Book Reviews / Critiques de livres

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BIODETERIORATION AND PRESERVATION IN ART, ARCHAEOLOGY AND ARCHITECTURE

Edited by Ralph Mitchell and Jennifer Clifford, Archetype Publications, London, UK, 2018; 199 pages, colour and b&w illustrations, paperback, CDN$100.00, UK£35.00; ISBN 978-1909492646.

Biodeterioration and Preservation in Art, Archaeology and Architecture presents both a broad yet detailed overview of the impacts of biodeterioration from environmental threats on a range of cultural heritage objects and the ensuing preservation challenges. Whereas most conservation publications focus on the implications that biological agents have on heritage objects, Mitchell and Clifford further the conversation by linking it to environmental parameters, like air pollution and the global impact of climate change. Issues of biodeterioration continue to threaten our cultural heritage, and this book should be required reading for conservators and conservation scientists alike.

Mitchell and Clifford have compiled a collection of articles that deconstruct the scientific language surrounding the study of biodeterioration and present it in a straightforward and easy to read manner. While still including the science necessary to understand these complex organisms and their biochemical pathways, the information presented in this book remains accessible to those with only a basic background in biological sciences.

In the first section of the book, "The Impact of the Environment on Biodeterioration and Preservation of Heritage Materials," two papers explore the key role that biological agents play in their respective environments and how cultural heritage materials found in these environments become incorporated into these ecosystems. In the paper entitled "Effects of Climate Change on the Biodeterioration of Historic Materials," contributing author Peter Brimblecombe discusses how the roles of these biological agents are shifting due to the impacts of climate change, shifts that are beginning to have a more drastic influence on heritage materials and consequently put a greater portion of materials at risk.

The bulk of the second section, entitled "Biodeterioration and Preservation Processes," is devoted to an exploration of the specific effects of biological agents on a wide variety of heritage materials, ranging from naturally-derived to synthetically-derived materials. Along with material types, the articles included in this section also present an assortment of environments within which these heritage objects are found, from archaeological sites to built heritage and museum collections. The articles begin first by introducing the particular heritage material, its history, composition and typical conservation concerns. Following this, they go into greater detail, presenting unique ways that various biological agents can affect different heritage objects, depending both on the material type and the surrounding environmental factors that may be present. Heritage materials are introduced in terms of common conservation concerns, prior to presenting the impacts of biodeterioration on them. This allows readers to create links based on their prior knowledge, thus facilitating their understanding of these complex deterioration pathways. The second section also includes a discussion of the analytical methods used for the evaluation of microbial communities on cultural heritage objects.

The final section, "Novel Approaches to Preservation," examines innovative preservation strategies for heritage objects suffering from biodeterioration. After a practical discussion of the advantages and disadvantages of each strategy, the authors advocate for multidisciplinary teams of conservators and conservation scientists to pursue future developments in this field of study.

Until recently, the implementation of the biological sciences in the conservation field has been limited; researchers have just started to incorporate advancements more regularly from the biological sciences into the field. However, this voracious uptake can easily begin to create a disconnect between the science and its practical applications to conservation. Conservators attempting to navigate the tumultuous assortment of publications pertaining to this area of research can easily be left by the wayside.

There are few publications that so thoroughly address the science of the biodeterioration of heritage objects while still presenting the information in direct relation to conservation treatments. Mitchell and Clifford bring together thoughts and information on a diverse range of pertinent issues including preventive and reactive preservation strategies, cost-benefit analysis, the balance between preservation and remediation, risk analysis, and disaster preparedness and response. Most of these concepts have been covered elsewhere; however, this book is one of the few examples where they have been extensively integrated into a single publication that remains accessible to conservation scientists and conservators alike. The need for such a comprehensive resource within the conservation field has been apparent, as only just recently are scientists and conservators recognizing a need for more thorough studies on the understanding, prevention and treatment of biological agents affecting cultural heritage.

This book is applicable not only to conservators and conservation scientists in general, but also speaks to every conservation speciality, including fine and decorative arts, natural history, contemporary art, time-based media, architecture and archaeology. Moreover, this book is an important read for conservators and conservation scientists at any stage in their career. Those who have minimal experience regarding the biodeterioration of heritage objects will benefit from the thorough introduction of these issues and the current methodologies that will help address them. Likewise, those who have come across and dealt with one too many cases of objects at the mercy of biodeterioration will be happy to have a resource that explores new research in the prevention and treatment of these preservation issues. Furthermore, every reader will most likely learn something new about the risks to the objects in their care. The relatively small size of the book, the accessibility of the language, and the pertinent content make this an undaunting read to even the least experienced professional.

