

## CURRENT STUDIES AND APPROACHES IN THE FIELD OF CULTURAL HERITAGE CONSERVATION SCIENCE. HARMONISING THE TERMINOLOGY IN AN INTERDISCIPLINARY CONTEXT

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### **Abstract**

*During the last years, both the problem of harmonizing the specific terminology of Conservation Science and the modern approach related to the scientific investigation, preservation, restoration, display, and treasuring of cultural heritage assets have been frequently addressed at prominent events and meetings in the field. With this in mind, this paper addresses some aspects concerning the nomenclature employed in the field of Conservation Science, as it has emerged from its use in interdisciplinary contexts. The paper also advances a series of considerations made by our research team, such as: heritage elements and functions, routes of the cultural assets with their historical context, the role of scientific investigation in valorisation of old artefacts, and current nomenclature of the specific professions in the field of Conservation Science.*

**Keywords:** *Cultural property; Specific terms; Nomenclature; Interdisciplinary; Heritage elements and functions; routes of the cultural assets; historical context.*

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### **Introduction**

The field of Scientific Conservation of the tangible cultural heritage has captured the attention of numerous research institutions across the world. One such example is provided by the UNESCO Forum “University and Cultural Heritage”, founded in 1996 by the Polytechnic University of Valencia and gathering as members over 260 universities with specialized departments of cultural heritage. The Forum organizes on an annual basis an international gathering of young and established professionals in the field of Scientific Conservation, who present their work, elaborate guidelines concerning the management and valorisation of the cultural heritage through various activities focused on the discovery, acquisition, investigation, evaluation, preservation, and displaying of heritage goods [1-4]. The field has evolved to the degree to which dedicated Master and Doctorate programs are being organised, including in inter-university and cross-border configurations. One prominent example is the European

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Doctoral School EPISCON, a project funded by the European Community's Marie Curie programme and hosted by the University of Bologna (Italy) [5, 6].

Roundtables, meetings and workshops are organised each year, in which current interdisciplinary aspects of the scientific conservation of heritage goods are being discussed. One of the critical aspects relates to the relevance of Conservation Science for a wide range of social issues, from the point of view of its development prospects as an interdisciplinary science. Special attention is paid in this sense to the impact on the conservation of cultural and natural heritage, as a structural-functional, ambiental and cultural reintegration [7, 8].

Having the above in mind, on the basis of the experience held by the authors of this paper, we advance a series of considerations with respect to the terminology, concepts and terms employed in the field of Conservation Science, as well to the professional facet, in terms of objectives and activities, heritage elements and functions, levels of conservation and their priorities, routes travelled by cultural property items, their representative contexts, types of expertise and their role, etc.

According to the existing directives worldwide, the conservation of cultural heritage requires harmonizing and updating the *general theory of the fundamentals and methodology of scientific investigation, preservation, restoration, and display*. In this respect, calls for a unified approach enabling the formulation of new priority directions for researching the complex problematic of the field, which demand scientific, technical and artistic expertise taken from related fields [9-12].

It is known that, for example, the investigators in the field of Conservation Science use several modern methods of pure science, in order to identify new valuable features of old cultural property items, which are useful both in interventions preservation and restoration, as well in authentication, respectively to deepening the art techniques and technology used by craftsmen and artisans. Thus, using physical-chemical methods it will be possible to identify the nature of component materials by establishing chemical composition and physical-structural features from the surface and/or from the interior, followed by both the evaluation of the conservation status and of the mechanisms of the evolutive degradation and deterioration effects. The methods of microbiology will allow the identification of the species that attack cultural and scientific assets (viruses, bacteria, yeasts, moulds, algae, insects, plants or animals), and in the case of wood as a support, ornamental or base material, dendrology establishes the species, age and age of the tree [13, 14].

Often the investigation of old artefacts involve a range of methods from related sciences that allow both the identification of the heritage characteristics and evaluation of the aesthetic-artistic, cultural, historical, technical, scientific, and spiritual functions. It is thus possible to appreciate and valorise the level of the technological evolution, the artistic message, and its historiographical/scientometric data.

Another series of modern methods, those of the Environmental Science, permit in addition the monitoring and controlling of the environmental factors, the identification of optimal conditions for climate control and protection measures for display, while those of Science and Technology of Materials allows the identification of the internal and surface microstructural defects by non-destructive testing, such as colorimetry through reflection, X-ray fluorescence, radiography, infrared and ultraviolet reflectography, and occasionally ultrasound and 3D profilometry [15].

