

Book Review

THE DETERIORATION AND DEGRADATION OF CULTURAL HERITAGE ITEMS

volume I and II

by

Ion SANDU

„Alexandru Ioan Cuza” University of Iași Publishing House, 2008,
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The author of the monograph **The Deterioration and Degradation of Cultural Heritage Items**, which comprises two volumes, is a well known specialist in the field of cultural heritage items restoration and preservation.

His impressively rich activity in the field of cultural heritage restoration science and his works in which he implemented and integrated physical-chemical methods in a multi-disciplinary context, undoubtedly recommend him as an outstanding personality for the application of science in the field of arts and culture.

The achievements of the author in the field of archaeological restoration/conservation cover a broad spectrum of issues and offer significant insight into and also explain specific "interdisciplinary chemical effects" as well as "physical functioning principles of the reactive systems", with practical implications, such as: patination or repatination of metallic items by using additive-subtractive or subtractive-additive methods, spotting differences in the corrosion structure in volume of antique bronze items visible in the three patina types (primary - formed during the period the object was used, secondary - formed starting with the end of the period the object was used in and after the object was discarded, and tertiary - formed under the influence of pedological processes). The author also contributed to the process of establishing the normal variation interval for the hydric equilibrium of fresh and old wood, with its practical implications. He introduced the concept of integrative conservation, next to that of integrated conservation, which was unanimously accepted, the concept of restorative metallurgy for metal artifacts, the definition of heritage elements and functions, the establishment of artifact-metric or of new archaeo-metric criteria, the substantiation of the five levels of conservation and of their priorities and specific characteristics, the study of the mechanisms involved in the physical-mechanical and climatic deterioration processes that affect the physical state of various structural and functional components and also processes of chemical, electro-chemical, microbiological and radiative/thermal alteration on which the cumulative degradation effects on heritage items are based.

The research and achievements of the author allowed him to focus on certain main directions, such as those involving the following: proper nomenclature for this new interdisciplinary science, modern methods of scientific investigation (as, for example, new authentication techniques), certain synthesis and characterization procedures for materials and optimum display methods in order to make the results count.

The scientific contributions of the author led to conclusions, methodologies and concepts in regard to the deterioration and alteration of valuable heritage objects. The deterioration and alteration of an object begins right after the object is made and continues at increased rate with the passing of time due to the action of *increasingly aggressive environmental factors*. *Resistance* in time depends on *the stability* of the materials and on their *compatibility*. Moreover, any intervention on the object after it is finished affects it. Unauthorized preservation-restoration, improper maintenance, failure to comply with protection and display rules have a negative impact on the object. Anthropogenic factors have the most serious impact. Vandalism and counterfeiting actions may be controlled. There are events such as natural disasters and other accidents that cannot be controlled. Therefore, knowing

the form and mechanisms involved in those processes is important if one wishes to stop the decay due to them and to eliminate the causes of the decay.

In this context, the monograph elaborated by the author Ion Sandu was welcome as a necessity to generalize, extend and integrate aspects of experimental research into an unitary scientific concept. The monograph is in itself a scientific argumentation of the experience gained in time of the Romanian research activities in an European and international context. The author had the idea to elaborate a work on that topic in mind for a long time. Actually, most of the papers he wrote during the past 15 years of activity were on many of the aspects of this topic.

Integrated scientific conservation of cultural heritage items requires complex knowledge in interdisciplinary and transdisciplinary domains, such as: material science and engineering (which involves chemistry, physics, biology, geology etc), art history and theory, archaeology, anthropology, environment sciences and engineering, sociology, computer sciences, cybernetics, forensics and others, each of which having their own research instruments allowing integration into the complementary system of mutual assistance and collaboration in a scientific investigation aiming to uncover all relevant details required to save and store objects for future generations to see.

As pointed out by the author in the preface to the two volumes, "those for whom the title may seem, at first sight, somehow unclear, will come to agree that enhanced knowledge of those processes is extremely important when performing efficient preservation-restoration interventions and, implicitly, an integrated scientific conservation". The monograph starts with a proper definition of the two concepts and gradually shifts from simply describing the effects of alteration on the structural-functional elements and material decay, to presenting certain novel aspects observed by researchers. Those aspects allow us to understand the process of decay and alteration of cultural heritage objects.