Finally, one of the best things about this book is that most of the examples are drawn from numerous studies and the experiences of conservation professionals and scientists from varying specialties. Though all articles within the book provide captivating information pertaining to various conservation specialities, the article entitled "Modern Materials and Contemporary Art," written by Francesca Cappitelli and Federica Villa, presents a particularly unique perspective through an exploration of the risk of biodeterioration of synthetic materials, a subject that is generally misunderstood and under-represented within the conservation community. The diverse array of perspectives included in this book allows for the reader to develop a wide range of knowledge pertaining to all aspects of the cultural heritage field. Moreover, the book not only introduces the reader to the complexities of the biodeterioration of cultural heritage but has much to offer in terms of practical usefulness. The inclusion of case studies effectively bridges the gap between the theoretical and practical, giving the reader tangible examples that illustrate the complex theories presented in the text as well as a chance to link these examples to their own projects.

As the risk of biodeterioration to cultural heritage is unavoidable, conservators and conservation scientists must become versed in this area of study in order to stand a chance in combatting the issue. *Biodeterioration and Preservation in Art, Archaeology and Architecture* provides an excellent stepping stone into an area of research that can quickly become convoluted. It is an integral work that belongs on the bookshelves of all conservation professionals and conservation students.

Kyna Biggs
Emerging Conservation Scientist
Master of Art Conservation Program, Queen's University
15 Bader Lane, Kingston, Ontario K7L 3N6, Canada
kynabiggs@gmail.com

INTERACTIONS OF WATER WITH PAINTINGS

Edited by Rhiannon Clarricoates, Helen Dowding and Adèle Wright, Archetype Publications, London, UK, 2019; 121 pages, colour and b&w illustrations, paperback, CDN$55.00, UK£32.50; ISBN 978-1909492691.

This volume contains papers presented at the ICON Paintings Group Conference in October 2018 and is aimed at the experienced professional. Using water as a theme provides a tangent with which to explore different aspects of paintings conservation practice: from the devastating impact of excessive moisture on objects, to the myriad ways in which water can be manipulated to aid in conservation treatments, and also to the artistic use of water-borne media or water-assisted techniques. Anyone hoping for a paintings equivalent to the excellent *Paper and Water: A Guide for Conservators* by Gerhard Banik and Irene Brückle (Archetype, 2018) will be disappointed; however, there is much to recommend this volume, particularly for the practicing conservator. The individual contributions are largely excellent and many include useful details on the preparation and application of materials and processes.

The book opens with an exceptional contribution by Andrea Santacesaria, "The conservation legacy of the flood of 1966: the experience of the Opificio delle Pietre Dure in Florence through the restoration of *The Last Supper* (c. 1546) by Giorgio Vasari." Santacesaria provides details of the construction of the panel support and of the extensive damage caused to it when it was soaked in the flood waters. A description of the flood recovery efforts is fascinating and includes the methods devised for monitoring and managing wood moisture content. Damage to *The Last Supper* included extensive flaking paint, loss of the preparatory layers, and dirty, weakened and eroded boards; it was in such a state that it was originally written off as irrecoverable. The level of description of the structural treatments makes this paper essential reading for anyone working with panels.

Two other standout papers regarding the devastation wreaked by water are "The challenges of reconstructing water-damaged paint layers on painted wooden panelling," by Maja Sučević Miklin and "Paintings affected by mould at the Palace of Westminster," by Alison Seed and Sally Higgs. Both highlight the challenges of working within historic structures on large and difficult-to-access painted surfaces. The former addresses damages to three different decorative ceiling and wall panels, where water ingress caused severe loss of ground and paint layers, as well as water and tannin staining. Trateggio and mimetic techniques, applied in water-based retouching media sealed with resins, were used to restore lost decoration. Meanwhile Seed and Higgs detail the challenges of detecting and handling mould infestations, including methods to safely deinstall one of the large paintings in a public space. The authors stress the cooperative nature of this project, with experts in microbiology, wall paintings, museum environments and structural conservation all contributing to its success. Mould spore counts of the surfaces were taken to assess and monitor treatments. Interestingly, the removal of visible white material with dry cleaning methods did not significantly reduce this number, while targeted wet cleaning treatments were more effective.

