

## Cultural Heritage And Aerobiology Methods And Measurement Techniques For Biodeterioration Monitoring

This book is published open access under a CC BY 4.0 license. Over the past decades, rapid developments in digital and sensing technologies, such as the Cloud, Web and Internet of Things, have dramatically changed the way we live and work. The digital transformation is revolutionizing our ability to monitor our planet and transforming the way we access, process and exploit Earth Observation data from satellites. This book reviews these megatrends and their implications for the Earth Observation community as well as the wider data economy. It provides insight into new paradigms of Open Science and Innovation applied to space data, which are characterized by openness, access to large volume of complex data, wide availability of new community tools, new techniques for big data analytics such as Artificial Intelligence, unprecedented level of computing power, and new types of collaboration among researchers, innovators, entrepreneurs and citizen scientists. In addition, this book aims to provide readers with some reflections on the future of Earth Observation, highlighting through a series of use cases not just the new opportunities created by the New Space revolution, but also the new challenges that must be addressed in order to make the most of the large volume of complex and diverse data delivered by the new generation of satellites.

The most comprehensive guide to material selection & installation It takes a wise choice of building materials and details to create durable, attractive, and affordable custom homes and remodeling projects. Best Practices Guide to Residential Construction provides up-to-date, field-tested recommendations that help professionals balance cost and performance when designing and building residential projects. Steven Bliss, former editorial director of The Journal of Light Construction and founding editor of Progressive Builder, draws on his extensive knowledge as a practicing builder, designer, and construction editor to help building professionals select the right materials for every job and install them with confidence. This one-stop resource covers the real-world challenges of material selection and installation so designers, contractors, and building owners can make informed decisions for all major building components. Useful to architects, designers, and specifiers--as well as contractors, builders, and developers--Best Practices Guide to Residential Construction features: \* More than 200 photos and illustrations of critical residential construction details \* Installation tips and cautions that help prevent costly product failures \* Descriptions of the latest composites and synthetics that are changing the way we build \* Easy-to-use charts for making quick product comparisons \* An authoritative guide to indoor air quality and healthy house construction

Our country's cultural legacy is one of the world's most diverse, drawing millions of visitors every year to our convents and monuments, and to our museums, libraries, concert halls and festivals. In addition, it is a dynamic trigger of economic activity and jobs. Among the various scientific branches, microbial biotechnology offers an innovative and precise approach to the complexity of problems that restorers face in their daily work. This book discusses a range of topics, including the biodiversity of microbial communities from various cultural heritage monuments, microbial biotechnological cleaning techniques, the role of bacterial fungal communities for the conservation of cultural heritage, and microbial enzymes and their potential applications as biorestation agents. Written by internationally recognized experts, and providing up-to-date and detailed insights into microbial biotechnology approaches to cultural heritage monuments, the book is a valuable resource for biological scientists, especially microbiologists, microbial biotechnologists, biochemists and microbial biotechnologists.

Coping with Biological Growth on Stone Heritage Objects: Methods, Products, Applications, and Perspectives offers hands-on guidance for addressing the specific challenges involved in conserving historical monuments, sculptures, archaeological sites, and caves that have been attacked and colonized by micro- and macroorganisms. The volume provides many case studies of removal of biological growth with practical advice for making the right choices. It presents detailed and updated information related to biocides and to alternative substances, features that will be valuable to dealing with these challenges. The author's goal is to provide access to information and offer the conceptual framework needed to understand complex issues, so that the reader can comprehend the nature of conservation problems and formulate her/his own views. From bacteria to plants, biological agents pose serious risks to the preservation of cultural heritage. In an effort to save heritage objects, buildings, and sites, conservators' activities aim to arrest, mitigate, and prevent the damages caused by bacteria, algae, fungi, lichens, plants, and birds. Although much has been learned about these problems, information is scattered across meeting proceedings and assorted journals that often are not available to restorers and conservators. This book fills the gap by providing a comprehensive selection and examination of international papers published in the last fifteen years, focusing on the appropriate methods, techniques, and products that are useful for the prevention and removal of micro- and macroorganisms that grow on artificial and natural stone works of art, including wall paintings. Results on new substances with antimicrobial properties and alternative methods for the control of biological growth are presented as well. The book also emphasize issues on bioreceptivity of stones and the factors influencing biological growth and includes an outline of the various organisms able to develop on stones, a discussion on the bioprotection of stones by biofilms and lichens, a review of the main analytical techniques, and a section on bioremediation. This volume will be a valuable reference for cultural heritage conservators and restorers, scientists, and heritage-site staff involved in conservation and maintenance of buildings, archaeological sites, parks, and caves.

