Spring 2013 Volume 10, Number 2

Journal for the Society of North Carolina Archivists

Journal for the Society of North Carolina Archivists
Published semiannually by
Society of North Carolina Archivists

J-SNCA Editorial Board

ISSN 1945-8533

Journal for the Society of North Carolina Archivists

Volume 10, Number 2

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1918 Olive drab wool World War I military uniform jacket and belt of Dr. Anna Grove, college physician and instructor, from the Textiles Collection, University Archives, University of North Carolina at Greensboro.

Collecting Textiles: Is It Worth It?

by Beth Ann Koelsch, Kathelene McCarty Smith, and Jennifer Motszko

Abstract

This article describes both the benefits and disadvantages of collecting textiles in an archival repository based on an analysis of three different collections housed at the Martha Blakeney Hodges Special Collections and University Archives at The University of North Carolina at Greensboro. The article details how the curators weighed concerns regarding preservation and storage against the value of using textiles for research, instruction, and exhibits for each of their collecting areas. Their conclusions, and the rationales behind them, highlight important issues regarding textile collections within the archival field.

Introduction

Do textiles belong in archival repositories? Does the historic and intrinsic value of textiles outweigh concerns about storage space, preservation issues, and archival significance? Collecting, preserving, and storing textiles, which are by nature "among the most fragile of all artifacts," is a constant challenge for archivists.[1] Ideal preservation conditions dictate specific storage requirements and strict environmental control. Additionally, textiles consume substantially more space than paper-based documents.

Archivists have traditionally prioritized the collecting of documents, leaving textiles to the realm of museums; however, recent literature makes the point that everything that institutions collect can be considered a

"document."[2] Whether they are considered "documents" or "artifacts," textiles can greatly enhance and add context to paper-based collections. Thus, archivists should examine the value of collecting textiles along with more traditional paper-based documents.

The case for collecting textiles can be found in the study of "material culture" and in the historic value of materials. Material culture is predicated on the idea "that objects made or modified by man reflect, consciously or unconsciously, directly or indirectly, the beliefs of individuals who made, commissioned, purchased, or used them, and by extension the beliefs of the larger society to which they belonged."[3] The fact that some college and university archives collect textiles at all suggests that some archivists are interested in preserving the history which these materials document. Ultimately, they agree with the theory that textiles are "essential to an understanding of the past, of cultures, and even of ourselves."[4]

Of the colleges and universities that do collect textiles, most are associated with clothing and textile departments and the items are mainly used as teaching collections.[5] In 2012, the Association of Research Libraries (ARL) conducted an online survey with its member libraries regarding art and artifact management within their collections. Results revealed a lack of best practices and management strategies within the institutions regarding art and artifact materials, a category that includes textiles. Survey comments showed that artifacts were not generally collected "intentionally," and that their value was often limited to exhibition use.[6] In fact, one respondent mentioned that "because [artifacts] are not integral to our mission

(except occasionally in the University Archives) we have not made their care a priority in any way."[7]

Over the past three years, curators of three distinct collections at the Martha Blakeney Hodges Special Collections and University Archives (SCUA) at The University of North Carolina at Greensboro (UNCG) addressed the dilemma of collecting textiles. Kathelene McCarty Smith, the curator of the University Archives Textile Collection (UA Textile Collection), Beth Ann Koelsch, the curator of the Betty H. Carter Women Veterans Historical Project (WVHP), and Jennifer Motszko, the manuscripts archivist for Manuscripts Collections, each inherited textiles as part of their collections. This article details the curators' deliberations as they weighed the value of continuing to collect textiles against concerns regarding preservation and storage. Their differing conclusions, and the rationales behind them, highlight important issues regarding collecting textiles within the archival field.

