Digital Imaging and Conservation: Model Guidelines

JOHN F. DEAN

ABSTRACT

ARTIFACTS ARE NOW BEING INCLUDED in digital imaging projects at an increasing rate. Digital imaging staff are rarely experienced in the handling or disposition of artifacts and often regard the artifact as being "preserved" simply through the act of digitization. The guidelines refer to some of the problems likely to be encountered in the intersection of conservation and digitization and make some recommendations on procedures designed to address them.

The following examination of the intersection of conservation and digital imaging is drawn from guidelines proposed at the Cornell University Library. The words "conservation" and "digitization" represent two different philosophies and seem to operate in different worlds. Yet, an increasing number of digitization projects involve rare and unique materials, and scanning is often undertaken by staff who lack experience in the handling of artifacts. Sometimes attention is focused so intently on the technical requirements needed to produce and store viable images that ensuring competent care and secure housing for the artifact is given inadequate consideration.

Conservation represents the care of the original artifact in terms both of stabilization and treatment. The definition of an artifact, according to the CLIR *Evidence in Hand: Report of the Task Force on the Artifact in Library Collections* is "an information resource in which the information is recorded on a physical medium, such as a photograph or a book, and in which the information value of the resource adheres not only in the text or content but also in the object itself" (Nichols & Smith, 2001, p. 8). For exam-

John F. Dean, Director, the Department of Preservation and Collections Maintenance, Cornell University, Ithaca, NY 14853
LIBRARY TRENDS, Vol. 52, No. 1, Summer 2003, pp. 133–137

ple, the way a book is bound, the materials used in executing the binding, the paper on which the text is printed or written, the form of printing and illustration, the decoration, and so on, are all potentially valuable pieces of information that should be preserved. In the context of these guidelines, an "artifact" is taken to mean an item that, when scanned, will be retained and returned to the collection.

Digitization represents the digital capture of the artifact, and this raises a number of issues related to long-term file maintenance, authenticity, copyright, etc. From the conservation standpoint, it is often tempting to regard digital imaging as no different from microfilming or any other analog photography, as all seem to reproduce the artifact. However, the ubiquity of access possible with digital conversion seems to add another dimension, and the special lighting requirements, exposure times, and handling concerns suggest that a different response should be made, especially as many analog reformatting tasks were traditionally the province of conservation. Every digital imaging project concerned with the capture of artifacts must involve the preservation of the digital image *and* the original artifact and, at the very least, digitization should do no harm to the original source document.

These guidelines thus seek to address the intersection of conservation and digitization but do not discuss the technology of digital imaging, as it is in this intersection that a peculiar set of problems can arise. It is anticipated that additional information will be added to the guidelines as experience and technological development inform our thinking. It is the overall goal of the curator and conservator to protect the artifact, minimize its physical handling, ensure that the scanning function does not cause any damage and that the artifact is stored or treated in a secure and stable fashion following scanning.

Before Scanning

When an artifact(s) has been identified for scanning and considered appropriate for postscanning sequestered retention by the curator, it should be examined by a conservator prior to any further digitization work going forward.

Assessing Condition

The conservator should assess the condition of the piece(s) and help to determine the circumstances under which the scanning can occur. Generally, the conservator will consider fragility, light sensitivity, binding structure, etc., as part of the assessment process but may also consider what treatment needs to occur before any scanning is undertaken. For example, a photographic image may need extensive cleaning before scanning to ensure that the piece is captured at its best. In some cases, large artifacts, such as drawings and maps, may need to be unrolled or unfolded and flattened by the conservator prior to scanning.

Determining Scanning Mode

The conservation assessment may also result in recommendations on how the item should be scanned. For example, a bound volume may need to be scanned using a book scanner with the appropriate cradle or by using a device for face-up scanning at an angle with a digital camera. The conservator should become conversant with the various scanning devices, including the use of special book cradles, such as the Linhof cradle, the Manfred Mayer cradle, and various other devices designed to avoid having books open to an 180-degree angle (Chapman, 2002).

Digital cameras are often chosen as the capture device of choice for larger items. There are many advantages to a digital camera over a flatbed or book scanner, which are apparent when faced with oversize materials, objects of different shapes, or extremely precious book objects, such as a bound manuscript. The flatbed scanner may be much speedier but is limited because of the platen size and the ability to process only two-dimensional objects. The book scanner can be successfully employed for the scanning of most books but is limited in terms of the size and shape of the object. A digital camera is capable of capturing oversize format items, such as large maps and drawings, and three-dimensional objects, such as sculpture (Hirtle & DeNatale, 1998).

