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Clifford A. Price Ralph Mitchell John Peter Cooney Jennifer A. Blakesley
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heritage science is emerging as a discipline that brings together chemists physicists microbiologists conservation scientists archaeologists and conservators its scope precise boundaries and the interfaces between its component disciplines may be in a state of flux but above all its interdisciplinary nature offers understanding of the causes control and protection of heritage from ever present environmental challenges in particular the activities of microbes play a central part in shaping the natural world of our planet but this awesome power constitutes a serious threat to the integrity of our most precious art heritage artefacts monuments and cultural treasures heritage artefacts that have been recovered from water or that exist near the sea in maritime conditions pose special conservation problems due in main to the combined effect of microbial activities and physical chemical assaults that the environment can offer this book is a result of the invited and updated papers from hms2005 microbes monuments and maritime materials and forms a comprehensive volume that addresses key topical areas of heritage science and discusses the threats to a wide range of heritage materials and monuments by biological and chemical agents of decay key features of the book include up to date summaries on the conservation of internationally important artefacts and monuments clear outline of molecular techniques to identify microbes in environmental heritage samples wide range of case studies covering wood stone cave and cave paintings contributions presented as fully referenced research publications giving useful technical details and identification of areas for future study informs conservators about the threats from microbes to a range of materials extensive range of case studies of important

world heritage artefacts and monuments as well as an overview of in situ preservation of historic ships provides background knowledge on the use and application of modern analytical techniques in conservation contains detailed information on molecular and synchrotron techniques to assist with identifying biological and chemical threats to heritage artefacts and monuments the book also provides up to date information on subjects covering the component field of heritage microbiology molecular and chemical analytical techniques and the mechanisms of degradation and deterioration of historic ships and buildings the book details state of the art techniques for the study of large and small heritage objects and their conservation techniques cover the use of gis image processing molecular biological analysis of environmental samples including fish electrophoresis to remove corrosive ions and synchrotron radiation to detect chemicals present in artefacts several authors have developed their methods through involvement in international collaborative projects such as biobrush bacpoles and save the vasa extensive emphasis is placed on case studies and there is a valuable section on historic ships covering the preservation of hms victory ss great britain vasa and the mary rose this book provides an indispensable guide and reference source for those working in all areas of historical conservation biodeterioration microbiology and materials science

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 bio restoration 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

this open access book offers a comprehensive overview of the role and potential of microorganisms in the degradation and preservation of cultural materials e g stone metals graphic documents textiles paintings glass etc microorganisms are a major cause of deterioration in cultural artefacts both in the case of outdoor monuments and archaeological finds this book covers the microorganisms involved in biodeterioration and control methods used to reduce their impact on cultural artefacts additionally the reader will learn more about how microorganisms can be used for the preservation and protection of cultural artefacts through bio based and eco friendly materials new avenues for developing methods and materials for the conservation of cultural artefacts are discussed together with concrete advances in terms of sustainability effectiveness and toxicity making the book essential reading for anyone interested in microbiology and the preservation of cultural heritage

cop ing 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 emphasizes 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

first published in 1996 this volume has been substantially updated to reflect new research in the conservation of stone monuments sculpture and archaeological sites

ideal for anyone concerned with recognizing and dealing with microbial deterioration of

heritage materials provides a unique single overview of the seminal literature in conservation microbiology presents the current state of the art along with a synthesis of the major developments over the years represents the findings of leading international experts and pioneers in the field offers conservation scientists and conservators an inclusive view of the heritage conservation field plus extensive resources for further investigation

academic paper from the year 2019 in the subject archaeology grade 1 0 university of wolverhampton language english abstract owing to the role that micro organisms play it can be seen that the need to comprehend the composition and functionality of complex microbial groups within ancient structures is important as to ascertain if it is dangerous to health this can be shown within a process of demolition and refurbishment on a heritage building information modelling platform for the identification of such micro organisms two applications are considered for the identification and data collection firstly metagenomics applies and utilises a set of genomic advances and bioinformatic instruments which will access and identify the microbial communities content within structure as it allows a culture free identification within a natural and or host associated micro organism community and to provide and give insight to the micro organisms structure dynamic and function within a prescribed environment secondly polymerase chain reaction pcr allows for the detection and production for large amounts of dna found within structure this particular technique is commonly used to detect and identify illnesses clone and sequence genomic families and to undertake very sophisticated quantitative genomic work at a very sensitive level however the use and application of both procedures have never been considered or sought for the detection of micro organisms within an ancient monument setting this paper will primarily look at the two applications in a specific scientific manner as to establish and understand its relevance and subsequent ability for data collection and sequencing within the ancient structure

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