Organizational Change and Collection Development

In April 2010, the library hired a new SCUA head and reorganized the department's organizational structure. These changes resulted in rethinking the department's mission, prioritizing collection development, and broadening the archivists' curatorial autonomy over their collecting areas. This autonomy allowed curators to reassess their collecting, instruction, and outreach initiatives within the broader departmental mission of collecting, preserving, and making accessible unique and historic materials for learning and research. Additionally, the new departmental head charged the archivists with devising collecting priorities

which were integrated into the departmental collection development policy.

Other changes resulted from a renovation of the SCUA storage and office spaces in 2011-2012. In preparation for the departmental move into a renovated and expanded space, Smith, Koelsch, and Motszko were asked to deliver collection assessments, including a plan for future storage needs. They discovered that textiles currently within the archives required over 500 linear feet of shelving. Including the estimates for future collection growth, textiles were allotted approximately fourteen percent of the department's shelving space.

Smith, Koelsch, and Motszko believe that as part of an academic library, the department's mission is not only to collect and preserve materials, but also to promote the use of the collections by UNCG students and faculty, the broader scholarly community, and the general public. Each curator sees the archival value of textiles and emphasizes using a wide variety of materials for instruction, research, and short-term display purposes. To date they have prioritized use over preservation considerations. They differ, however, in their views on how textiles should feature in the future of their collections.

Origins and Descriptions of the SCUA Textile Collections

The University Archives can trace its beginnings to the early 1940s. At that time, textiles were not a priority in the university's archival collections. This changed in the 1980s when the university archivist, Betty Carter, began to reconsider established collecting policies. Carter concluded that "the history of the university is paper, textiles, artifacts, photographs and, of course, all sorts of electronic and digital

files… [but] we are a visual society and textiles and artifacts supply the 'visual.' In my opinion, an archivist is charged with preserving the history of an institution—all of the history."[8] Believing that public interest and historic value supported her decision, Carter began to accession textiles and artifacts into each of the University Archives and Manuscript Collections, which became the foundation for the UA Textile Collection and the WVHP, and expanded the parameters of the Manuscript Collections.

Not surprisingly, the UA Textile Collection holds the greatest number of textiles in the department and focuses entirely on items associated with UNCG, from its founding in 1891 to the present day. The UA Textile Collection's origins and major acquisitions resulted from two large transfers from other campus sources and from a publicized appeal to the alumni community. The initial transfer came from the School of Home Economics' Textile Collection, which incorporated clothing that belonged to early college faculty and students. In the early 1980s, the School decided to weed this teaching collection and the textiles that were not considered important for instruction were transferred to the University Archives. Items of particular interest from this transfer included clothing owned by the college's founder and first president, Charles Duncan McIver, and his family; early school gym suits; a 1916 graduation dress; and the World War I Abercrombie and Fitch Red Cross uniforms and surgical vestments belonging to Dr. Anna Maria Gove, an early campus physician and teacher.

The second large transfer of textiles occurred in 2010, when the UNCG Alumni Association donated its own textile collection to the Archives, increasing the UA Textile Collection's size by more than thirty percent. The Alumni

Association transfer brought in a rich trove of textiles that included early twentieth-century pennants and banners, as well as class jackets. The tradition of class jackets began in the 1930s and remained at the college until the early 1970s, a decade after men were welcomed onto campus in 1963. While the Archives already possessed class jackets, this transfer increased their number in the collection. Hoping to fill in additional gaps, the university archivist recently posted a short article in UNCG Magazine asking for donations of jackets for the years that the collection lacked. This article was met with enthusiastic donations of class jackets that filled out the collection's holdings from 1950 to 1973. The UA Textile Collection continues to expand, adding not only items chronicling the school's past, but also more recent items such as a 9/11 commemorative quilt.

Unlike the UA Textile Collection, uniforms and other textiles in the Women Veterans Historical Project are usually part of an individual veteran's collection, which can also include manuscript materials. The foundation of the WVHP textile collection began in 1992, during a campus celebration of the 50th anniversary of the establishment of the United States Navy WAVES (Women Accepted for Volunteer Emergency Service). For this occasion, several veterans sent uniforms and other memorabilia to the Alumni Association. Those items, which were used in an exhibit, were transferred to the University Archives in 1997, and formed the nucleus of the WVHP.

