

Digitize to Preserve—Photographic Collections Facing the Next Millennium

*Franziska Frey
Image Permanence Institute
Rochester Institute of Technology, Rochester, NY*

Abstract

Digital imaging is having a great impact on collections of photographic materials in libraries and archives. The technical aspects of digital imaging present collection managers with very difficult and complex choices. Institutions must be able to relate the digital image projects to the fundamental collection activities such as access and preservation. In addition, digital imaging emerged so quickly that there is still a lack of standards concerning the technical as well as the quality issues.¹ While the great benefits of digital imaging can be confidently foreseen, both a learning process and experience are needed to get from here to there.

Introduction

The materials that make up photographs, such as silver or dyes as image forming materials; paper, celluloid or other plastics as base materials; and gelatin, albumen or colloid as binders are not chemically stable. Environmental influences such as light, chemical agents, heat, humidity and storage conditions affect and destroy photographic materials. The only reliable method to preserve them for a long period of time is dark storage at low temperature and low humidity. Nevertheless, correct storage is expensive, and access to the objects can be difficult. Until now, the only way to ensure access was to duplicate the photographs on film. However, the duplicates are not stable either, and furthermore, every new generation of copies leads to a loss of image quality.

Much laboratory research has been done to define the kinds of storage conditions that are necessary for preserving faded color or decaying film bases, and the research shows that long-term keeping of unstable photographic originals like these is only possible with cold storage. All of the available options to cope with such deterioration require relatively prompt action and involve cost. Digital imaging, on the other hand, makes it possible to produce as many digital copies as needed, all perfectly identical to

the first copy. At the same time, digital copies are ready to be used in an image data base, allowing fast and easy access to the images.

Preservation or Access?

The question of the role of digital-image conversion in the preservation of photo collections goes considerably beyond the obvious issue of reducing handling of originals. It involves a number of complex questions and assumptions about the collection materials, their values and purpose in the institution and in broader culture, and whether or not digital information can be considered to be "permanent" at all.^{2,3} Most digital-image database projects are justified mainly on the basis of improved access, and so it is easy to avoid confronting preservation-related issues. After all, it is reasoned, replacement-quality images are too expensive, technology will change, and digital images are not permanent, so we might as well go forward and obtain the benefits of better access and not be too concerned about preservation at this stage.

In fact, there are several reasons why preservation is very much an issue for all digital-image database projects. The first is that institutions have finite resources. Any expense on the scale of a large digital-image database project will claim a sizable share of limited budgets, money that could be spent on other things, including "conventional" preservation in the form of improved enclosures, storage conditions, photographic duplication, preventive conservation, etc. If those two options are presented openly as competitive interests, the outcome might still be to invest in the digital-image database, but often the choice is not presented in these either/or terms. Such an important policy choice ought to be debated and explored in depth.

The second reason that digital-image database projects impact preservation is that some collection managers already want to use digital files as "preservation masters," i.e., as replacement images, dispensing with the original photographs altogether. As technology improves

and costs for high-quality imaging decrease, more and more collection managers will raise the question of what is the best form in which to retain images.

Collection purposes and contents differ widely. For some, an all-digital collection is out of the question, for others, it represents a welcome change that adds value to the collection. A university slide collection which consists of hundreds of thousands of fading color images, none of which are terribly valuable as artifacts, could well be imagined as existing exclusively in the form of high-quality digital images. They could then be digitally reconstructed and output in slide or print form upon demand. On the other hand, a very valuable collection of 19th-century photographs might be digitized, but definitely will not be discarded. Between these extremes lie many other situations where the balance between available reformatting options—none, conventional, or digital—must be struck according to the needs of each collection. Nevertheless, even the best digital copy is no substitute for the original.

New Possibilities

Negative collections especially profit from digitization due to the fact that this makes them easily accessible. Millions of negatives are never used only because their image content is not readily available to the user. A printing process is needed to get a positive image. Therefore, not only the public but often even the collection managers themselves don't know what a negative collection contains. It has already been proven that as soon as negatives are scanned and a positive image can be viewed almost instantaneously their use has grown enormously. A huge number of older negatives are glass plate negatives. Choosing to digitize them reduces the risk of loss through breakage because they only have to be handled once.

