to update the tools available today to improve dialogue within the scientific community in defining the discussed intervention methodologies, considering new anthropogenic natural risks and climate change.

Keyword: Climatic and anthropogenic risk, Scientific glossary, NorMaL Commission, UNI-NORMAL.

1 Scientific glossaries and new risks to heritage. Some Reflections

New natural and anthropogenic risks and climate change stimulate further research in the field of cultural heritage protection and conservation. This aspect has led to a necessary and continuous revision of the most appropriate actions to be taken for safeguarding.

Temperature variations, precipitation, increased atmospheric humidity, wind intensity, catastrophic events, and air pollution were recognized by the *United Nations Educational, Scientific and Cultural Organization* (UNESCO) [1] in 2007 as the main threats to the safeguarding of cultural heritage sites. UNESCO's policy documents, in addition to recognizing the threat of climate change, provide a framework for the Member States of the World Heritage Convention to develop and implement effective mitigation and adaptation strategies, to promote international cooperation and to improve the involvement of local communities.

More recently, in 2019, a report published by the *International Council on Monuments and Sites* (ICOMOS) [2], summarized the main climatic stress factors and their impacts on various materials and categories of heritage. The report highlights the need to update heritage safeguarding actions, starting from the necessity of new multidisciplinary approaches in areas such as vulnerability documentation, conservation, education and training, as well as the presentation methods of heritage sites to visitors [3].

The multidisciplinary approach is fundamental in defining a correct restoration project, particularly in analyzing the influence of new climatic stress factors on different types of architectural artifact degradation. Numerous studies show how increased precipitation and humidity, combined with warmer temperatures, influence the growth of microorganisms on stone and how variations in wind speed and direction affect the transport of atmospheric pollutants, sand, and salts, accelerating the corrosion mechanisms of materials [3,4,5]. Considering the risks that threaten the integrity of heritage today, it is evident that a

necessary and continuous revision of the most appropriate actions to be taken for the protection and conservation of cultural heritage is required. This can be achieved through an increasingly integrated approach, which also involves the search for a language shared by the entire scientific community.

In view of the aforementioned risks, a worthwhile new project regarding the research of a common language is urgently required to facilitate the dialogue among researchers from different scientific fields and among the various actors involved in the restoration. A first consideration of the tools available today, such as scientific glossaries translated into different languages [6,7], could be, for example, the limitation of the categories of materials considered, mostly stone materials, excluding other entries related to different material categories, such as reinforced concrete. This aspect implies the exclusion of forms of degradation found in twentieth-century architecture, which is also strongly influenced by new risks. The literature highlights the terminological inconsistency existing in the field of restoration projects and in the description, classification, and representation of the various forms of degradation, which are closely linked today to the effects of climate, natural and anthropogenic changes.

The research traces the events that led experts and researchers to early international discussions for defining a common lexicon for restoration, with the intent of resuming the line of studies initiated in the last century and expanding the research to areas of investigation not previously analyzed. In particular, the study focuses on the activities of the NorMaL Commission, initiated in the 1970s, delving into the fundamental role it played in identifying common methodologies for studying the alterations and degradation of stone materials and particularly in defining a shared lexicon for restoration. It is also interesting to analyze the influence of the Commission in drafting Italian technical standards and, subsequently, those of the European standards in the early years of the twenty-first century.

2 The first experiences in the definition of scientific glossaries

2.1 The Italian context: the NorMaL Commission

The identification of the most suitable actions for the conservation of cultural heritage has been the focus of numerous meetings and debates, which have seen the comparison between theorists, treatise writers and protagonists of the discipline of restoration. In the twentieth century, the debate took shape starting from the drafting of the first *Carte del Restauro*, which was born as a methodological-operational tool to address interventions on heritage [8]. It was also during this period that many institutes and laboratories were established at the international level. In 1938, with the establishment of the *Istituto Centrale del Restauro delle opere d'Arte* (ICR), it was finally recognized the importance of integration between different disciplines, technical and scientific, for heritage conservation [9].

The debate about the preservation of the historical-artistic heritage and the new conservation issues was extended in the 1960s [10], following the damage caused by the disastrous floods in Florence and in Venice, in November of 1966. These events have led scholars from various scientific fields to undertake research on new techniques of intervention, supported also by instrumental investigations in relation to the environmental issues that were emerging [11].

In the same years, among the national bodies for scientific research for the conservation of heritage, a fundamental role was played by the National Research Council with the three centers in Milan, Florence and Rome. The aim of the research centers was to develop specific methodologies of cognitive investigation and intervention on surfaces and structures, starting from basic knowledge of chemistry, biological physics and engineering [11].

In this scenario, a group of researchers from the *Istituto Centrale per il Restauro delle opere d'Arte* (ICR) and the *Consiglio Nazionale della Ricerca* (CNR) presented in 1975, at the *International Symposium on Conservation of Stone Mate-rials*, held in Bologna under the auspices of the *International Institute for Conservation of Historic and Artistic Works* (IIC), the methodological proposal *Artistic «Stone» Works. A proposal for the unification of the methods of studying stone decay and of controlling stone conservation*, on behalf of Giovanna Alessandrini, Carlo Manganelli del Fà, Paola Rossi Doria, Marisa Tabasso, Sergio Vannucci [12]. The proposal arose from the need to apply common methods of control and analysis to the study of works of art, focusing on the degradation that afflicted stone materials and the consequent control of the effectiveness of products used in conservative treatments.