In 1998, the WVHP was formalized and the collections were expanded to non-alumnae veterans. It became the general policy to solicit donors for all of their military materials, including uniforms. These uniforms ranged from one piece, such as Rachel Twiddy's World War

II-era Army Nurse Corps cape, to the fifty-six pieces from Gretchen Davis' fifteen-year army career from 1978 to 1993. Additionally, the collections were augmented by purchases from eBay vendors and other sources to create the ninety-piece Women Veterans General Textile Collection. This artificial collection includes a variety of uniforms and textiles, including a rare World War I uniform worn by a volunteer for the American Red Cross/Army Nurse Corps who served in France; a World War II Coast Guard SPARS dress uniform; and a World War II Women's Army Corps (WAC) guidon.[9]

Similar to the WVHP, textiles within the Manuscript Collections are part of individual collections, and have been accepted along with donations of papers and artifacts. The first textiles were donated in 1996 as part of the Joseph Bryan Archives. In addition to the more than sixty linear feet of personal and professional records, the Archives received Joseph Bryan's top hat, Oasis Shriner Fez, several suits, academic robes, and five green golf jackets (two from the Greater Greensboro Open and three from the Augusta Masters Tournament). The Bryan Archives represents the largest group of textiles in the Manuscript Collections, but it is not the only example. In 2002, New York artist Duston Spear gave to the Archives materials related to 3 Women in Black, a project started by Spear to show solidarity with the "Women in Black" movement of Belgrade, Serbia, which protested the rape of women during the conflicts in central Europe. This collection includes three black dresses, one pair of leather gloves, two mismatched knit gloves, a ski mask, and two veiled headpieces. A final significant group of textiles arrived with the Weatherspoon Guild Collection in 2003. This collection includes six dresses made of paper that

were worn by the UNCG Department of Art faculty at the Art on Paper 1967 show on October 10, 1967.

Use of Textiles in Exhibits, Instruction, and Research

In the last three years, SCUA has seen a significant increase in use of textiles. During this time, departmental statistics show that approximately 300 textiles have been used for exhibits, instruction, and research. Smith, Koelsch, and Motszko attribute most of the statistical increase to the expanded use of textiles in exhibits and instruction. SCUA offers UNCG professors the opportunity each semester to bring their classes into the archives to learn about campus history, archival methods, and the use of our collections for research. Participating disciplines include History, Kinesiology, Art, Library Studies, and English.

Textile collections also are seeing increased use for individual research, thanks to a recent library-wide digitization initiative. The department has improved cross-collection access for researchers by photographing and uploading images of textile items into CONTENTdm, our digital collection management system. CONTENTdm allows archivists to digitally manage and display each item with complete metadata. This software also makes it possible to show different angles of each textile and view them closely using the zoom feature. Most of the textiles in the UA Textile Collection and the WVHP textiles have now been photographed and the images uploaded to CONTENTdm, creating easy access without further damage to the textiles. This valuable research tool dovetails successfully with departmental exhibits and instruction.

Exhibits

Smith has frequently used textiles from the UA Textile Collection for exhibits in the UNCG library, as well as other campus venues, for alumni reunions, School of Nursing events, and campus commemorations. Exhibits have featured class jackets, historic school banners and pennants, college gym suits, junior marshal dresses, and regalia. These one-day exhibits are complicated as they include up to seven dressed mannequins and related materials that must be transferred from the Archives to another campus building. Some of the most successful exhibits have been those related to the annual alumni reunions. The alumni react to the clothing as if they were old friends, often taking group photographs with a class jacket or a gym suit.

Preservation can also be a significant consideration when exhibiting textiles. One noteworthy example was the exhibit of junior marshals's dresses that accompanies the annual UNCG junior marshal installation. This exhibit includes delicate and easily damaged dresses dating from 1907 to 1950. The transportation and handling of these dresses has caused noticeable stress to the textiles. While the textiles enhance the historical context of the installation, preservation concerns may necessitate a more limited exhibit in the future.

