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## Introduction

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Over the past thirty years, our society has undergone substantial changes, and the cultural heritage community has come to face new challenges. In this publication, the authors draw on specific examples to consider the conservation and utilization of cultural heritage with reference to two shifts that have had a considerable impact on the field of conservation. These are “New Environmental Challenges” in terms of global warming and other climate changes taking place on a planetary scale (Part I) and “New Media Challenges” as embodied in the shift from an analog to a digital world (Part II).

In this publication, the term “conservation” is used according to the ICOM-CC “Terminology to characterize the conservation of tangible cultural heritage”.<sup>1)</sup> “Conservation” is defined as “all measures and actions aimed at safeguarding tangible cultural heritage while ensuring its accessibility to present and future generations. Conservation embraces preventive conservation, remedial conservation and restoration...”

### Part I: New Environmental Challenges

Environmental change impacts a variety of aspects associated with the conservation and management of cultural heritage. For example, global warming has necessitated a reduction in our consumption of fossil fuels, inviting further discussion on adequate museum climate control. The effects of ozone layer protections have also been significant, especially in Japan, where they have spurred a fundamental review of pest control in museums and other institutions. In Part I of this publication, the authors position “environmental change” as a key term in their pursuit of sustainability in the context of conserving and utilizing cultural heritage.

In “Theory and Practice of Sustainable Preservation,” James M. Reilly (Image Permanence Institute, Rochester Institute of Technology, Rochester, USA) argues that science-based environmental management techniques, appropriate building design, and various levels of packaging materials—from enclosures to buildings—all have an impact on moisture and temperature equilibration. His paper offers a demonstration of how sustainable conservation can be realized. He insists on the importance of gathering reliable temperature and relative humidity data. He makes use of a web-based software program called *eClimateNotebook*® developed by the Image Permanence Institute to estimate the risks of mold growth, metal corrosion, and mechanical damage. Pointing out that the environmental condition standards of 21°C and 50% RH (relative humidity) used

in Europe and the USA were determined on the basis of human comfort rather than the consideration of the materials, he takes an example of the Danish buildings that were designed for storage only, assuming low human occupancy rates. Material deterioration is a function of chemical changes that increase with higher temperatures. Buildings that are not equipped with heat, though the environment is not necessarily comfortable for human beings, are appropriate as storage facilities that embody an environmentally friendly design, keeping costs low and reducing fossil fuel consumption.

Sustainable conservation and the environmental improvements it entails will be important considerations in the context of twenty-first-century museums. With reference to Japan-based initiatives, the discussion features two specific cases with contrasting backgrounds, respectively concerning a museum built with environmental conservation in mind and a museum built in the 1970s.

In “Creation of a New National Museum to Meet the Environmental Needs of the Twenty-First Century: Kyushu National Museum,” Mitsuko Honda (Kyushu National Museum, Fukuoka, Japan) reports on a museum concept and facilities that aim to reduce energy usage and achieve coexistence with the surrounding natural environment. In addition to using natural energy technologies such as solar power generation, rainwater use, and geothermal heating, the museum has also thoroughly implemented environmentally conscious countermeasures in its air conditioning, fire suppression equipment, and pest control measures, all of which were chosen to avoid the use of ozone-depleting substances. The storage area was built mainly of wood that had undergone electrical seasoning during the sawmilling process, and inspections and cleaning were carried out at every stage of construction. By sharing the responsibility for collection management and related activities between local volunteers, non-profit organizations, and specialized IPM (Integrated Pest Management) technicians, the museum aspires to be an active participant in the local community.