In that respect, the monograph **The Deterioration and Degradation of Cultural Heritage Items** was structured in two volumes. The first focuses on traditional inorganic materials used in various art items and old historic monuments, while the second volume focuses on organic materials used in sculptures, old wood furniture, paintings and documents on various organic materials, with details of certain aspects in regard to the mechanism of the deterioration and degradation processes.

The two volumes were written after consulting a wide variety of works and based on the data and results from personal experiences in the field. Special emphasis was put on the latest monographs and scientific works published in our country and abroad, as well as on a large number of inventions patented by the author.



The first volume, which comprises 462 pages, has five chapters, each of which having up to date bibliography, and presents the degradation of inorganic materials and the alteration features specific to various structural elements of monuments and other works of art made mostly of traditional inorganic materials.

The first chapter contains general aspects in regard to degradation and deterioration factors, the classification and presentation thereof, the methodology and description of the effects and mechanisms thereof, as well as of specific deteriorations and degradations, levels of conservation and the stages passed through by a heritage item from conception to museum display.

Chapters II and III deal with metal as material and structural component of artifacts, with its specific deterioration and degradation, with a special emphasis on its aging patina.

Chapters IV and V focus on the processes of alteration for stone, pottery, glass and other inorganic materials used in the structure of cultural and historic monuments (strong frames, fills, coatings, ornaments, fine works etc.), as well as in other heritage objects.

The second volume focuses on the deterioration and degradation of objects made of *organic materials*, with details in regard to chemical, physical-structural and mechanical properties of objects and the display of sculptures, wood furniture, documents on various materials and paintings. This volume comprises 538 pages and contains six chapters with up to date bibliography.

The first chapter focuses on wood as material and structural component of various heritage items. Starting from its macro and microscopic structure, they analyze its chemical, physical-structural and mechanical properties, linked to durability and protection measures involved. Special emphasis is on wood humidity, mainly on the normal variation domain of hydric equilibrium and the factors that influence it and the phenomena it generates. Closing the chapter is a presentation of the systems for wood stabilizing and consolidation.



Chapter II focuses on the effects of deterioration on wood structural elements and wood as material. There is a presentation of the macro-structural characteristics of various wood varieties, local and exotic, with relevant applications and ways to make objects of wood, whole objects or parts of larger structures. At the end of the chapter there is a description of defects, deteriorations and degradation of wood in various processing stages.

Chapters III and IV focus on the degradation of cellulose materials and the practical implications involved. Thus, in chapter III, after presenting the structure and chemistry of cellulose, they describe the degradation process mechanism under the influence of various factors and Chapter IV approaches paperworks with the degradation and deterioration thereof in various periods, from conception to museum display.

Chapter V focuses on the characteristics of leather and parchment, with their forms of deterioration and degradation and Chapter VI presents details of the deterioration of old paintings, with emphasis on crackles and a description of the main degradation forms of painting materials.

At the end of every volume there is an annex with the works published by the author in the field of scientific investigation and conservation of cultural heritage items as a subsystem of environment engineering and of material science and engineering.

The monograph is aimed primarily at students from master and doctoral studies, students who specialise in the conservation of heritage items and environment protection, but also at specialists and workers in The Ministry of Culture, The Ministry of Environment and Durable Development, The Ministry of Transport, Construction and Tourism, as well as at owners of monuments and objects of art.

Thanks to its consistency, thoroughness and the clarity of its academic discourse, the monograph constitutes not only a basic study for students, but also for researchers and restoration workers.

In conclusion, **The Deterioration and Degradation of Cultural Heritage Items** is a book for all those interested in scientific issues of conservation-preservation of heritage items in conjunction with exact sciences and advanced physical-chemical sciences. It is clear, with eloquent examples and coherent analyses of great heuristic and pedagogic importance.

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by Using Advanced Physical-Chemical Methods.*