The use of current methods through systems of coassistance or corroboration between interdisciplinary techniques demand, for the purpose of processing and interpreting the experimental data, the harmonization of the nomenclature from the related fields.

However, often it happens in practice, and in some publications to find erroneous formulations or uses of terms related to specific activities of this interdisciplinary field of Conservation Science.

In this sense, this paper presents, based on the Fundamental Principles of Scientific Conservation, the terminology commonly accepted worldwide. At the same time, it takes into account both the recommendations of the International Commission for the Nomenclature of Exact Sciences, as well as definitions from various consecrated dictionaries. It also presents a series of aspects developed by our team of research and higher education professionals, such as: heritage elements and functions, routes of the cultural assets with their historical context, the role of scientific investigation in the valorisation of old artefacts, and the current nomenclature of the specific professions in the field of Conservation Science.

### Terminological clarification of the term conservation in modern acceptance

Climate changes and geopolitical shifts occurring during the last decades have contributed to an increase in the complexity of the problems faced by specialists in the field of Science of Conservation of the cultural and natural heritage. These have led to the development of specialized high-level education and training programs in many countries and of fundamental and applied research, all of which require the introduction and harmonization of an up-to-date nomenclature. Thus, Scientific Conservation has become a discipline with a specific nomenclature, by correctly and coherently adopting terms, definitions, annotations, indexing codes, etc. from the interdisciplinary system. A unitary terminology and a directory theory for the activity of integrated scientific conservation of cultural heritage represent the first desideratum both at national and global level. In the last 60 years there were developed a series of reference works on scientific conservation ethics rules, and there was a constant preoccupation for the development of principles and generally valid terminology [16-21], but nevertheless the results on a global level were often contradictory and for long contested [9-14].

Article 4 of the Venice Charter (1964) states that conservation means safeguarding the monuments and sites for future generations, and their maintenance on a permanent basis; further on, in Article 9 we find that restoration is a highly specialized operation that must stop at the point where conjecture begins [16].

If instead we are looking for the term *conservation* in two international consecrated dictionaries, we find the following definitions:

- in the Thesaurus dictionary [22] *conservation* is defined as the “restoration and preservation of works of art”.

- in the Britannica dictionary [23] the term *art conservation* “denotes the maintenance and preservation of works of art and their protection from future damage and deterioration. Art restoration, by contrast, denotes the repair or renovation of artworks that have already sustained injury or decay and the attempted restoration of such objects to something approaching their original undamaged appearance”.

In Romanian, most lexicons define the verb "to conserve" (Rmn. *a conserva*) with the meaning of "to keep in original condition, to guard", while the verb "to restore" (Rmn. *a restaura*) has a meaning which is strictly limited to the target field, "to restore artefacts or architectural work."

According to the current nomenclature, *conservation* is the generic term of the new interdisciplinary science (Conservation Science), with the meaning of perpetuating the cultural heritage, and which relates to a certain level of conservation status. At the same time, *preservation* is a lucrative subdomain of conservation, with two directions: one acting on the environment (passive preservation or acclimatization, with preventive role) and another with interventions on the artefact (stopping the evolutive deteriorations and degradations with specific treatments having a prophylactic role). The third term, *restoration*, is another lucrative subdomain with specific activities which relate to material, artistic technique, execution technique, and takes into account the age, the state of conservation, level or value (catalogue or

market), etc., using various compatible intervention materials and processes. These require previous compatibility studies of the new materials, or of compatibilisation of the restoration operations through artificial or accelerated aging, followed by monitoring the behaviour of the interventions for a set period of time.

In fact, Conservation Science has eight lucrative subdomains, which involve, differentially, certain disciplines, as follows [24]:

1. *Discovery* (Archaeology, Geomorphology, Geotechnics, Geophysics, etc.), *acquisition, transfer, taking into custody and itinerating* (Museology, Marketing, Trade, Tourism, etc.);
2. *Classing (cataloging), typological classifying and heritage evaluation* (Art History and Theory, Materials Science and Engineering, General Theory of Conservation, Aesthetics, etc.);
3. *Scientific investigation*, focusing on six expertises: *authentication, value evaluation (market and catalogue), establishment of conservation status, studies of compatibility, monitoring the behaviour of interventions during a fixed period, on-going monitoring of the conservation status* (Chemistry, Physics, Biology, Geology, Archaeometry or Artefactometry, Art history, Museography, etc.);
4. *Passive preservation (preventive) or acclimatization* (Thermophysics, Cryogenics, Climatology, Ecology, etc.);
5. *Active preservation (curative) or treatments to stop the deterioration and degradation evolutive processes* (Biology, Materials Science and Engineering etc.);
6. *Restoration* through consolidating operations and/or dimensional stabilization, structural reintegration through completions or additions (Structural and Building Mechanics, Materials Science and Engineering, etc.), chromatic reintegration (Theory of Art, Aesthetics, Colorimetry, etc.), ambiental-landscape or architectural reintegration (Architecture, Landscaping, Climatology, Ecology, etc.) or cultural and diplomatic reintegration (Building Economic Bridges: Integrating Cultural Diplomacy into Nation Branding, Corporate Social Responsibility and Global Governance);
7. *Display, valorisation and treasuring* (Museology, Marketing, IT, Design etc.);
8. *Protection and maintenance* (Guard and Protection Norms, Ecology, Environmental Sciences and Engineering, Museology, etc.).