Of all photographic materials, color photographic materials show the quickest degrading behavior. It is absolutely essential that the caretakers of these images are well educated about the aging of their color collections. Correct storage is expensive, and substantial financial means have to be spent on it.

The worldwide shift from black-and-white photography to color photography started rather slowly with the introduction of Kodachrome transparency films in 1935, became noticeable in the 1960s, and is now essentially complete in all but a few segments of still photography and motion pictures. Consequently, more and more collections have dealt or will have to deal with archival and permanence issues of color photographic material. Regardless of the type or purpose of a collection, the majority of the images from the second half of this century were taken in color. Large museums as well as

historical societies in small towns will have to preserve color photographic material.

Restoration of faded materials by chemical processes, principally possible for black-and-white photography, is not possible for color photography because dye fading is an irreversible process. Methods to restore images through photographic copying have been developed, but these methods are slow, need skilled operators, and work only if fading has not proceeded too far.

Digital imaging allows for a digital restoration of color photographs. Note that digital restoration is not a restoration in the classical sense where the image is usually restored and conserved on its original support. Therefore the term "reconstruction" should be used instead of "restoration." Digital reconstruction is a very new topic and there are still a lot of problems to be solved, both technical and philosophical.⁴

Electronic Photography

Apart from digitizing existing photographic collections, newly created images are being generated in digital form. More and more, collections include images that never had a film original. Already much photojournalism and fine art photography originate electronically, and this trend will continue to grow. Caring for these electronic originals, as well as for reformatted digital "preservation masters" will require a knowledge of digital imaging technology.⁵ In the long run, the required know-how should be available on site in the collection. Proper custodianship of collections must now employ a greater awareness of disciplines previously far removed from the established practices of the photographic archives. File formats, intellectual property law, high-speed data transfer technology, and data base management are but a few of the specialties demanding the attention of collection managers.

Conclusions

Faced with deterioration in the form of color dye fading, vinegar syndrome in acetate film, and degrading and flammable nitrate film, collection managers are asking whether it is better to invest in improved storage or in reformatting. Options for reformatting now include both conventional photography and digital imaging. Choosing to reformat unstable originals into digital form has the added attraction of creating the potential for greatly enhanced access through image database systems, even as the goal of preservation is achieved. Conventional photographic reformatting is expensive and difficult, but it produces a tangible preservation master with known characteristics. In the case of color, the duplicate images

also require cold storage for maximum life, so fading is halted, but necessary storage costs are not lessened by much. In addition, conventional reformatting does not offer much in the way of increased access. It is apparent that the addition of digital reformatting as a viable preservation option widens the range of choices for collection managers but also requires that they understand in some depth what digital imaging can do and cannot do. The preservation community cannot afford to be naive about the capabilities and practical realities of digital imaging. There is work underway to address the issues of digital imaging in preservation.⁶

The many advantages of the emerging digital technologies for photographic collections are obvious, but there is still a long way to go. The technology is still young and changing rapidly. This is the reason why museums, libraries, and archives that want to use digital imaging have to buy the know-how or to find suitable partners.

Most importantly, communication has to be improved among all the participating parties. Due to the fast-changing and complex imaging technologies involved, collection managers need to work together with engineers and imaging scientists, who often lack collection-related knowledge. Both sides need to be willing to learn the special problems and needs of the other party. This is the

only way to make sure that future generations, too, can enjoy the documents of our century.

References

1. F. Frey and S. Süssstrunk, "Image Quality Requirements for the Digitization of Photographic Collections," *Very High Resolution and Quality Imaging*, SPIE Vol. **2663**, 1996.
2. P. McClung, ed., *RLG Digital Image Access Project*, Mountain View, CA: The Research Library Group, Inc., 1995.
3. M. Ester, *Digital Image Collections: Issues and Practice*, Commission on Preservation and Access, 1996.
4. R. Gschwind and F. Frey, "Electronic Imaging, a Tool for the Reconstruction of Faded Color Photographs," *Journal of Imaging Science and Technology*, **38**, no. 6, pp. 513-519, 1994.
5. J. Holm, "Survey of Developing Electronic Photography Standards," *Critical Reviews of Optical Science and Technology*, SPIE Vol. **CR61**, pp. 120-152, 1996.
6. *Imaging Initiative of The Getty Art History Information Initiative* (<http://www.gii.getty.edu>).