Two papers deal specifically with environmental effects on lined pictures. "Bulging in wax-resin impregnated canvas paintings," by Cecil Krarup Andersen et al., tracked the deformations which typically appeared when these objects were moved or travelled. Despite the common perception that wax-resin linings would resist environmental changes, the authors summarise research confirming that such canvasses are affected, particularly at higher temperatures and relative humidity when wax-resins are softer and more permeable. Lined paintings under tension will relax and bulge, resulting in deformations, some permanently. Case studies illustrate the issues, and valuable recommendations are provided regarding keying out and re-stretching these works, notably, to avoid using constant tension stretchers which may exacerbate canvas expansion. Should one want to monitor lined paintings, the paper by Vladimir Vilde et al. provides a "Methodology for

monitoring the impact of moisture on lined canvas paintings in historic houses." The authors present the results of their laboratory research using Two-dimensional Digital Image Correlation, (2D DIC) in combination with gravimetry and nuclear magnetic resonance (NMR). The former technique is used to track physical changes in a picture while the latter monitors moisture intake and chemical composition of the material. The project highlights the potential for using an affordable 2D DIC system to monitor canvas expansion and contraction in variable environments, with good qualitative results; however, due to the expertise required, this is likely to be of interest mainly to conservation researchers.

Aqueous systems for cleaning, relaxing and consolidating paintings are the focus of five papers and each one contributes to advances in practice. "The conservation of two water-sensitive, 14th-century Italian fresco fragments by Spinello Aretino, previously treated and displayed as easel paintings in the 19th century," by Eric Miller et al., illustrates the complexities of dealing with heavily compromised objects. The contextual information provided by the authors on the origins, subject and painting technique, as well as the original detachment and lining treatment from 1855, set the stage for the recent interventions to clean and stabilize the fragments. Opting to retain the existing canvas support, the careful application of water-based treatments to relax the lining, remove old facings and reactivate the glue consolidation were effective. Particularly useful is the discussion around the choice of consolidant used to secure the paint (isinglass rather than Lascaux Medium for Consolidation) and to fill gaps (isinglass mixed with wheat starch paste rather than Plextol D 498) between the paint and canvas.

In "Edvard Munch's monumental Aula paintings: a review of soiling and surface cleaning issues and the search for new solutions" by Lena Porsmo Stoveland et al., the authors are on the cusp of a research project testing three novel systems to clean these fragile and water-sensitive surfaces. This paper presents an impressive summary of the existing research into the unvarnished Aula paintings, including the assessment of six previous cleaning campaigns and detailed study on the deposition of dirt via thermophoresis. The impact of building structure, installation and heating systems are explained, as well as a soiling study confirming that the biggest challenge in the treatment will be removal of fine carbon particles from the porous surface. Studies on the water sensitivity of the oil paint explore links to metal soap formations, hydrolysis of the oil binder, and use of water-sensitive pigments, such as cobalt blue.

"The application of water-based cleaning systems in the treatment of George Stubbs' wax paintings" by Annie Cornwell summarises the different systems used to remove overpaint and varnish from solvent-sensitive wax-based paintings, including a useful description of the encaustic technique. Previous varnish removal techniques using Evalon textile to limit mechanical action on the surface of paintings proved useful, but also left a slight grid pattern on the surface. Cornwell details two further treatments using water-rich cleaning systems to remove polar coatings safely. One successful application used Nanorestore PEGGY gels; however, this method was not suitable for the final painting which had a more sensitive response in the dark colours. Working with Chris Stavroudis, Cornwell developed a water-continuous phase microemulsion to remove the bulk of the varnish. Residues were then picked up with PVOH-borax gels used as a putty. The paper effectively describes the different approaches and reasoning behind each choice, as well as displaying the range of options available for cleaning sensitive surfaces.