Scanning

The handling of artifacts through the scanning process needs to be considered very carefully when rare materials are involved. In most cases, especially when scanning photographs, cotton gloves should be worn to avoid damaging the artifact. It is also extremely important to ensure that the resultant mages are properly "archived," because if the images are not stored it could result in the constant rescanning of artifacts, a practice that should be considered unacceptable. Photographs, art-on-paper, and maps are especially vulnerable to rescanning. Because file sizes tend to be very large for these objects, a "scan on demand" approach may be adopted that is designed to produce a single, printable image without any attempt to save the images, and this should be avoided. It is also necessary to ensure that the artifact is scanned in the optimum manner to achieve the desired results, as a failure to do so might also result in rescans to improve quality down the road. Additional key considerations include:

Temperature and Humidity

When artifacts are delivered to the scanning area, it is important to consider possible changes in the ambient temperature and relative humidity, and adjust the time that the artifacts are out of the storage area according to the type of object. For example, artifacts written on parchment and bound in vellum are dimensionally unstable and will react to changes in the level of humidity. Such artifacts should spend only a short time in the

scanning area and should be held under restraint unless actually being scanned. It is important to monitor the temperature and relative humidity in the scanning area.

Lighting

Scanning devices, digital cameras, and analog cameras require significant amounts of light in order to capture the artifact at the correct resolution. Exposure to intense light, especially for long periods, can cause irreparable damage to artifacts. When using a digital camera, it is important to avoid having the artifact linger under the intense lights needed to accomplish the capture; thus, exposure should be as brief as possible.

Light damage is a function of the intensity of the illumination level and the length of exposure time. Illumination level is measured in *lux* or foot candles. Light exposure can be calculated in lux-hours or in millions of lux-hours, abbreviated to Mlxh. For example, an exhibition period of 1000 hours at 50 lux could be expressed as 0.05 Mlxh. A light-sensitive item illuminated at 100 lux for 50 days of 10 hours would be exposed to 50,000 lux hours, or 0.05 Mlxh, which would be the maximum amount of exposure for that item in one year.

Some items may be exposed at a higher light level for a longer period, although it is important to remember that exposure damage is cumulative; thus, later reliance on the scanned image rather than the original can significantly reduce exposure, and this can be sufficient justification for scanning. Before scanning occurs, a measure of the operating light level should be taken and a calculation done to try to ascertain the equivalent exhibition exposure limit for the item. In some cases, the use of intense light may be unavoidable, but the artifact should be exposed to it for as short a period of time as possible.

Handling

It is important that all materials be handled with care, but especially large, flat objects. These must be adequately supported over the entire dimension of the object by placing a chemically stable board or other appropriate support under the object when moving it from its folder to the scanning bed. Books should be opened carefully to avoid acute opening, which can cause severe damage to early binding structures, and the page opening should be held down with a strip of polyethylene tape if this does not affect the scanning.

Security

When artifacts are removed from storage for scanning, they should be accorded the same general level of security as when they are secured in closed-access storage or in the rare book reading room. Scanning should thus occur in a secure environment, with staff and user access to the area carefully controlled. Artifacts should be returned to the vault or other sequestered area when scanning has been finished for the day.

After Scanning

When items have been scanned and the work considered complete, some consideration must be given to the stable storage of the original artifact. In some cases, artifacts may be returned to their original storage containers, but in others, new storage containers must be used. Recommendations made by the conservators during the early assessment stage should now be taken into account. Large artifacts that have been unfolded or unrolled will need to be housed in configurations different from those used before.[1]

Folders

Folders that are too small or filled with too many other artifacts need to be replaced. In many cases, old folders that may now be acidic and worn should be replaced and discarded. Oversize folders, designed to support storage in steel flat files (map cabinets) should be slightly smaller than the size of the file drawer or exactly half the size of the drawer.

Boxes

In a similar fashion, boxes may be too small, inappropriate, or too acidic. They should be replaced.

Grant-Funded Scanning Projects

When staff are preparing grant proposals that involve the scanning of artifacts, it is extremely important to take into account the cost of conservation work or rehousing supply purchases. Postscanning rehousing can be quite expensive, especially for large numbers of artifacts, and any conservation treatment hours must be calculated into the grant request.

Notes

1. See http://www.librarypreservation.org for information on housing, especially for oversize artifacts.

References

Chapman, S. (2002, August). Book scanners and cradles: Links to products and reviews. *RLG DigiNews, 6.* Retrieved May 26, 2003, from http://www.rlg.org/preserv/diginews/.

Hirtle, P., & DeNatale, C. (1998, September). Selecting a digital camera: The Cornell Museum Online Project. *RLG DigiNews, 2.* Retrieved May 26, 2003, from http://www.rlg.org/preserv/diginews/diginews2-6.html#technical1.

Nichols, S. G., & Smith, A. (2001). *The evidence in hand: Report of the task force on the artifact in library collections.* Washington D.C.: Council on Library and Information Resources.