We can say that the term *conservation* covers all activities listed above and, in its present-day acceptance, it represents a set of measures, means and actions to preserve unaltered the aspect of the heritage objects (or as close to the original). Accordingly, the broad sense of the term *conservation* must be acknowledged, specifically as the preservation and safeguarding of a cultural or natural heritage asset, through maintenance activities meant to transmit it to future generations, involving a complex set of measures to be taken with respect to its discovery, classing, storage, protection, and valorisation.

Thus, *conservation* loses its lucrative meaning, keeping only the attribute of being a science or discipline (the evolution of the original form and his meanings across *historical contexts*, a generic term for conservation science), while *preservation* and *restoration* are different activities by means of which a heritage asset is allowed to be valorised in a museum. *Preservation* is a lucrative undertaking, with two goals: preventive through climatic control and prophylactic by stopping the evolutive effects of deterioration of the physical condition (at micro and macrostructural) and the degradation of natural materials. Conversely, *restoration* includes interventions with specific operations of *structural* (including macro-structural consolidation), *ambiental* and *chromatic* reintegration. In this respect, there are two examples of operations that still raise discussions, namely: whether the ambiental reintegration and consolidation of the foundation soil of monuments are part of the preservation or of the restoration undertakings. Since they are major interventions, they count as part of the restoration.

To conclude, Conservation Science contains an assemblage of measures and norms that seek to maintain the *aspect of the heritage good* and of the messages that it transmits, as close as possible to the initial one, within a process of continuous valorisation, socially integrated, and by keeping the *historical stratification* (i.e., the traces left by certain significant events), having as ancillary the lucrative undertakings of investigation, preservation, restoration, displaying, treasuring, and protection.

### Prominent examples of infringement of the ethical principles of Conservation Science in restoration works

Particular attention should be given to the term *restoration*, which relates to a series of actions and principles that categorically differentiate it from repair, renovation, rehabilitation, reconstruction, rebuilding, replication, etc., as seen in the table 1 [25]. The restoration activity means restoring an artefact through structural, ambiental and chromatic reintegration, while rehabilitation seeks to restore a functional or technological system — for example, rehabilitating the heating or air conditioning system.

**Table 1.** The term *restoration* versus other terms almost similar but different in terms of intervention approach

<b>Restoration</b>	<i>to reestablish</i> a certain historical condition of an artefact through structural-functional reintegration (completing the material losses, etc.) aesthetic-artistic reintegration (chromatic), ambiental reintegration (landscaping, architectural, urban etc.) and cultural reintegration;
<b>Reparation</b>	<i>to perform repairs</i> , additions or replacements at long time intervals;
<b>Renovation</b>	<i>to renew, to gain</i> the aesthetic unity of the artefact by intervening on visible surfaces
<b>Rehabilitation</b>	<i>to modernize</i> (e.g., <i>to bring</i> a building at the current requirements of habitation), which often involves structural and nonstructural interventions on spaces and facilities etc;
<b>Reconstruction reconstitution</b>	<i>to reconstruct</i> a lost original, based on evidence (pictures, writings, material);
<b>Rebuilding</b>	<i>to reconstruct</i> an original destroyed by accidents, natural disasters (earthquakes) or wars, in general by recent events;
<b>Replication (scientific copy)</b>	<i>to execute</i> the duplication of an original that still exists (in order to protect it).

Regarding these approaches, below are some eloquent examples of interventions that have not respected the ethical principles and rules imposed by the General Theory of Scientific Conservation (GTSC). In the case of renovation works, we have the example of interventions made to the old buildings on Lajos Kossuth Street in Győr, Hungary (Fig. 1), where it can be easily noticed that the generally accepted principles of reintegration (especially the aesthetic-artistic reintegration) were not respected.