Rebecca Hellen et al. explore the water-sensitivity of a completely different sort in their excellent study summarising the artist's technique and conservation care of four paintings made by David Hockney between 1962 and 1971. Working either in waterborne emulsion paints (acrylic or vinyl-acrylic blends) or oils, the artist's views on the advantages and disadvantages of these mediums, as well as his response to surface soiling and changes over time are presented, based on previous interviews and recent discussions. Cleaning challenges are presented, and a review of the attempts to address staining on *The First Marriage (A Marriage of Style I)* is particularly thought-provoking in terms of managing change, as the exposed canvas support continues to darken over time.

The final paper on cleaning treatments by Paola Carnazza and Serena Francone, "Using high molecular weight polysaccharides to clean vinyl paintings: a case study on a mixed-media contemporary artwork and experimental tests," details the treatment of an Alberto Burri painting from 1955. Tailored solutions in gellan gum or liquid form were used on roughly textured white surfaces while fabric collage elements were cleaned with a 0.4% solution of Funori, to minimise tidelines. A surgical aspirator was used in concert with the liquids to limit the contact time. The paper includes full testing information on the gellan gum and Funori preparations and on the impact on the different vinyl products identified in the painting, using mock-ups.

Finally, Tatjana Wischniowski writes about a most intriguing method of painting miniatures, describing the history and technique of eludoric painting, whereby oil colour is painted under a layer of water. This paper is highly recommended for anyone interested in general oddities of painting technique.

The UK paintings conservation associations continue to present and publish papers showcasing the links between research and advanced practice, giving valuable insight into how new conservation techniques can be translated and adapted to specific projects. *Interactions of Water with Paintings* exemplifies this tradition with its aqueous romp through the different ways that paintings (and conservators) interact with water.

Patricia Smithen
Assistant Professor, Paintings Conservation
Director, Art Conservation Program
Queen's University
15 Bader Lane, Kingston, Ontario K7L 3N6, Canada
p.smithen@queensu.ca

PREVENTIVE CONSERVATION: COLLECTION STORAGE

Edited by Christopher Norris and Lisa Elkin, Society for the Preservation of Natural History Collections, American Institute for Conservation of Historic and Artistic Works, Smithsonian Institution and George Washington University Museum Studies Program, New York, 2019; 944 pages, 186 colour and 15 b&w illustrations, hardcover, US$95.00; ISBN 978-0997867923.

Many conservators consider preventive conservation to be the most effective approach to prolonging the life and use of collections, but other institutions, professionals or the public do not always understand the subject. The recent publication *Preventive Conservation: Collection Storage* discusses the planning and implementation of preventive conservation in a way that all those working and/or interested in heritage can understand. Over 110 contributors from professional and educational organizations and private practice have contributed their experience and knowledge to provide a comprehensive understanding of the importance and implementation of various facets of preventive conservation. Information is both at the collection level – archival, artifactual, digital, bibliographic, modern materials, electronic and fine art – and at building-wide, planning and administrative levels.

The book is organized in eight sections that examine preventive conservation from a macro perspective of risk assessment, collection surveys, site management and facility planning, down to the more common point of view of storage situations, furniture and materials. Each section contains a number of succinct and well written chapters. Many contain reference tables, appendices, images, real-life examples and case studies. They are also prefaced with an apt and usually humorous quote.

Subject overlap among chapters helps tie together and develop concepts. For example, the chapter on "Off-site Storage" in section V, "Specialized Collection Environments & Care," mentions security and emergency preparedness/ response issues that are discussed in other, dedicated chapters. Similarly, strategic use of collection data and use of historic buildings for collections storage are discussed in "Assessment and Planning" (section II) and developed further in the following section on "Creating and Renovating Storage Facilities." This approach accommodates readers who need more in-depth knowledge without overburdening those who simply need an introduction to the subject.

There are new concepts, perspectives and information in every section that can serve either as an introduction or as the basis for further study and research, depending on the reader's level of knowledge and familiarity with the subject. The editors' emphasis on partnerships and stakeholder collaboration is fundamental to the practice of preventive conservation. Without administrative support and conservation's active participation in strategic planning, preventive conservation tends to devolve into a series of unconnected mini-projects. This principle is developed further in the opening chapter, "Respectful and Responsible Stewardship," and continued throughout the book.