Cultural Heritage Microbiology

Coping with Biological Growth on Stone Heritage Objects

### Ecology of Cyanobacteria II

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Their Diversity in Space and Time

During the last couple of decades Afghanistan s cultural heritage has faced exceptional challenges. Looting of the National Museum, Kabul Museum , the neglect of monuments and extensive illegal excavations have taken place. However, what really shook the world was the destruction of the Buddhas of Bamiyan in March 2001. This volume focuses on Afghanistan s cultural heritage protection. Its purpose is threefold. To provide an overview of the diversity of activities undertaken in the cultural heritage field. To change public opinion into a more positive one. And to serve as an example for future generations. This multidisciplinary book (including contributions from archaeologists, linguists, and lawyers) will interest both scholars in the cultural, legal and humanistic field as well as the public at large. Many exceptional photographs are included.

Cultural Heritage and AerobiologyMethods and Measurement Techniques for Biodeterioration MonitoringSpringer Science & Business Media

Since prehistoric times and throughout the course of human evolution, wood has been an integral part of all civilizations. Wooden Cultural Heritage can be found worldwide, providing valuable information on the social and economic context of human history. Nonetheless, as a natural cellulosic material, wood shows low resistance to biodeterioration and thus wooden Cultural Heritage often fails to escape decomposition in both aquatic and terrestrial ecosystems. This book provides a comprehensive overview on the biodeterioration of wooden Cultural Heritage and describes the decay mechanisms of key organisms and microorganisms encountered in aquatic and terrestrial ecosystems. Cultural Heritage professionals, researchers and academics may explore within this book the associations between deteriogens, habitats and decay, which will assist them to understand wood biodeterioration and design effective prevention, mitigation and remediation strategies. The book presents case studies around the world to demonstrate the impact of biogenic deterioration on wooden Cultural Heritage and illustrates mechanisms and patterns in order to be a useful handbook of decay diagnosis. Lastly, by adopting a holistic approach to wood decay, basic concepts of wood technology, ecology, and deteriogens' biology are introduced, permitting readers of different scientific backgrounds to easily comprehend wood biodeterioration.

This book contains forty reviewed papers delivered at the International Congress on Molecular Biology and Cultural Heritage held in Seville, March 2003. It is divided in four parts, the first one presents the state-of-the-art and reviews molecular techniques applied to the study of microbial communities colonizing monuments and cultural heritage assets. Part two covers specific molecular techniques used in biodetereoration studies, part three includes an updated overview on on-going biodetereoration European Commission projects, and part four presents selected biodetereoration case studies from all over the world.

The British National Bibliography

Art, Biology, and Conservation

Art and Archaeology of Afghanistan

Fungi and Mycotoxins Risk Assessment and Management

PROCEEDINGS 4th International Congress on "Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin" VOL. II

Best Practices Guide to Residential Construction

Handbook of Modern Coating Technologies: Application and Development reviews recent applications and developments of modern coating technologies. The topics in this volume consist of role of antibacterial coatings in the development of biomaterials, insights of technologies for self-healing organic coatings, sensor applications, application of carbon nanotubes–based coating in the field of art conservation, oxide-based self-cleaning and corrosion-protective coatings, protective coatings for wood, applications of optical coatings on spectral selective structures, application of natural antimicrobial coating for controlling foodborne pathogens on meat and fresh produce, efficacy of antimicrobial coating in reducing pathogens on meat, composite membrane: fabrication, characterization, and applications, development of nanostructured HVOF coatings on high strength steel components for turbine blades, nanoscale multilayered composite coating, applications of sol–gel coatings, application of graphene in protective coating industry, application of coatings in outdoor high-voltage installations, defects and doping effects in thin films of transparent and conductive oxides, and functional coatings for lab-on-a-chip systems based on phospholipid polymers.