In the case of rehabilitation, it is often the case that due to a desire to adapt the building to modern standards, thermo-insulated glass is used (Fig. 2), in which case it infringes the *primum non nocere* principles of minimal intervention and reversibility.



**Fig. 1.** Renovation of the buildings on Kossuth Lajos Street, St. Gy r, Gyor-Moson-Sopron:  
a – picture from Google Earth, May 2014; b - personal photo, November, 2014.



**Fig. 2.** Rehabilitation/modernization using thermo-insulated glass:  
a – Building on Tomis Boulevard, Constanta, Romania (personal photo, July 2016);  
b – Hadâmbu Monastery church, Schitu Hadâmbului village, Mireneasa commune, Iasi County,  
Romania (personal photo, July 2016);  
c, d and e –Hlincea Monastery church, Iasi county, Romania (personal photo, august 2016)

Another critical aspect related to St Nicholas Church from Iași is the infringement of the ambiental reintegration norms, by raising in 1980 the Moldova Hotel just behind the medieval monument, at less than 50 m afar and with an exaggerated height.

With respect to inadequate approaches of the term *reconstruction*, an eloquent example is provided by the St Nicholas Church from Iași, Romania, built by Stephen the Great in 1491–1492 and wholly rebuilt in 1884–1904 by the French architect André Lecomte du Noüy, who demolished the ancient structure and reconstructed it on the same foundation and approximately in its original form with other materials, at the same time completely eliminating the old annexes (Fig. 3). This approach was based on the famous definition of restoration given by Viollet-le-Duc, nowadays shunned: *Restaurer un édifice, ce n'est pas l'entretenir, le réparer ou le refaire, c'est le rétablir dans un état complet qui peut n'avoir jamais existé à un moment donné*<sup>1</sup> [26].



Fig. 3. St Nicholas Princely Church from Iași, Romania (personal photo, June 2016)

When talking about a duplicate, in the form of scientific replicas used in display cases, they were and are still used to protect valuable artefacts such as very old paintings or sculptures in a status of conservation that does not allow their exposure in museums. Such scientific copies are often found in the great museums of the world. For instance, Raffaello's *La Trasfigurazione*, found in the Vatican Museum, has a copy in Louvre, while Michelangelo Buonarroti's *David*, which is exhibited in the Galleria dell'Accademia in Florence, has a copy in Piazza della Signoria. Romanian museums and the galleries of the National Archives are likewise home to scientific replicas of highly valuable (incunabula, manuscripts, correspondence, photographs, diplomas, certificates, charters, etc.), since the latter's high photosensitivity means that exposure for long periods would affect the conservation status.

<sup>1</sup> Restore a building, not maintain it, repair it or rebuild, it's restoring in a state that may never have existed at one time.

## Harmonization the nomenclature in the field of the Conservation Science

Like any discipline, the Conservation Science operates with a series of general terms and specific codes, notations, definitions and rules contained in the nomenclature of the field, most of them derived from related sciences. It can often be observed that some principles of nomenclature from other sciences or disciplines are not clearly present in the specific rules of Scientific Conservation. Because of this, we will present some illustrative examples from current practice, officially accepted also in Romanian, regarding the approach to some terms.

With the adoption of the World Heritage Convention (1972), the concept of *cultural heritage* was adopted in the very first article. Thus, *cultural heritage* includes [27]:

- *monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science;*

- *groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science;*

- *sites: works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.*

And “*natural heritage*” is considered as:

- *natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view;*

- *geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation;*

- *natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.*

Nevertheless, a differentiation should be operated between the terms *monument* and *work of art* (historical monument/artistic monument/natural monument, or a movable or immovable artefact).

Similarly, special attention should also be given to the terms *method* and *technique*, which are most often used correctly in scientific investigation, evaluation, analysis, testing, etc. undertakings, but improperly used for process/methodology and technology (for example, the phrase *method of analysis* is correct, but in the case of *blending method* the phrase *blending process* should be used instead).

In the same vein, the terms *artistic techniques* and *technologies*, often also used in teaching activities, are not properly employed, since only the *technique* is *artistic*, whereas technology is the undertaking of the execution work, which involves processes/operations, tools, appliances, etc.

Another major blunder in scientific writing concerns the use of the phrase *relative humidity* instead of *humidity of the gaseous medium*, the former being a form of expression/commensuration/unit of measure, while the latter is a work parameter. Similarly for the phrase “according to the molarity, molality or titre”, instead of the correct “according to the concentration”.