Chapter 4, Collections Risk Assessment, in section II, "Assessment and Planning," describes preservation as a goal, a system *and* a project, making it easier to conceptualize at different strategic levels. The in-depth exploration of the purpose, design and use of collections care surveys, in chapter 5 on "Collection Care Surveys for Preventive Conservation," clearly explains how to design evidence-based, institutional-level collection surveys with clear purpose and scope, consistent definitions and data collection methods, and clear communication of survey results. Mapping survey data by location or using matrices is a concise, visual method of sharing collection information with other staff in lieu of multi-page reports.

Planning construction or renovation projects often requires conservators to advocate for the collection using financial, engineering or architectural terms and principles. The detailed overview of historic building design features in chapter 6 on "Balancing Collection Storage with Historic Buildings" includes a useful overview of the often-underrated passive environmental control features often found in historic houses. Compatibility between the building and the collection is emphasized, with collection storage design accounting for building features. The following chapter on "Building Project Process" contains a detailed overview of the entire planning and design process from a conservation perspective, and includes a detailed outline of preventive conservation in all stages of building projects that shows functional programs as integral to facilitating access, exhibition, research and appropriate storage in project design. Chapter 8, "Functional Planning for Collection Storage," clearly explains the spatial, functional and technical requirements of functional programs.

Information in section III, "Creating and Renovating Storage Facilities," spans the process from the first planning meetings to the movement of collections into a finished space, noting that the goal is to create a preservation facility, not a storage space. Consideration of passive preventive conservation solutions supports this goal, though they are not always considered.

As well as providing a detailed overview of HVAC design, placement, cost and maintenance requirements, "Environmental Management and Related Systems" (chapter 10) recommends including facilities staff in the design team to ensure that the institution is capable of operating and maintaining its HVAC system. The discussion on design requirements (including the point of diminishing returns) can be used to clarify or justify HVAC requirements. Instructions to commission to the owner's (not just the contractor's) satisfaction will resonate with staff stuck with an HVAC system that functions but does not meet requirements. The reference to both British Standards and ASHRAE classes of control will be useful to European readers.

Chapter 12, "Fire Protection for Collection Spaces," introduces the NFPA 550 Guide to the Fire Safety Concepts Tree for planning fire prevention and mitigation strategies, and

contains a comprehensive introduction to various fire safety systems and their effectiveness. "Securing Your Collections" (chapter 13) takes the approach of outlining the security perimeters of a collecting institution from vault to grounds, while discussing the level and type of security required at each stage. Security design, construction and strategy are discussed in depth, as are systems and components. Access control, parcel control and internal security are rightly highlighted as essential factors to consider.

A collection move can be a challenging process but chapter 14, "Managing a Collection Move," points out that it is also an opportunity to make improvements to collections care. Detailed information and supporting photographs, provided by the authors under the headings "Planning," "Project Management," "Packing and Transport" and "Unpacking," indicate firsthand knowledge and experience in these areas. The emphasis is on careful planning and communication at every step. The sidebar discussing barcode and RFID technology is helpful for those unfamiliar with the technology.

In section IV, "Facility Management," the first chapter, "Facility Management: The Partnership with Collection Preservation," reviews the specialized skills required for managing the built environment that is a collection preservation facility. Collaboration and planning, and the identification of roles and responsibilities among facilities and collection care staff is discussed from the perspective of shared responsibility and goals.

Chapter 17, "Safety and Health Issues within Storage Spaces," comes back to risk assessment as a method to identify, prevent and mitigate the hazards within collections storage. Prevention, remediation or elimination of hazardous conditions, and physical control systems are discussed in informative detail. Safe work practices, personal protective equipment, training and hazard communication, post-emergency cleanup, and hazardous waste disposal are covered. The sidebar on working with radioactive aircraft instruments was enlightening, as was the list of hazardous materials found in buildings, storage furniture, displays and dioramas.

"Integrated Pest Management for Museum Collections" (chapter 18) maintains a balanced approach between degree of risk and likelihood of impact that takes into account a collection's susceptibility and vulnerability to pests (including microbes), frequency of infestation, and likelihood of harm, indoors and out. It offers a practical, hands-on approach that explains the well-known tenets of IPM – avoid, block, detect, respond, recover – and how to implement them. The overview of chemical/non-chemical control is practical and factual.

The value, tools and methods of monitoring are thoroughly examined in chapter 19, "Environmental Monitoring." Pollutants, vibration and light are discussed along with temperature and relative humidity. Information on the analysis, understanding, use and presentation of data is well explained and particularly useful for supporting action to be taken. The author recommends a collaborative approach to address undesirable results of monitoring and includes a useful environmental monitoring program checklist.