Environmental stress caused by water continuously exposes buildings to microbial colonization. This is highly evident when both minor dampness and mass flooding occur. The text describes how microbiological corrosion of buildings and the structures and substances derived from these hazards are responsible for adverse health effects on people exposed to these contaminated environments. Microbiological Corrosion of Buildings: A Guide to Detection, Health Hazards, and Mitigation describes the key elements and methods for neutralising and removing microbiological contamination, and the operating algorithm for checking the effectiveness of preventative solutions. Ideal for construction engineers, microbiologists and professionals in the field. Features: Latest methods for detection of indoor microbial hazards Identifies the tools needed for natural, non-destructive and non-invasive methods of bio-corrosion removal Describes the social and health problems associated with exposure to microbiological hazards Provides case studies and examples of microorganisms responsible for microbial corrosion. 'Climate change and the associated adverse effects, such as floods and whirlwinds, make the problem of microbiological corrosion of buildings that generates health risks and economic losses on a global scale, the focus of science and technology. The monograph presents a complex problem of building bio-corrosion, that requires knowledge of the distant fields of microbiology and building technology, for the use of both scientists and practitioners. This pioneering work of an interdisciplinary nature harmoniously combines knowledge on specific microbiological issues relating to the process of bio-corrosion and the associated health risks with detailed issues of construction technology concerning the prevention of bio-corrosion and its removal. The authors succeeded in combining a very high scientific level in the monograph with an accessible and understandable presentation of complex problems. The extensive references, ranging from "classical" items from many years ago to the most recent articles presenting the state of the art in this field, are worth emphasising.' —Prof. Jacek Dutkiewicz, Ph.D., D.Sc., Institute of Rural Health in Lublin

"Conservation Science 2007 was organised jointly by the Institute of Conservation Science, ICS, at the time the conference was first planned), the Politecnico di Milano, Italy, and theUniversity of Milan, Italy, and held at the Politecnico di Milano 10-11 May 2007. This was the second ICS conference." "Almost all of the papers from the plenary session From science laboratory to conservation practice, both papers and poster abstracts from the three working sessions, and posters on the theme of Architecture are published here. The 30 papers have all been peer reviewed. This volume provides a valuable overview of current research being carried out worldwide in conservation science."--BOOK JACKET.

Fungi are the largest group among living organisms after insects. The total fungal species is estimated to be 1.5 million, of which 72,000 have been reported and ~1500 are added every year. Fungi are used in various biotechnological applications such as in the pharmaceutical and agrochemical industries, in bioremediation, biological control, as natural scavengers, for recycling of elements, dyes, etc. This book attempts to cover the various aspects of fungi. This book will add substantially to the knowledge of fungal diversity and its applications in specific areas and bring the information under one umbrella.

Microbiological Corrosion of Buildings

Its Fall and Survival : a Multi-disciplinary Approach

Biodeterioration of Works of Art

Book chapters from the 6th International Symposium on Occupation Safety and Hygiene (SHO 2018), March 26-27, 2018, Guimarães, Portugal

Methods, Products, Applications, and Perspectives

Biodeterioration and Conservation

This book intends to provide information about detection and health effects due to bacteria, fungi and viruses in indoor environments. The book will cover also information about preventive and protective measures to avoid health-hazardous. Case studies will be also addressed to enrich the book with the expertise of each invited author. The book also intends to fill gap regarding information about all biologic agents, since most of the books available are dedicated to only one type of microorganisms. For various different biologic agents and metabolites this book will compile information about indoors presence, detection methods, exposure assessment and health effects. Several problems regarding the exposure of biologic agents will be presented through case studies, and also the implementation of preventive and protective measures to avoid/minimize exposure. Besides, all the book will focus on occupational health and/or public health point of view.