In “Sustainable Collection Management in a 1970s Building: A Case Study of the National Museum of Ethnology, Osaka” (National Museum of Ethnology, Osaka, Japan, hereinafter “Minpaku”), Naoko Sonoda discusses how the museum environment is maintained with reference to the environmental conditions required by the objects on loan from overseas institutions and museum’s own collection, respectively. Building dating from the 1970s was not constructed with energy savings in mind, nor was it envisioned that they would ever use anything other than fossil fuels. As a practical example of sustainable collection management for the museum’s own collection under these conditions, the paper focuses on two examples. One example is the climate control in general storerooms where a power-saving regimen was introduced after the Great East Japan Earthquake of March 2011 that includes turning off the air conditioning during spring and autumn. The other example is the adoption of LED lighting in the place of halogen spotlights in museum exhibits. Both solutions have resulted in reducing expenditures, proving to be simultaneously more economically feasible and environmentally conscious.

Sustainable environment control and conservation initiatives are important issues, not only for large-scale museums but also for small-scale institutions and individual

collectors. The next two papers clarify how sustainable conservation is possible even when facilities, personnel, and available funding are limited.

In “The Conservation of Photographs Using Local Resources in Luang Prabang, Laos,” Martin C. Jürgens (Rijksmuseum, Amsterdam, the Netherlands) reports on a project being carried out for a local monastery to sort, clean, digitize, and conserve over 30,000 photographic materials. This project has been promoted based on the understanding of the local people and has used locally available materials for storing the photographs rather than forcibly imposing Western criteria, packaging materials, or methodologies without modification. An important part of this project consisted of teaching the staff fundamental skills and a basic understanding of photograph conservation and archiving, which resulted in the creation of an English-Lao glossary of related technical terms.

Shingo Hidaka (Minpaku) presents “Mobile and Non-Chemical Pest Control Measure Applicable to Small-Size Museums” with reference to ethnological and folkloristic objects. This paper describes a carbon dioxide pest control treatment that has become a popular alternative to the gas fumigation that was long used in Japan as biocidal treatments for cultural properties but is now subject to usage restriction as an ozone-depleting substance. After outlining the carbon dioxide treatment that has been implemented at Minpaku since 2004, Hidaka presents two cases in which this technique was transferred. One was carried out as part of the support activity following the Great East Japan Earthquake, and the other was done at a small-town school facility used as a storehouse for folk cultural properties.

## **Part II: New Media Challenges**

Part II examines the changes that have arisen in both conservation and utilization as a consequence of the transition from analog to digital media. The images referred to herein include still photographs as well as motion pictures. Indeed, the technologies used in film are basically the same for both cases.

Nora W. Kennedy (The Metropolitan Museum of Art, New York, USA) explores the impact of the digital era both on the conservator and the artist in “Moving with the Times: Conservation’s Evolving Role within Museums.” Digital art has affected the way artists see their work, how the museum collects it, and how it is documented, stored, and conserved. In addition to the challenges presented by analog photographs such as sizable print-based photographs, the appearance of conceptual art, digital photography, and time-based media artwork (TBMA) have necessitated a dramatic change in the role and consciousness of photograph conservators, calling on these professionals to assume more leadership and take on wider-ranging responsibilities. Kennedy emphasizes the importance of open communication and sharing between professionals and institutions to deal with the present digital challenges.

In “Photography and Its Conservation: Continuity and Changes in the Digital Era,” the social impact of the emergence of digital photographs and digital technologies is taken up by Bertrand Lavédrine (Muséum national d’histoire naturelle, Paris, France;

Overseas Visiting Fellow, Minpaku, 2017). The transition from a culture of photographic prints to an imaging culture and from memorial photography to fast consumption photography—these transformations have also influenced both the objects and methods of conservation. The “photograph,” once a permanent image created by the action of light on a support, has been transformed from a tangible object to an intangible artifact. For the conservation of digital photographs, it is important to ensure authenticity and long-term access. Solutions proposed are, for example, micro-etching the data on a solid substrate such as a metal plate or glass plate. Lavédrine also points out an interesting method for safely conserving digital information over a long period of time, using the analog photograph.