"Air Quality, Monitoring, and Management" (chapter 20) is an excellent resource that includes a comprehensive overview of primary, secondary, indoor-generated and off-gassed pollutants, and a discussion of monitoring and mitigation methods.

Section V, "Specialized Collection Environments & Care," looks at the specialized environments available for sustainable preservation of collections from human remains to fluid-preserved specimens. "Specialized Macroclimates and Microclimates: Options for the Control of Temperature, Relative Humidity, and Pollutants" (chapter 21) builds on earlier chapters on environmental control by discussing use of saturated salts and hygroscopic materials for relative humidity control, and low oxygen environments. The equipment and procedures required for low temperature storage, including less common options (e.g., liquid nitrogen freezers), are described in chapter 22, as well as costs, functionality, and health and safety issues. "Storage in Fluid Preservatives" (chapter 23) covers all aspects of storage as well as issues of dehydration, rehydration, washing and fixing, and use of the Alcomon Indicator System (a simple visual monitoring system). The tables facilitate quick reference.

Sufficient storage space is an issue for most institutions and "Visible Storage" and "Off-Site Storage" (chapters 24 and 25) demonstrate how to determine the net value of either of these options, based on space planning, cost, goals, calculation of space requirements, security, access, energy efficiency and sustainable design that have been discussed in earlier chapters. Consideration of flood zones and integration of floodwalls is topical considering the current climate extremes. The real-life examples are useful, as are the tables and extensive index of off-site storage considerations.

Chapter 26, "Outdoor Storage Situations," is an important read for anyone responsible for outdoor artifacts. Practical approaches to improve preservation include triage based on both curatorial factors and artifact vulnerability; mapping of the exterior storage area to determine how it can best be used; and mitigation through supports, removal of vulnerable parts, protective coatings, pest control and use of temporary shelters. There are useful tables on evaluating site features and artifacts in outdoor settings.

"Storage of Human Remains" (chapter 27) reminds conservators of the protocols and procedures required to work collaboratively with descendants, archaeologists, researchers and curators on the preventive conservation of human remains. The Kennewick Man case study (misspelling of "remains" noted on Figure 2, p. 605) provides a fascinating explanation of how skeletal fragments were protected during research and eventual reburial. The role of a cool, dry environment in preventing hydrolysis of organic matter (skin) was brought home in the sidebar on oozing mummies.

Section VI, "Storage Equipment and Materials," looks at *all* aspects of storage equipment and materials, in amazing depth. Despite the level of detail provided, it is easy to read and understand either for a conservator searching for information on a cellulosic permanence test or a new staff member wanting to learn about the protection of artifacts in storage.

Although information on digital preservation is widely available from other sources, section VII on "Storage of Digital Collections" compares similarities in problems and issues faced in the preventive conservation of digital media and traditional objects. It is presented as a collaborative effort – not solely an IT issue – and a proactive approach based on the OAIS Reference Model is proposed as the basis of a preservation framework.

"Storage at a Glance" (section VIII) presents a framework that provides a consistent approach to the storage needs of nearly 30 formats and media of artifacts. It presents a broad, colour-coded analysis of the vulnerability of an artifact to the 10 agents of deterioration, taking into account precautions taken to avoid/mitigate them. The information is intended to be a guide and the basis for further investigation and risk assessment, but not the last word.

In the days before internet search engines and instantaneous communication, published information about conservation was obtained by requesting copies directly from the authors or getting a grainy Xerox copy from someone lucky enough to already have it. I recall a colleague whose office wall was lined with bookcases full of binders containing thousands of articles on conservation. However, the wide ranging information available in this publication can replace that wall of binders for conservators and collection specialists.

The information provided in *Preventive Conservation: Collection Storage* is an invaluable resource to promote preventive conservation in the face of limited resources and increasing demands for access, engagement and collection use. Given the emphasis on partnerships and collaboration throughout the book, any staff person, volunteer, board member or stakeholder will find it useful.

Jane A. Dalley, Conservator
Jane Dalley, Heritage Consulting
217 Lipton Street, Winnipeg, Manitoba R3G 2G8, Canada
j_dalle@zoho.com