Environmental Mycology in Public Health: Fungi and Mycotoxins Risk Assessment and Management provides the most updated information on fungi, an essential element in the survival of our global ecology that can also pose a significant threat to the health of occupants when they are present in buildings. As the exposure to fungi in homes is a significant risk fact for a number of respiratory symptoms, including allergies and hypersensitivity pneumonitis, this book presents information on fungi and their disease agents, important aspects of exposure assessment, and their impacts on health. This book answers the hard questions, including, "How does one detect and measure the presence of indoor fungi?" and "What is an acceptable level of indoor fungi?" It then examines how we relate this information to human health problems. Provides unique new insights on fungi and their metabolites detection in the environmental and occupational settings Presents new information that is enriched by significant cases studies Multi-contributed work, edited by a proficient team in medical and environmental mycology with different individual expertise Guides the readers in the implementation of preventive and protective measures regarding exposure to fungi

Occupational Safety and Hygiene VI collects recent papers of selected authors from 21 countries in the domain of occupational safety and hygiene (OSH). The contributions cover a wide range of topics, including: - Occupational safety - Risk assessment - Safety management - Ergonomics - Management systems - Environmental ergonomics - Physical environment - Construction safety, and - Human factors Occupational Safety and Hygiene VI represents the state-of-the-art on the above mentioned domains, and is based on research carried out at universities and other research institutions. Some contributions focus more on practical case studies developed by OSH practitioners within their own companies. Hence, the book provides practical tools and approaches currently used by OHS practitioners in a global context.

Bioaerosols, sampling and characterization -- Sources and transport of microbial aerosols -- Impacts of microbial aerosols on atmospheric processes -- Impacts of bioaerosols on human health and environment

Biodegradation Technology of Organic and Inorganic Pollutants

Environmental Mycology in Public Health

Occupational Safety and Hygiene VI

Science and Technology for the Conservation of Cultural Heritage

Fundamental Studies in Conservation Science

Handbook of Modern Coating Technologies

In recent years, a debate has arisen concerning the convenience of conserving subterranean cultural heritage and the necessary management models. There is often pressure from local authorities more interested in using the cultural heritage sites in order to develop the economy and the tourism industry rather than in the conservation of the cultural

This second fully updated and extended edition of Biotechnology and Conservation of Cultural Heritage provides in-depth insights into the role of different microorganisms and microbial compounds in biodeterioration, conservation and restoration of artworks and artifacts. Latest methods to detect, remove and prevent microbial colonization on artwork surfaces and in air environments of libraries and museums are discussed and illustrated by engaging case studies. Furthermore, this edition covers new case studies on Archaeobiology, exploring ways to perform the molecular biology characterization, restoring and protecting museum taxidermal specimens, preserving and guaranteeing the future integrity. Finally, the use of halloysite-nanotubes is investigated to set up innovative protocols in consolidation and long-term protection of waterlogged and archaeological wood. This book addresses to Biologists, Microbiologists, Conservation Scientists and Conservators who are interested in understanding the role of microorganisms and bioactive molecules in conservation projects.

Cyanobacteria have existed for 3.5 billion years, yet they are still the most important photosynthetic organisms on the planet for cycling carbon and nitrogen. The ecosystems where they have key roles range from the warmer oceans to many Antarctic sites. They also include dense nuisance growths in nutrient-rich lakes and nitrogen-fixers which aid the fertility of rice-fields and many soils, especially the biological soil crusts of arid regions. Molecular biology has in recent years provided major advances in our understanding of cyanobacterial ecology. Perhaps for more than any other group of organisms, it is possible to see how the ecology, physiology, biochemistry, ultrastructure and molecular biology interact. This all helps to deal with practical problems such as the control of nuisance blooms and the use of cyanobacterial inocula to manage semi-desert soils. Large-scale culture of several organisms, especially "Spirulina" (Arthrospira), for health food and specialist products is increasingly being expanded for a much wider range of uses. In view of their probable contribution to past oil deposits, much attention is currently focused on their potential as a source of biofuel. Please visit <http://extras.springer.com/> to view Extra Materials belonging to this volume. This book complements the highly successful Ecology of Cyanobacteria and integrates the discoveries of the past twelve years with the older literature.