Koelsch exhibits a different selection of uniforms from each of the military branches at the annual women veterans's luncheon at UNCG, which honors the military service of women and highlights the WVHP collections. The accompanying exhibit typically includes ten to twelve uniforms, as well as artifacts and a display of posters and other images. The women veterans examine the uniforms intently and compare them to their own uniforms. Koelsch

often receives specific requests from veterans to display the uniforms they donated.

Uniforms were also featured during a local television news segment for Independence Day. The news crew came to campus, and Koelsch used a uniform display to explain the history of women in the United States military. Uniforms have traveled to different community events, such as an exhibit celebrating Women's History Month at Fort Bragg. Enlisted women soldiers wearing camouflage battle dress uniforms were fascinated by the wool World War II WAC dress uniform. One Fort Bragg soldier expressed envy for such a "ladylike" uniform, even though the WAC uniform, hurriedly adapted from the men's uniform, was considered at the time to be the ugliest uniform of all of the women's branches.[10] Although uniforms were the marquee pieces of these exhibits, Koelsch eventually decided that the risk of damage was too great and stopped using textiles in off-site exhibits and presentations.

Motszko has found only a few opportunities to include textiles in exhibits highlighting the Manuscript Collections. SCUA has lent Joseph M. Bryan Archives items to the Greensboro Historical Museum for several short-term exhibits. In addition, Bryan's top hat, walking cane, and Masters green jacket were used for various UNCG library exhibits. The paper dresses from the Weatherspoon Guild Collection were put on a short-term display in Jackson Library at UNCG shortly after their acquisition. For most exhibits, Motszko favors using photographs and paper documents, which she feels better represent the collections.

Instruction

While it is not surprising that alumni and veterans appreciate viewing items from their own history, it is perhaps more interesting to see current students's reactions to textile items used to teach classes in the archives. Smith incorporated the UA Textile Collection into many of the classes taught in the archives and found that the students were fascinated with the differences in styles and in the constricting nature of some of the clothing. In one particularly effective example of using textiles to enhance instruction, Smith showed early campus gym suits and related material to a History and Philosophy of Sports and Physical Education class. By examining these textiles, dating from 1905 to 1972, students could easily observe the evolution in design and draw conclusions about the changing attitudes of physical exercise for girls during the twentieth century. On display were 1905 and 1916 black serge gym suits that have long-sleeved blouses, tied at the collar, buttoning onto voluminous pantaloons. This more restrictive style was compared with a 1930s blue one-piece cotton gym suit that allowed for flexibility and comfort. For further contrast, two gym suits from the 1960s and 1970s were also exhibited. The gym suits serve as important visual teaching aids that illustrate the school's interest in advanced physical education theory and practice throughout its history. Ultimately, these textiles represent a microcosm of the history of physical culture and fashion at UNCG.

Koelsch and Motszko have found fewer opportunities to use textiles for instruction, although WVHP textiles have been incorporated into class sessions about the history of World War I and World War II. Additionally, the Department of Consumer, Apparel, and Retail Studies offers

a course on Historic Costume and the WVHP conducts a class session devoted to World War II uniforms. Motszko can recall only one instance of instructional usage: Bryan's Oasis Shriner fez was displayed for a lecture about the use of primary sources.

Research

The University Archives Textile Collection is not on permanent public display and is considered a teaching collection viewable by appointment only; therefore, having a digital equivalent of the textiles for researchers is essential. The digital accessibility of the collection has created an alternative to handling and displaying the often fragile textiles. Displaying the collection through CONTENTdm software (http://libcdm1.uncg.edu/cdm/textilesandartifacts/) has allowed this unique resource to be available to students, alumni, scholars, and the general public. Students find the option for "at-home" research particularly helpful and the link to the UA Textile Collection landing page is included in lectures and research guides. Additionally, low-resolution images may be downloaded for inclusion in class papers and projects. This site is also popular with alumni and researchers who are not able to visit the archives in person.