Confusions in the specialised literature occur between *origin* (primordial) and *original* (mark of time), between (chemical) *components* and (structural) *components*, between *viability* (for live systems) and *reliability* (for material and technological systems or in vitro), between *adsorption* (surface chemical process, occurring through physical bounds) and *absorption*



(endothermic physical-mechanical process of dispersion up to a nanostructural level, followed by exothermic chemical processes of solubilisation/solvation at the molecular level in the volume phase of a system/material), etc. With respect to the last two terms, the following phrases are accepted: *spectral absorption*, *absorption of vibrations* or of *sound* into a material/body, *biological absorption* (the movement of a substance through a biological barrier/membrane or cell).

Other examples of terms that are often used in phrases with ambiguous meanings are *calamity* and, respectively, *cataclysm*, often used for the natural factors and those causes by the anthropic factor, *catastrophe* or *disaster*.

With respect to the use of the term *trace*, which may be *shape trace – fingerprint* or *impression*, *traces of effraction*, and *material trace*, it is mandatory to be used accompanied by the term for typological definition.

Particularly in the field of cultural property law the term ‘fake’ (non-genuine article, replica or copy for illicit purpose) is used improperly, as is that of ‘counterfeit’ (partial fake made by modifying or adding a graphic element, applying a mark/stamp, modifying certain details, artificial aging, etc.).

As of late, in Romanian, which has borrowed the term from English, it is frequently used erroneously the term *expertise* (investigation/analysis/study/exam carried out and certified by a document — the certificate/report of findings) instead of *experience*, in the sense of capability, skill of comprehension/analysis (commensuration of knowledge, of intellectual abilities).

There are numerous terms and definitions borrowed from other fields, which have either been adopted as such by agreement, or were harmonised according to the necessities related to the specificity of the attribution.

For instance, there are differences between the *scientific investigation*, which can involve besides methods of analysis and a historiographical study, also the *expertise*, with its five main scopes (see the types of expertises presented above), then also *analyses*, *tests*, *exams*, etc. which solve an *expertise*.

Similarly, a differentiation should be made between the notion of *study* (case analysis or documentary analysis and synthesis, historiographical analysis, etc.) and that of *research* (differentiated along fields and applications, e.g. forensic research, scientific research, technological research, field research, etc.). The following phrase is allowed: “studies and research on ...”.

Another very important aspect concerns the unanimously accepted way in Romanian and English to refer to the historical contexts by means of time periods, with respect to the phrases “before or after Christ” and “before or in the common/current era”, by means of the abbreviations “AC” (*ante Christum natum*), “BC” (Before Christ)/“AD” (*Anno Domini*) and, respectively, “BCE” (before the Common Era)/“CE” (Common Era).

### **The differentiated use of the terms “*deterioration*” and “*degradation*”**

A last example of terms that are improperly used and which are not synonymous relate to the use and definition of the effects: deterioration and degradation.

Even though the *International Biodeterioration and Biodegradation Society* was founded and Elsevier started publishing the *International Biodeterioration and Biodegradation* journal as early as 1969, the terms *deterioration/biodeterioration* and *degradation/biodegradation* are still used inadequately, being often assigned the same meaning, even though they are entirely different notions, which demand rigorous definitions.

These terms were adopted separately on account of the need to differentiate between changes in the physical-structural state and those of a chemical, microbiological and thermal/radiative nature. As such, *deterioration* is the effect incurred by an artefact, commensurate as a whole or for component elements, through the structural-functional change

of its state under physical-mechanical actions, assisted or not by climatic factors. This effect is based on processes of microscopic or macroscopic destruction/damage, which affect the physical state and reference a structural-functional element. It is often a singular physical or cinematic effect, with a single result, but with one or multiple causes. Conversely, the term *degradation*, until recently synonymous with *deterioration*, represents the effect of the change of the material nature under the action of chemical, electrochemical, biochemical, microbiological, radiative/thermic, etc. factors. The effect is based on the processes of alteration of the chemical components, referencing a certain type of material. For this reason, the degradation effects are cumulative (different causes and results), being grouped into chemical, thermic, radiative, biological, etc. effects, which in their turn can be simple or complex (electrochemical, thermochemical, biochemical, photochemical, radiochemical, etc.).