Every 3rd issue is a quarterly cumulation.

Principles and Methods in Landscape Ecology

Cultural Heritage and Aerobiology

The Conservation of Subterranean Cultural Heritage

Encyclopedia of Astrobiology

Biotechnology and Conservation of Cultural Heritage

The Quality of Air

“Risk Management in the Cultural Heritage Sector: Museums, Libraries, Archives” is the second volume in the Book Series “Education and Research in the Sector of Cultural and Environmental Heritage”. Its contents can be traced preliminarily to a historical overview of the regulatory situation regarding the safety of cultural heritage in Italy and internationally, with a consequent discussion of procedures for evaluation and prevention, guidelines and security systems, in particular, in confined environments. Attention then focuses on the various types of risk and relevant scientific methodologies, comparing methodological paths and monitoring standards established by Italian and International Organisations. A number of case studies carried out by the Diagnostic Laboratory for Cultural Heritage of the Department of Cultural Heritage at the Alma Mater Studiorum University of Bologna are examined.

Astrobiology is a remarkably interdisciplinary field. This reference serves as a key to understanding technical terms from the different subfields of astrobiology, including astronomy, biology, chemistry, the geosciences and the space sciences.

The earth’s subsurface contains abundant and active microbial biomass, living in water, occupying pore space, and colonizing mineral and rock surfaces. Caves are one type of subsurface habitat, being natural, solutionally- or collapse-enlarged openings in rock. Within the past 30 years, there has been an increase in the number of microbiology studies from cave environments to understand cave ecology, cave geology, and even the origins of life. By emphasizing the microbial life of caves, and the ecological processes and geological consequences attributed to microbes, this book provides the first authoritative and comprehensive account of the microbial life of caves for students, professionals, and general readers.

Historic and culturally important objects, like all materials, are vulnerable to microbial attack. Over time, microorganisms can affect paint, wood, paper, glass, textiles, metal, wax, stone, polymers, and coatings, Microbial deterioration of heritage materials can be caused by the formation and growth of biofilms or by direct attack by a variety of microorganisms, all of which may be difficult to correct without also damaging the materials themselves. On the other hand, microbial processes can also be adapted to conserve and even restore heritage materials, pointing to the complex nature of microbial interactions with these irreplaceable materials. Cultural Heritage Microbiology assembles over twenty scientific papers published during the past two decades, each presenting a major advance in some facet of this complex field. These seminal articles, by a wide range of international experts, are grouped by the historic material affected. Each section is introduced by a thorough review, written for this volume, which serves to introduce and synthesize these past studies and to combine them with the latest cutting-edge findings to present the most current state of the field. Extensive references in every chapter and article offer valuable resources for further investigation. Cultural Heritage Microbiology is ideal for anyone concerned with recognizing and dealing with microbial deterioration of heritage materials. Professionals and students in microbiology, conservation science, archaeology, fine arts, architecture, museum conservation, and other fields will find here the most current knowledge and approaches to preserving cultural heritage objects for generations to come.