Almost all of the researchers of the WVHP textiles access the collections via the WHVP website (http://library.uncg.edu/dp/wv/) to view the seventy high-resolution photographs that were taken of uniforms and hats. Occasionally, there are phone calls and on-site visits by theatrical costume designers and historical re-enactors who want detailed information about a uniform's construction.

Motszko believes that researchers rarely request access to the textiles included in the Manuscripts Collections

because they are seen as peripheral to the research value of the paper materials. None of the textiles has been photographed and they are not represented in CONTENTdm.

Considerations and Conclusions

Smith, Koelsch, and Motszko all believe that textiles are relevant to the mission of the department, but each archivist has separate collecting priorities; therefore, they have made different decisions about the future of the textiles in their respective collections. These decisions will be integrated into the departmental collection development policy.

Given the popularity of the UA Textile Collection in exhibits and instruction, the question of whether or not to continue to collect textiles is clear. However, at the current rate of collecting, Smith estimates the textiles will reach the storage capacity within the next three to five years. She realizes that space limitations must dictate whether to continue to accept every new donation, particularly in the case of the alumni class jackets for which the collection has a full run after 1950. The library's relationships with the alumni community, as well as the campus community, are an important factor in the development of the UA Textile Collection; therefore, in some cases she will accept duplicate jackets to cultivate good donor relations. In addition to storage considerations, constant use of the collection for exhibits and instruction has naturally limited the use of some textiles because of preservation issues. While digital access has alleviated some of the stress on the textiles, Smith believes that their physical display is still important to current and future students, alumni, and researchers. Therefore, she has decided to continue to exhibit the textiles

based on condition and length of display. Smith has also decided to continue to actively collect textiles related to the university with consideration toward the alumni/donor relationships, but to limit duplicate item donations when possible. She also aims to maintain a realistic balance between preservation and use to rationalize the continued collecting of textiles.

In the case of the WVHP, Koelsch realized that her collection contains numerous duplicates of certain types of uniforms, especially from the World War II era. Storage space limitations make accepting uniforms from every donor unfeasible. Accordingly, Koelsch has decided to collect only unique uniforms not already within the collection and will retain all previously donated items. However, exceptions may be made in cases of donor relation development or when the offered uniforms are in better condition than ones currently in the collection. This decision will result in a loss of historic information because, even though every military branch produces tens of thousands of dress and work uniforms, each uniform is also customized by the individual veteran—be it by name labels, alterations, shoulder patches or insignia—and is as distinguishing of each woman's personal experiences as letters and photographs. By accepting the medals, ribbons, and other insignia from each uniform, Koelsch hopes that most of the informational and artifactual evidence of a veteran's military career can be preserved.

Unlike the UA Textile Collection and the WVHP, the textiles in the Manuscript Collections are seldom used in teaching and research. In most cases, the textiles are not unique and weighed against storage and usage considerations; Motszko believes they hold little archival

value. She has decided to discontinue collecting any form of textiles and will consider deaccessioning or transferring textiles currently in her collection.

The authors' initial question of whether repositories should invest their resources in collecting textiles does not have a one-size-fits-all answer. Ultimately, each repository must carefully evaluate their instructional, research, and outreach goals against the physical limitations of their storage capacity, stability of their storage environment, and preservation concerns, to determine the value of collecting textiles.

Beth Ann Koelsch has been the curator of the Betty H. Carter Women Veterans Historical Project (WVHP) at The University of North Carolina at Greensboro since 2008. She received her MSLS from the School of Information and Library Science at the University of North Carolina at Chapel Hill in 2007.

Kathelene McCarty Smith has been the Artifacts, Textiles, and Digital Projects Archivist at the Martha Blakeney Hodges Special Collections and University Archives at the University of North Carolina at Greensboro since 2010. She received an MA in Art History from Louisiana State University and an MLIS from UNCG.