In what follows is a series of examples encountered in the practice of Scientific Conservation, for each of the two effects. From among the causations within which the physical state of a structural or functional element was changed, under the action of physical-mechanical and climatic factors, we can mention: the breaking of a girder, post, wattle, rafter, etc. of a structure or of a painting frame, the cracking of the pictorial layer of a painting or of a monument's coating, the loosening or swelling of the plastering, the tearing of the paper or textile support, the bending, dilation or contraction of wooden panels, etc. Conversely, for the degradation effects, which change the chemical nature of a material under the action of chemical, radiative and biological agents, coassisted or not by climatic factors, we have several examples: the corrosion of metals and alloys; the rotting of wood, paper, leather/parchment, textiles, etc.; the discoloration of pigments; the opalization of glass, obsidian or gems; the efflorescence and deliquescence of salts; etc.

If degradation occurs from the outside to the interior of the material, deterioration develops from the centres of least resistance (e.g., the points with natural or manufacturing defects) towards any direction, particularly along those allowed by the lowest structural stability. Generally speaking, degradation occurs as a cumulative effect of the action of multiple factors or agents, whereas deterioration occurs as the sole effect of the action of a single factor or agent. As to not absolutized this case, we mention that there are also cumulative deterioration, for example contraction with longitudinal-radial and circular (at the level of annual rings) fissuring, and, respectively, the loosening of tenons in woodworks, under the simultaneous or sequential influence of temperature, humidity and mechanical strain.

If deterioration can be described by schemas of planimetric, topographic and/or stratigraphic transformations, at the microstructural or macrostructural level degradation takes place as a sequence of chemical, electrochemical, radiochemical/thermochemical, or biochemical reactions or interactions, which take place at the molecular or supra-molecular (nanostructural) level.

There are known cases in which the two effects occur either simultaneously, either consecutively, the mechanism of their development being hard to trace down. For example, the attack of wood by the fungus *Merullius lacrimans* leads both to the alteration of the cellulose, and of the lignin, leading to fragilisation and rotting of the wood (degradation effects), followed by cracking of the affected area (deterioration effects); therefore, biodegradation has as secondary effect, biodeterioration. Similarly, the attack of xylophagous insects that create galleries and orifices in the wood leads to the deterioration of its physical state and, through the metabolic endproducts and the enzymatic systems incurred, to the gradual fragilisation of the wood. In this case we are dealing with biodeterioration, coupled by biodegradation.

In Environmental Science and Engineering, the term *degradation* is used in a positive sense, as a sought effect, when it refers to the beneficial process of disposing, eliminating or detoxifying a toxic material, unwanted from the ecological point of view, by means of natural degradation or biodegradation processes.

## Heritage elements and functions

In heritage assessment, respectively in ascertaining the auction (market) or catalogue value through scientific and historiographical investigation, the heritage or archaeometric elements (characteristics) and, respectively, the heritage functions are highlighted.

The first come mostly from the execution, while few are acquired in time, represented by a series of attributive aspects, such as:

- conception, material, artistic technique, degree of innovation/novelty and uniqueness, execution technique, size, and structural or technological complexity;
- condition or state of conservation, age and patina;
- period of execution/dating, geographic area of execution and of use;
- author, school, workshop, disciple, etc.
- one-of-a-kind, copy/replica, series;
- origin—original.

Most represent or contain archaeometric or chemometric characteristics, with an archaeometric function (evolving in time, with chronological marking).

Conversely, the heritage functions are grouped along five evaluation grids/criteria:

- aesthetic-artistic;
- technical-scientific;
- historical-documentary;
- socio-economic and utilitary;
- spiritual.

Of these, the first two are inherited from the execution, and the rest are acquired in time.

Often in the practice of valorising and treasuring an item of cultural property, its use is carried out under the name of attribute, most determined by authentication expertises.

## Routes taken by artefacts and contexts

The artefacts currently displayed or used in various cultural activities can originate from various historical contexts, in which they crossed a series of routes, from among which we mention:

- the normal route of a work of art or monument;
- the route through discard, to the loss of the use functions;
- the route through theft and discovery;
- the route through hiding and forgetting (hoards, jewellery, money, etc.);
- the route through loss (jewellery or tiny artefacts);
- the route through weather and natural calamities (floods, landslides, earthquakes with rubble, volcanic eruptions — Pompeii, explosions, etc.);
- the route through man-made disasters (explosions, wars, insurgencies, collapses, shipwrecks — the Titanic, etc.);
- the route through plagues — cities and monuments for long abandoned (the pyramids and temples of the Mesoamerican civilisation (there is no universally accepted theory as to why this collapse occurred: overpopulation, foreign invasions, peasant revolt, as well as the disintegration of key trade routes. The ecological hypotheses include environmental disasters/drought, epidemics, and climate change).