Scientific Analysis and Management Strategies

A Guide to Detection, Health Hazards, and Mitigation

Science and Conservation for Museum Collection

Microbial Life of Cave Systems

Molecular Biology and Cultural Heritage

Papers from the Conference Held in Milan, Italy, 10-11 May 2007

Despite the perception that artworks are timeless and unchanging, they are actually subject to biological attack from a variety of sources--from bacteria to fungi to insects. This groundbreaking volume, which publishes the proceedings of a conference held at The Metropolitan Museum of Art in 2002, explores how the development of these while preserving both the work of art and the health of the conservator.The richly illustrated text, containing the writings of over 40 scientists and conservators, is divided into sections on stone and mural paintings, paper, textiles, wood and archaeological materials, treatment and prevention, and special topics. The artworks and cultural products among many others, Paleolithic cave paintings, Tiffany drawings, huts built by early Antarctic explorers, and a collection of toothbrushes taken from Auschwitz victims.

The Quality of Air discusses the topic from both the environmental and human health points-of-view. As today’s policymakers, academic, government, industrial researchers, and the general public are all concerned about air pollution in both indoor and outdoor scenarios, this book presents the advances in the analytical tools available for air quality political, and legal frameworks. With its multi-author approach, there is a wide range of expertise in tackling the topic. Addresses real scenarios of polluted sites Presents updates of the available methodologies for the quality control of indoor and outdoor air Includes evaluations of working scenarios in different fields as mandated by regulatory frameworks

The book describes the morphological, physical and chemical properties of aerosols from various natural and anthropogenic sources to help the reader better understand the direct role of aerosol particles in scattering and absorbing short- and long-wave radiation.

'The Atlas of Climate Change Impact on European Cultural Heritage' aims to reveal the links between climate science and the potential damage to our material heritage. While the vulnerability atlas shows overall patterns of threat, greater detail about the scientific basis of the project can be found in the appendices, which give some background information.

The Atlas of Climate Change Impact on European Cultural Heritage

Biodiversity of Fungi

Exposure to Microbiological Agents in Indoor and Occupational Environments

Towards a Science of the Landscape

Museums, libraries and archives

Biology in the Conservation of Works of Art

Brings together wide-ranging scientific contributions from those who have studied the biological degradation of cultural heritages. It tackles both general topics (mechanisms of biodeterioration; correlation between biodeterioration and environment; and destructive organisms) and specific ones (the problems presented by different materials, environments, climatic conditions, and geographic settings). The contributors also discuss ways to diagnose, prevent, and control deterioration.

Bioremediation technologies for environments contaminated by organic and inorganic pollutants are a major focus of researchers and scientists worldwide. The chemical control of agricultural pests and advocacy for sustainable agriculture have led to the development of new paradigms in environmental remediation. This book covers recent advances in the bioremediation technology of organic and inorganic pollutants in the environment.

Landscape ecology is an integrative and multi-disciplinary science and Principles and Methods in Landscape Ecology reconciles the geological, botanical, zoological and human perspectives. In particular ,new paradigms and theories such as percolation, metapopulation, hierarchies, source-sink models have been integrated in this last edition with the recent theories on bio-complexity, information and cognitive sciences. Methods for studying landscape ecology are covered including spatial geometry models and remote sensing in order to create confidence toward techniques and approaches that require a high experience and long-time dedication. Principles and Methods in Landscape Ecology is a textbook useful to present the landscape in a multi-vision perspective for undergraduate and graduate students of biology, ecology, geography, forestry, agronomy, landscape architecture and planning. Sociology, economics, history, archaeology, anthropology, ecological psychology are some sciences that can benefit of the holistic vision offered by this textbook.

This book provides detailed insights into the role of microorganisms and microbial products in biodeterioration, conservation and restoration of cultural heritage. Topics to be discussed are microbial colonization and their growth control on both artworks and aerosol of indoor environments such as libraries or museums, as well as human health hazard from exposure to microbial agents. In addition innovative biotechnological protocols and strategies for the removal of undesired layers on artwork surfaces are described in detail. Also the advances and perspectives in this emerging biotechnological field are discussed, supported by the latest original findings.