This last solution is discussed in detail by Katsuhisa Ohzeki (National Film Archive of Japan, Tokyo, Japan) in “Storage of Digital Images and Digital Motion Pictures on Photographic Film.” In this era of digital technologies, while the method for conserving still and moving images has shifted films to digital media, the long-term conservation of images and motion pictures is still a matter of concern. An ultimate solution for conserving moving images is the three-color separation method and storage on black and white film. Digital images are separated into information for the three primary colors red, green, and blue, each of which is then recorded on three separate black and white films. While the life expectancy for digital data is determined not only by the life expectancy of the storage medium but also by the lifespan of the system, necessitating data migration, the long-term chemical stability of silver halide photosensitive material has already been proven. This return to analog photographic film as a conservation tool satisfies a proposed “true archiving system allowing data to be decoded after it has been created, forgotten about, and later rediscovered.”

In terms of image utilization, we consider retaining original imaging information by replacing media with similar or dissimilar media and then using that information on a shared basis. The following three authors discuss initiatives that make use of the respective characteristics of motion pictures and still photographs.

In “Creation of the ‘Japanese Animated Film Classics’ Database,” Yuzo Marukawa (Minpaku) introduces a website that was created to commemorate one hundred years of Japanese animation and was made publicly accessible in 2017 in both English and Japanese. This website was jointly developed by the National Research Project for the Sustainability of Born-Digital Cinema (BDC Project) of the National Film Center of the National Museum of Modern Art, Tokyo (NFC) and Akihiko Takano and his team’s laboratory at the National Institute of Informatics (NII). Hosting not only images but also research findings such as film formats, screening records, technical information, and production personnel, the website was initially intended to be publicly accessible only until December 31, 2017. However, the appreciation that this information dissemination initiative received from overseas has resulted in the decision to continue its public availability from 2018.

“Exploring the Creative Use of Germany’s *Encyclopedia Cinematographica*” by Itsushi Kawase (Minpaku) discusses the *Encyclopedia Cinematographica* (EC) films produced by Germany’s Institute for Scientific Film (Institut für den Wissenschaftlichen

Film, or IWF). The EC films are known for an approach that, in service of the comparative study of human and animal behavior, places an emphasis on the thorough observation of subjects without explicitly revealing the presence of the filmmaker. Kawase reports on attempts to glean new value from these productions. As an example, researchers familiar with the societies represented in these films can add a variety of supplementary information, in some cases indicating the intentions and possibilities of staging used by the offscreen producers behind the EC ethnographic films.

In “DiPLAS: Academic Image Platform for Twentieth-Century Photographs,” Taku Iida (Minpaku) introduces a program launched in April 2016 with a Japan Society for the Promotion of Science (JSPS) Grant-in-Aid for Scientific Research on Innovative Areas (Platforms for Advanced Technologies and Research Resources) to promote the digitization of photographs and the database storage of digital images. Minpaku is the core institute of the program, and five projects were selected in FY2016, eight in FY2017, eleven in FY2018, and fifteen in FY2019. As the program will be publicly accessible for academic purposes, Iida believes we must be resolute against use for mere amusement purposes.

How are images used in museum exhibits, and what ideas underlie their utilization? Initiatives taken by Minpaku researchers based on their fields of expertise in ethnomusicology, cultural anthropology, linguistics, and museum informatics, are presented respectively in “The Use of Images in the Music Gallery” by Shota Fukuoka, “Info-Forum Museum for the Regional Cultures of China Gallery” by Hiroko Yokoyama, “Utilizing Visual Materials for Introducing the Languages of the World and the World of Language” by Ritsuko Kikusawa, and “Videothèque: Past, Present, and Future” by Yasunori Yamamoto.