With respect to the description of the historical contexts, it concerns their typology and specifically the context of the creation or conception, that of the manufacture or execution, then the context of use, display, discardment, discovery, preservation-restoration, and that of reintroduction into the museum or tourist circuit. Within the context or the transition phases, of interest is the shape and appearance of the object, its state of conservation.

In the case of archaeological artefacts, particular attention is given to the context of discovery, which contains:

- *manner of discovery* (through systematic archaeological excavations, randomly after ploughing, excavations in construction works, mass wastings, in alluvia or after floods, in old galleries or in animal burrows, etc., and following looting without exhausting the site);
- *photofixation and stratigraphic survey of the occupation levels* (stratigraphic position and in the elevation drawing);
- *determining the physical-chemical and microbiological load* of the lying soil and, respectively, the determination of the chemical composition and of certain archaeometric characteristics of the crust/deposits and of the base material (morphology, texture, porosity, microstratigraphic structure, structural components from contamination, etc.);
- *evaluating certain transformations/processes/effects of structure/composition/etc. with assessment of the evolution between discardment and discovery* (pedologic effects), or, for that matter, establishing a number of heritage elements and functions before discardment.

Discussions on the route followed by an artefact, by including all its contexts, should also consider the main stages (phases) and changes in shape and content.

### **The role of scientific investigation in the valorisation of cultural property**

Given a newly discovered or procured artefact, its scientific investigation (by means of expertises that seek to authenticate, establish the state of preservation, the historical contexts covered, and the value) allows the creation of three main valorisation groups:

- a. *Obtaining new historiographical, archaeometric and technical-scientific data*, the latter providing new contributions to the technological and scientific field afferent to the execution of the artefact (gemmology, ceramology, archaeometallurgy, archaeodendrology, etc.);
- b. *Museum display*, the introduction into the tourist circuit, the presentation, valorisation and treasuring of the artefact;
- c. *Antiquities trade*, in its two forms, licit and illicit trade.

For valorising through museum display and for treasuring, of critical importance are both the expertises for authentication, establishing the auction (market) or catalogue value, and determining the state of conservation on the one hand, and the historiographical and scientometric studies on the other.

For example, in what concerns the last endeavour, that of treasuring, it allows the valorisation of an artefact in any stage that it might be found: in the archaeological site, in the investigation laboratory, or in the preservation-restoration workshop, displayed or stored in the museum or a private collection, following a transfer or itinerary, etc. Valorisation is made by involving to the greatest degree the five heritage elements (authenticity; paternity; catalogue, auction or market value; level/group of classing and classifying; patina/age) and, respectively, of the five heritage functions (aesthetic-artistic; historical-documentary; technical-scientific; administrative-utility; and spiritual).

Treasuring seeks to enhance the heritage value of a good or artefact. This concerns on the one hand new discoveries from historiographical information (documents, photographs, maps, etc.), compositional and structural-functional changes, donations or unknown transfers and other novel, unpublished data, and, on the other hand, the publishing of web pages, albums, the organisation of round tables, conferences, symposia, the production of teaching itineraries (open and interactive courses, etc.), the employment of modern display systems (static or dynamic dioramas, holograms, etc.), and the arrangement in the museum or in collections [28-33].

A very important facet of valorisation is that of the employment of goods in teaching activities, at all educational levels, and in protocol systems developed around the mobility of

delegations, groups of tourists of excursionists, by presenting the elements of authenticity/uniqueness with high visibility.

An optimal treasuring and valorisation requires a good knowledge, alongside the heritage functions acquired in time, the value, the level or group of classing/classification and state of conservation. The last allows assignment into a certain level of grouping, with priorities related to the interventions of active presentation, restoration and display. Similarly, for a good valorisation, the conditions of display must be studied, which will correspond to the standards imposed from necessities of protection and optimal presentation, highlighting some elements related to the contexts covered (those of execution, use or archaeological discovery).

### **Liberal professions in the field of Conservation Science**

For reasons related to the trade in artefacts and concerning their protection and valorisation, all auction houses, galleries and antiques shops that sell art are required to hire an expert attested by the ministry in charge. For instance, the Romanian Ministry of Culture has attested around 600 experts. Among these, only 160 are attested for painting, each with their own specialisation, either on a certain type of easel or monumental painting, either on groups of artists or periods. This is why experts qualified in 19<sup>th</sup> century painting are solicited for appraising, besides modern painting, other types of artefacts, such as: tapestries, furniture, crystals, ceramics, etc. They are paid handsomely exactly by those interested in selling the goods. It is known that in the West, the buyer often comes accompanied by his own independent expert.