Organisms and Decay Mechanisms in Aquatic and Terrestrial Ecosystems

Book Review Index

Conservation Science 2007

Materials, Finishes, and Details

Microbiology of Aerosols

Conservation, Restoration, and Maintenance of Indoor and Outdoor Monuments

The idea of the book “Science and Conservation for Museum Collections” was born as a result of the experience made by CNR-ISTEC (Faenza) in the implementation of a course for Syrian restorers at the National Museum in Damascus. The book takes into consideration archaeological artefacts made out of the most common materials, like stones (both natural and artificial), mosaics, ceramics, glass artefacts and materials, like clay tablets, goldsmith artefacts, icons, leather and skin objects, bones and ivory, coral and mother of pearl. Each type of material is treated from four different points of view: composition and processing technology; alteration and degradation causes and mechanisms; procedures for conservative intervention; case studies and/or examples of conservation and restoration between their conservation problems, all the subjects are treated in a schematic, but precise and complete way. The book is mainly addressed to students, young restorers, conservators and conservation scientists all around the world. But the book can be usefully read by expert professionals too, because nobody can know everything and the experts often need to learn something of the material.

different fields of activity contributed with their experience for obtaining a good product. All they are Italian experts, or working in Italy, so that the book can be seen as an exemplification on how the conservation problem of Cultural Heritage is received and tackled in Italy. \_\_\_\_\_ SCIENCE AND CONSERVATION FOR MUSEUM COLLECTIONS INTRODUCTION 1 – PREVENTIVE

standards and guidelines 1.3 Environment-material interaction 1.4 Microclimate and monitoring 1.5 Handling works of art 1.6 Exhibition criteria 1.7 MUSA project: intermuseum network for conservation of artistic heritage Bibliography Acknowledgements 2 – STONE ARTEFACTS 2.1 What conservation means 2.2 Natural Stones 2.3 Artificial stones 2.4 Deterioration of the stone 2.5 Cleaning of stone studies Bibliography 3 – MOSAICS 3.1 Manufacturing techniques 3.2 History of the mosaic 3.3 Degradation of mosaic 3.4 Restoration of mosaics 3.5 Case study Bibliography 4 – CERAMICS 4.1 Ceramic technology 4.2 Technological classification of ceramics 4.3 Alteration and degradation processes 4.4 Ceramic conservation and restoration 4.5 Case studies 4.6 Examples of restoration Bibliography Deterioration 5.3 Conservative intervention 5.4 Case study: Syrian tablets Bibliography Acknowledgements 6 – GLASS 6.1 General information 6.2 Processing techniques 6.3 Glass deterioration 6.4 Glass conservation and restoration 6.5 Case studies Bibliography Acknowledgements 7 – METALS 7.1 Origin of metals 7.2 Manufacturing techniques 7.3 Conservation state of metals 7.4 Conservative intervention artefacts from terracotta containers Bibliography Acknowledgements 8 – GOLDSMITH ARTEFACTS 8.1 Goldsmith’s metals 8.2 Enamels 8.3 Precious stones 8.4 Alteration and degradation 8.5 Conservative intervention 8.6 Case studies Bibliography 9 – WOOD ARTEFACTS 9.1 Characteristics of the wood 9.2 Working techniques 9.3 Degradation of wood 9.4 How to start restoring 9.5 Restoration of a wooden tablet 9.7 The restoration of a seventeenth-century wooden crucifix Bibliography 10 – ICONS 10.1 The construction of icons 10.2 Degradation and damages of icons 10.3 Methods of conservation and restoration of icons 10.4 Examples of conservative interventions Bibliography 11 – TEXTILE FINDS 11.1 Morphology, characteristics and properties of textiles 11.2 Decay of textile fibres 11.3 Conservation practice: two case histories Bibliography Acknowledgements 12 – LEATHER AND ANIMAL SKIN OBJECTS 12.1 Introduction 12.2 Skin 12.3 The tanning process 12.4 Parchment 12.5 Leather degradation 12.6 Conservative intervention 12.7 Examples of conservative interventions Bibliography 13 – INORGANIC MATERIALS OF ORGANIC ORIGIN 13.1 The materials 13.2 The restoration operation Acknowledgements 14 – ANALYTICAL TECHNIQUES 14.1 General information 14.2 Optical microscopy 14.3 Spectroscopic techniques 14.4 Radiochemical techniques 14.5 Chromatography 14.6 Electron microscopy 14.7 Thermal analyses 14.8 Open porosity measurements 14.9 Analysis of microbial colonization Bibliography Acknowledgements