## **Summary and Remarks to Open a Dialogue**

The discussions in Part I reconfirm that environmental change represents an opportunity for emphasizing “sustainability” in every aspect of the conservation of cultural heritage. For all that we have spoken about the conservation of “objects” for so long, it may be that “people” have been given priority, as conservation conditions and methods have been selected in terms of being comfortable, useful, and convenient for humans. James M. Reilly considers that the environmental conditions of 21°C and 50% RH were advocated because these were comfortable for people. Moreover, there is some truth to the fact that gas fumigation to kill pests, fungi, and bacteria has long been used in Japan as a solution in cases of biological damage to cultural properties or as a preventative measure where damage has not yet occurred. We could say that rather than activities requiring diligent, daily, and continuous effort to create environments that are not conducive to biological damage, the process of gas fumigation—which can be completed in a matter of days—has proven to be more convenient for people. However, at the end of the twentieth century, the problems of global warming and the protection of the ozone layer became pressing concerns, and the social context demanded that further attention be given to environmental considerations. A shift occurred in the direction of developing and

selecting conservation conditions and methods that might not be necessarily convenient but would be kind to human beings, objects, and the environment in the truest sense. As presented by Mitsuko Honda, the example of the Kyushu National Museum, the creation of which considered environmental conservation and energy efficiency, offers a model case for both the creation of new museums and the renovation of old ones. Nonetheless, most Japanese museums are currently housed in buildings that date from a period when such awareness of environmental issues was weak. Yet even in the midst of such circumstances, I believe that the environmentally friendly controls of temperature and relative humidity and the environmental maintenance for exhibits that are presented in my own paper can be a useful reference. Sustainable collection management and environmental maintenance are not just issues for large-scale museums but are practices that should be adopted and implemented in all applicable settings, including personal collections and smaller-scale institutions with limited facilities, personnel, and available funding. That this is possible is proven in the cases respectively presented by Martin C. Jürgens of the conservation of photographic materials in the monastery of Laos and by Shingo Hidaka of a sustainable pest control treatment that can be used anywhere and does not involve the use of large-scale equipment.

In Part II, it becomes apparent that the shift from analog to digital media is not only technological in nature but also something that has fundamentally changed our society and, by extension, the ways in which we view and think about objects. Until now, the conservation of photographs and motion pictures has been concerned with the conservation of the original photographs and motion pictures as “objects” and of the “information” intrinsic to those media. With the advent of digital technologies, the notion of original photographs or motion pictures as tangible “objects” has grown weaker, becoming merged with the “information.” A consequence of this shift, as described by Nora W. Kennedy, has been the substantial transformation in the conservator’s role and what the conservator is required to do. Further, as indicated by Bertrand Lavédrine, notions have appeared that go beyond the genre limitations of photographs and motion pictures. As an answer to the conventional problem of image conservation, Katsuhisa Ohzeki proposes an ultimate method for retaining digital images with the analog technology of separating digital images into the information for the three primary colors and storing each of these separately on monochromatic film. Given the proven long-term chemical stability of monochromatic film, the return to analog as a “visible” means of conservation is leading to a reevaluation of analog technologies in this era of digital ascendancy. On the other hand, it is unquestionable that digital technologies have dramatically expanded the possibilities for the utilization and shared use of images. The discussions by Yuzo Marukawa, Itsushi Kawase, and Taku Iida are all conscious of digital technologies as tools for deepening relationships between people. Looking to the museum community as well, it is clear that the use of images has expanded possibilities for exhibitions, as shown in the papers by Shota Fukuoka, Hiroko Yokoyama, Ritsuko Kikusawa, and Yasunori Yamamoto on Minpaku’s music exhibits, cultural exhibits, language exhibits, and the Videothèque, respectively. All of these cases, from Minpaku and beyond, aim to create new lines of communication through the utilization and

transmission of images. We live in a contemporary age that calls on us to make full use of the potential and those characteristics intrinsic to both digital and analog technologies.

The theme of the conservation and utilization of cultural heritage in the twenty-first century will be further pursued with one of the Minpaku's inter-university research projects "Conservation Science Research on the Establishment of Sustainable Collection Management and Museum Environment" (October 2017–March 2021) for which this publication represents a point of departure.

### **Note**

- 1) <http://www.icom-cc.org/242/about/terminology-for-conservation/> (accessed May 27, 2019)