Given these conditions, a phenomenon occurs in Romania, in which besides the fact that experts hired by galleries or antiques shops are few and not very well trained, they become corruptible and furthermore eschew the galleries for months. Once Romania joined the EU, the scene became one of unharmonised norms and laws, with a heritage registry that is undefined or unindexed, which required attested specialists. Romania lacks the institution of “art experts”. The Romanian National Occupational Nomenclature lacks many occupations from the field Conservation Science.

Currently, at the European level it is increasingly spoken of the necessity of the two levels of specialisation: through a Master programme, on the basis of which the *attestation of specialist* with free practice in all EU countries, and, respectively, through a Doctorate programme, when besides the *title of doctor* in a branch field of a science or discipline (e.g., Environmental Science and Engineering, Material Science and Technology, Cultural Property Law, Intellectual Property Law, and History/Archaeology, when cultural goods and archaeological artefacts are studied), the *attestation of expert* with free practice is obtained. The following occupations are structured from these specialisations:

- *Conservation Scientist*, who has the professional title of Doctor of Science, and can cover any of the activities of the field (classing, investigation, preservation, restoration, display, treasuring, etc.), having the highest level of expert, and suitable for taking positions as cultural manager, councillor or manager of cultural institutions;

- *Scientific investigator*, who deals with the five main expertise groups (authentication, heritage assessment, determining the state of conservation, compatibilising the interventions, monitoring their behaviour for a set period of time, and monitoring the state of conservation for the entire period of display and storage), with two levels of specialisation, namely the base one as *analyst specialist* warranted by the MA degree, and the superior one of *expert investigator* obtained through attestation after the Doctorate (the *analyst specialist* can only issue *Certificates of analysis* or other *Synthetic analytical reports* with data obtained from scientific investigations, whereas the expert investigator can issue the *Certificate/report of expertise*, by

solving the requested objectives by means of processing and interpreting experimental data, providing solutions, indicating measures to take and directions to follow);

- *Art historian* is an occupation held by graduates of the faculties of History and Theory of Art and of History, who after the MA can take the positions of curator, museographer or guide, and, after specialisation through a Doctorate, of art expert;

- The *Archaeologist* is a graduate in History, with the two professional levels of *specialist* (after the MA) and *expert* (after the Doctorate), preoccupied with the identification, research and archaeological discharge of sites, as well as valorising and treasuring the artefacts discovered;

- The *Curator* is concerned with activities of protection and preserving (preventive climatisation and prophylactic treatments for stopping the evolutive effects of deterioration and degradation), likewise with two levels of specialisation, the basic one of *specialist* obtained after the MA, and the superior one of *expert*, obtained through attestation after the Doctorate;

- The *Restorer* is concerned with activities of restoration by means of consolidation and stabilisation operations, then those of structural (completions/additions), chromatics (mimetics, trategio, puntilismo...) and ambiental (landscape, architectonics...) reintegration, similarly with two levels of specialisation, namely the base one as *specialist* conferred by the MA degree, and the superior one as *expert* obtained through attestation after the Doctorate;

- The *Museographer* is the complementary occupation of the curator, who besides the basic activity of displaying artefacts, can also cover the domains of activity of the curator and even of the guide, having two levels of specialisation, specifically the base one as *specialist*, after the MA, and the superior one as *expert*, obtained through attestation after the Doctorate programme;

- *Guide* is the occupation taken by graduates of the faculties of Arts, Ethnography and History, tasked with leading and explaining to the public/tourists information on the heritage goods displayed in museums, and generally only with the level of *specialist*.

From all of the professions presented above, the scientific investigator, alongside the art historian (the traditional expert) and the archaeologist, can occupy the function of *art expert*, which can carry out evaluations in various galleries, antiques shops and commission stores that sell or auction works of art, or can occupy functions of superior councillors in cultural institutions.

## Conclusions

The harmonisation of the nomenclature in the field of Conservation Science at the national, European and international level is critically needed for a proper collaboration between specialist from across the world, and for a better understanding of the complex aspects of this field.

In this sense, the present paper focuses on ways of approaching the proper use and transmission, in the unanimously accepted form, of the terms and phrases used for elaborating scientific works and activities to train future specialists in the field of conserving cultural heritage goods. These aspects can represent the premise for facilitating the sharing of knowledge and experience, the formation of pluridisciplinary and interdisciplinary teams.

Another important aspect of the paper concerns the presentation of the heritage elements and functions, of the routes and historical contexts covered by the cultural goods, the role of the scientific investigation in valorising the old heritage artefacts, and of the role of the registry of occupations specific to the field of Conservation Science, developed by research and higher-education professionals.

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