The initiative led to the creation in 1977 of the NorMaL Commission, recognized and sanctioned on 19 July 1984 by the Decree of the Ministry of Cultural and Environmental Heritage [13]. Its formation

had the main purpose of creating stable, unified methodologies for the study of alterations that afflicted stone materials used in arches-roof and sculpture and to investigate the effectiveness of conservative treatments on the historical-artistic heritage [14]. In addition to natural materials, such as marble and stone, the expression "stone materials" was also used to examine materials derived from earlier processes, such as stucco, mortars and ceramic products.

The investigation of common methodologies of intervention not only concerned the characteristics of the material constituting the artifact, but investigated globally the architectural elements, paying particular attention to the climatic and environmental conditions to which it is exposed. The research was based on the experimentation of materials and conservation techniques, involving specialists from different scientific disciplines.

It is interesting to underline that the organization of the research activity is based on the multidisciplinary nature of the actors involved. The work was divided into groups and sub-groups organized into specific disciplines, into the different types of material and into the different conservation problems [15]. The harmonization of the activities of the individual Groups was managed by the General Coordinator, who had the task of maintaining the relations of the groups with the offices of the Ministry of Cultural Heritage and Environment and the CNR. The General Coordinator, together with the Coordinators of the individual groups, formed the Executive Committee, which was responsible for defining the general guidelines of the Commission's activities. The appointment of members and the formalization of the working groups were regulated by a circular of the Ministry of Cultural and Environmental Heritage, with annual updates. The Commission's work benefited from the free collaboration of academics, industry representatives and self-employed experts in the various relevant research fields.

Although initially, the activity of the working groups was limited to the study of stone materials, it was later extended, in the early 1990s, to the study of metal and wood [16]. The investigations concerned the study of intervention methodologies and heritage monitoring techniques, taking into account the characteristics of the surrounding environment. In particular, the search was carried out to find the definition of a common language for restoration. A selection of lemmas was identified by the research groups for the drafting of the Commission's first document, *NORMAL 1/80 - alterazioni macroscopiche dei materiali lapidei: lessico* [17]. A first update occurred in 1988 with the publication of *NORMAL 1/88 - alterazioni macroscopiche dei materiali lapidei: lessico* [18], where the need for a graphic (and photographic) correspondence to the description of the corresponding term was highlighted.

"Questa seconda edizione aggiorna, sostituendolo, il documento NORMAL 1/80.

Per alterazione si intende una modificazione del materiale che non implica necessariamente un peggioramento delle sue caratteristiche sotto il profilo conservativo; mentre il termine degradazione implica sempre un peggioramento.

Nella definizione dei singoli termini ci si riferisce esclusivamente a ciò che viene osservato visivamente, prescindendo dalle cause di alterazione e degradazione.

L'elencazione dei termini, ampliata rispetto alla precedente edizione, è basata sull'ordine alfabetico e non su criteri di classificazione o di collegamento dei fenomeni descritti.

Nell'attuale edizione ogni termine è illustrato da una documentazione fotografica significativa, ma non esauriente, e corredato di un simbolo grafico." [18]

For each item, the Commission applied the same analysis scheme, developed in five main points [19]: definition, graphic representation, detailed photo of degradation, origin and cause, and, finally, a selection of examples.

It is important to underline how this structure, enriched by graphical representations, favored a more immediate identification of the typologies of alteration and degradation, limiting the possible misunderstandings of the examined terms.

In the early 1990s, Commission documents, initially published only in Italian, were translated into other languages [20]. This has led to encourage consultation by scholars and professionals from other countries and it has also left room for different interpretations in the identification of different forms of degradation and alteration, due to language differences.

These first documents formed the basis of the research activity of the individual groups that converged in the publication of a series of "recommendations", documents marked by the NorMaL acronym, followed by a serial number and the year of edition.

The publication and dissemination were managed exclusively by the *Istituto Centrale per il Restauro delle opere d'Arte* (ICR). The Institute was responsible for distributing the documents to the various superintendence, bodies, organizations and laboratories in the sector, as well as selling them to freelancers, universities and companies at the Technical Secretariat [21]. In the early 1990s, the need to formalize the recommendations produced up to that time became increasingly apparent, and especially a recognition of these as Italian Standards in order to regulate the conservation interventions carried out without precise criteria until then.

2.2 The European context

On 19th June 1996 the Convention between the *Ministero per i Beni Culturali e Ambientali* and the *Ente Nazionale Italiano di Normazione-UNI* was signed, recognizing the documents produced as Italian Standards, with the acronym UNI-NORMAL [22,23].
In the early 2000s, UNI forwarded to the *Comité européen de normalisation* (CEN) the proposal to activate a European Secretariat dedicated to the standardization of cultural heritage, so as to allow a single and unique "language" among the subjects operating in Europe, which led to the birth of *CEN TC 346 - Conservation of Cultural Heritage* [24].
The initial Business Plan included five working groups [25]:

- alteration lexicon (WG1)
- macroscopic description of the state of conservation through a "condition report" for movable property or a "condition survey" for real estate (WG2)
- Characterization of materials constituting movable and immovable property (WG3)
- characterization of the environmental parameters of the microclimatic surroundings of the object (WG4)
- evaluation of products and methodologies used in conservation intervention (WG5)

The periodic revisions of the work programs were kept at the base of the search for guidelines for the definition of terminology.

It is interesting to note that the tools available today follow the working structure of the NorMaL Commission.

3 Conclusions

These first notes on the search for a definition of a lexicon for restoration highlight the importance of multidisciplinary work and the need to identify a common terminology fundamental for the protection of cultural heritage.

In addition, in the light of the dangers to which the heritage is subject today and the related conservative risks, it is therefore necessary to update the scientific glossaries with the inclusion also of terms referring to new forms of degradation and alteration due to changes climate and natural and man-made risks.

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