Jennifer Motszko has been the Manuscripts Archivist at The University of North Carolina at Greensboro since 2008. She received an MA in History and an MLIS from the University of Wisconsin-Milwaukee in 2007.

NOTES

1. Nancy Carlson Schrock and Kathryn Myatt Carey, *Archival storage of textiles* (New York: Gaylord Brothers, 1997), 2.
2. Robert S. Martin, "Intersecting Missions, Converging Practice," *RBM: A Journal of Rare Books, Manuscripts, & Cultural Heritage*, 8.1 (2007): 81.
3. Jules David Brown, "Mind in Matter: An Introduction to Material Culture Theory and Method," *Wintherthur Portfolio*, 17 (1982): 1-2.
4. Richard Martin, "Costume History: The State of the Discipline," *History News*, 45.6 (1990): 14.
5. For example, Cornell University, Louisiana State University, and The Ohio State University.
6. Morag Boyd and Jenny Robb, *SPEC Kit 333, Art & Artifact Management* (Washington, D.C.: Association of Research Libraries, 2012), 17.
7. Boyd and Robb, 17.
8. Betty Carter, e-mail message to Kathelene Smith, 11 January 2013.
9. SPARS was the name of the United States Coast Guard Women's Reserve. It is an acronym of the Coast Guard motto and its English translation: Semper Paratus Always Ready.
10. Mattie E. Treadwell, *The Women's Army Corps* (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1954), 166.

2013 Gene J. Williams Award Winner

The Gene J. Williams Award, presented annually by the Society of North Carolina Archivists, recognizes excellence for a paper on an archival topic written by a North Carolina graduate student for a graduate-level course. This award honors the late Gene J. Williams, archivist at the North Carolina Division of Archives and History and at East Carolina University, and charter member of the Society of North Carolina Archivists.

Living Legacies: Recovering Data from 5¼" Floppy Disk Storage Media for the Commodore 64

by Shaun M. Trujillo

This article is a condensed version of Trujillo's master's paper, which is available in full at http://bit.ly/XHmJCT.

Abstract

In an attempt to investigate the challenges of recovering and preserving digital objects from legacy systems, this case study focuses on working with a particular storage medium and computing hardware. This study illustrates the physical and representational challenges that result from recovering data created with a Commodore 64 computer and stored on 5¼" floppy disks. This study contributes to the discourse of collecting institutions engaged in digital preservation and provides examples of ad hoc solutions for working through the challenges of recovering meaningful information from legacy systems. The issues that come to light in this study can be extended beyond the context of the Commodore 64 to include other types of

digital resources and computing artifacts that may cross the archival threshold in the near future.

Introduction

Before ever opening a file saved to a hard drive or USB thumb stick, I accessed data stored on 5¼" floppy disks. My first computer was an Apple IIe, a gift for the family that was purchased by my parents in 1989. My computing routine at the time amounted to loading and playing classic video games like Dig Dug and Burger Time, and, depending on the minor holiday in question, occasionally printing ugly monochromatic cards with 8-bit pictures of birthday cakes or Abe Lincoln's profile on them. In the course of researching 1980s microcomputers twenty-two years later, I have come to appreciate that these machines offered far richer features and possibilities than I had ever realized. The computers I had miscast as glorified gaming consoles were in fact robust computing systems with scores of specialized devices and software with which users could tailor complex and customized information interactions. Much like the devices of today, the first generation of personal computers were intended for more than playing games; they allowed for the creation and manipulation of unique data and complex digital objects, and, by modem, mail and magazine, they inculcated hybrid networks of communication and discourse for the enthusiasts of the day. Nostalgia aside, I believe that contemporary users are still interested in pushing the capabilities of these older systems in part because they were so versatile in their own right and many users had not previously been able to experience the full scope of their capabilities. With this work

I hope to qualify some of the enduring value of these systems for the broader cultural heritage community.