Microclimate for Cultural Heritage: Conservation and Restoration of Indoor and Outdoor Monuments, Second Edition, is a cutting-edge, theoretical, and practical handbook concerning microclimate, environmental factors, and conservation of cultural heritage. Although the focus is on cultural heritage objects, most of the theory and instrumental methodologies are common to other fields of application. Microclimate for Cultural Heritage, Second Edition, is a useful treatise on microphysics and a practical handbook for conservators and specialists in physics, chemistry, architecture, engineering, geology, and biology who work in the multidisciplinary field of the environment, and, in particular, in the conservation of works of art. Part I, devoted to applied theory, is a concise treatise on microphysics, diagnosis and conservation. The second part of the book focuses on practical utilization, and shows in detail how field surveys should be performed, with many suggestions and examples, as well as some common errors to avoid. Presents updated scientific and technological findings based on the novel European standards on microclimate and cultural heritage Includes the latest information on experimental materials, such as the behavior of water and its interactions with cultural heritage materials Contains case studies of outdoor and indoor microclimate conditions and their effects, providing ideas for readers facing similar problems caused by heat, water, radiation, pollution, or air motions Covers instruments and methods for practical applications to help readers understand, to observe and interpret From 2nd to 5th October 2012 an International Congress on Science and Technology for the conservation of Cultural Heritage was held in Santiago de Compostela, Spain, organized by the Universidade of Santiago de Compostela on behalf of TechnoHeritage Network. The congress was attended by some 160 participants from 10 countries, which presented a total of 145 contributions among plenary sessions dedicated to eight topics, namely (1) Environmental assessment and monitoring (pollution, climate change, natural events, etc.) of Cultural Heritage; (2) Agents and mechanisms of deterioration of Cultural Heritage (physical, chemical, biological), including deterioration of modern materials used in Contemporary Art and information storage; (3) Development of new instruments, non invasive technologies for the conservation of Cultural Heritage; (4) New products and materials for conservation and maintenance of Cultural Heritage; (5) Preservation of industrial and rural heritage from the 19th and 20th centuries; (6) Security technologies, Remote sensing and Geographical Information Systems for protection and management of Cultural Heritage; (7) Significance and social value of Cultural Heritage; and (8) Cultural Heritage and the environment. The volume publishes a total of ninety-three contributions which reflect some of the most recent responses to the challenge of cultural assets conservation.

Aerobiology is the science that studies the biological component of the atmosphere and its effects on living systems and on the environment. This term was used for the first time in 1935, but the attention of scientists to the biological component of the atmosphere goes back to 1769, when the Italian biologist Spallanzani carried out a series of experiments that disproved the concept of spontaneous generation of microorganisms in the air. Aerobiology has marked characteristics of interdisciplinarity: its application fields range from respiratory diseases to the airborne outbreak of animal and vegetal diseases and to the biodegradation of substances and materials. The latter is the subject of this book. The purpose of aerobiological research applied to the conservation of cultural heritage is to evaluate the risk of deterioration of artefacts of historical, artistic and archaeological interest. Airborne spores and vegetative structures may develop on different substrates and may be a cause of degradation, in relation to the types of materials, the microclimatic situation and the pollution of the conservation environments. The qualitative and quantitative evaluation of the biological component of air, performed by means of targeted methods, supplies indispensable information for the evaluation of the actual risk and the planning of interventions. This book is divided into four main parts.

Biodeterioration of Wooden Cultural Heritage

Risk management in the cultural heritage sector

Applications and Development

Plant Biology for Cultural Heritage

Life Cycles and Effects on Air Quality and Climate

Earth Observation Open Science and Innovation