The catalyst for this study was Matthew Kirschenbaum's book, *Mechanisms: New Media and the Forensic Imagination*. In his meditation on the techniques of digital inscription, Kirschenbaum frames digital media as a writing technology and effectively places objects encountered by digital curators within the continuum of literary analysis and forensics. The arc of Kirschenbaum's analysis relies on the premise that information is in reality bound to a physical entity, and that although digital information is medium-independent, it can never be wholly intangible. Computer systems are designed to hide what is most essential to their functioning, allowing human users only a requisite margin of interaction and manipulation of the underlying processes that determine a machine's output. As computer technology has grown in complexity over the last century, the abstractions between the human programmer and the inner workings of the machine have broadened as well. Accessing information via a particular configuration of hardware and software binds it to a set of affordances that act as both ingress and terminus of human interpretation. Archivists working with born digital acquisitions will be charged with characterizing the advantages and limitations of various formats and media types and will be responsible for peeling back the layers of representation that digital objects possess. *Digital archaeology* is a term used to designate the work of curators employing post hoc strategies to recover information from legacy systems and formats.[1] Ross and Gow define digital archaeology as an approach "to accessing digital materials where the media has become damaged (through disaster or age) or where hardware or software is

either no longer available or unknown."[2] Comparing aspects of digital curation with archaeology is by no means arbitrary; data can be stratified within obsolete formats, corrupt files are essentially sealed off in a state of disintegration, orphan files remain unrenderable except by means of forgotten ancestral operating systems, and deleted information long believed to be lost can be fossilized on a magnetic disk.[3] I discovered one remark in an online message board that I believe succinctly sums up all the intricacies, frustrations and tribulations of data recovery and digital forensics: "It's like trying to reanimate a frozen Siberian mammoth.[4]

In an attempt to investigate the physical and representational challenges of recovering and preserving digital objects from legacy systems I have conducted a case study that explores the process of capturing data created with a Commodore 64 (C64) computer and stored on 5¼" floppy disks for approximately two decades. Figure 1 shows the C64 hardware used during the course of this project.

Fig. 1. Commodore 64 hardware
C64 setup (from left to right): VIC-1541 Drive, C64 computer, vision monitor and joystick

The issues that come to light in this study can be extended beyond the context of the C64 to include other types of digital resources and computing artifacts that will potentially cross the archival threshold in the near future (or are already in the stacks). The purpose of this study is to contribute to the discourse of collecting institutions engaged in digital preservation and to provide an example of developing ad hoc solutions for working through the challenges of recovering meaningful information from unfamiliar legacy systems.

Literature Review

Data Recovery and Levels of Representation

Increasingly, collecting institutions are encountering acquisitions that include born-digital materials. In recent years any number of collecting institutions have needed to come to terms with the reality of digital acquisitions, including museums, historical societies, public libraries, university archives and special collections, government archives, corporate and institutional archives, digital libraries, and other small records environments. If we add to that list the curation of personal digital objects by individuals in the wider social sphere, material that Jeremy Leighton John – the curator of eMANUSCRIPTS at the British Library – describes as "archives in the wild," then we begin to see the wide ranging influence that born-digital media will hold for the future of archives and cultural memory in general.[5]

Among the concerns that are central to the preservation and curation of born-digital materials is the problem of providing users with access to data created with outdated computing platforms and stored in legacy formats.

Transferring this data from its obsolete storage media into current contexts in which it may be accessed and used is the basic premise of data recovery.[6] Data recovery, or digital capture,[7] utilizes tools and strategies that rely on the physical realities of digital data in order to preserve the integrity and authenticity of digital information on a bit-by-bit basis. Many examples of cultural and commercial rhetoric regarding personal computing and the ubiquity and acceleration of information rely, to some degree, on equivocations about the imperceptible nature of digital data; that is, they confound the difference between information's invisibility to the human eye and inaccessibility to human touch with actual intangibility.

Data recovery – the process that results in the accurate reproduction and access of digital objects from data stored on fragile and at-risk media – relies on interacting with and evaluating a series of physical conditions that determine numerous means for interpreting a digital object. Kenneth Thibodeau defined digital objects as "information object[s], of any type of information or any format, that [are] expressed in digital form."[8] According to Thibodeau, digital objects have characteristics derived from three levels of representation which are described below:

> All digital objects are entities with multiple inheritance; that is, the properties of any digital object are inherited from three classes. Every digital object is a physical object, a logical object, and a conceptual object, and its properties at each of those levels can be significantly different.[9]

Accordingly, each layer of a digital object's representation presents specific challenges to recovery and preservation practices.

At the most fundamental level, digital information can be interpreted as a form of physical writing, i.e., binary inscription on the surface of a disk in the form of magnetic flux reversals.[10] Guttenbrunner, Becker and Rauber cite the UNESCO guidelines for the preservation of digital heritage to explain that the properties of a digital object inherited from its physical layer are threatened by decay to the storage medium, i.e., bitrot, as well as by the absence of the necessary hardware to access the medium.[11]

Kirschenbaum describes the next class "above" the physical representation of bits as a formal level of executing rationalized code, i.e., "data as it is recognized and interpreted by particular processes and applications software."[12] A machine that is processing code is actively reading and writing data in order to perform some action, which could involve the erasure, copying, addressing or modification of a file or other form of data. Here again digital objects are essentially grounded in inscription practices. Notably, this second level of representation accounts for the arrangement and allocation of the units of digital storage that are characteristic of magnetic media, such as blocks, clusters and sectors.[13] This arrangement of digital bytes is largely a function of a computer's operating system and generally takes place outside of the direct control of the user.

Finally, there is the high-level conceptual representation of digital information, which usually takes shape as the user-facing end product of an operating system's interpretation of digital bits. This level of

representation is synonymous with the user interface and is the common means of accessing an information object. Some examples of the variability of the conceptual layer of an information object include cross-platform games running on specific hardware, an MP3 played with a particular application, or an uncompressed image being accessed by an open source graphics editor.

In addition to the three classes of representation mentioned above Guttenbrunner et al., again citing the UNESCO guidelines, acknowledge a fourth layer of a digital object. This layer is described as the *essential elements* of a digital object and consists of "the context in which a digital object has been created. This information describing a digital object is usually referred to as metadata."[14] The Reference Model for an Open Archival Information System (OAIS) emphasizes similar contextual information for digital objects which it categorizes as *Preservation Description Information*. The PDI includes unique reference identifiers for the content of digital objects along with information for documenting the provenance, context, and fixity of the object.[15]

The conceptual level of a digital object is necessarily integrated with and dependent on its means of access, and therefore accessing a digital object in a new context, whether by converting the data or rendering the original data via emulation, will likely result in changes to the object's characteristics and will necessitate reinterpretation of its essential qualities. Since determining what qualifies a digital object as genuine and accurate is a judgment call that usually relies on the topmost level of interpretation, multiple possible encodings, or formats, of the same object are possible and can equally preserve the

essential characteristics of a digital object.[16] One of the challenges of digital curation is qualifying what the essential characteristics of a digital object actually are and then securing those characteristics over time. In the end preserving the essential aspects of a digital object may not be feasible for several reasons including high costs associated with analyzing recovered data and developing systems for emulating legacy files, loss of *ambient data* and metadata during migration of files,[17] or simply an inability to capture all of the relevant inheritances that comprise the object. Approaching new and unfamiliar sources of digital information will require that archivists develop methods for drawing out important characteristics of information objects and determining what qualities can be sacrificed and what qualities should remain in order to maintain the fidelity of the preserved object to its original source.[18]

Characterization, Affordances, Genre Classification, and Triage

Abrams et al., cite Adrian Brown in describing characterization as "information that describes a digital object's format-specific character or significant nature."[19] Characterization can refer to the specifications of the medium on which a digital object is stored, the encoding standard of the file types of which it is composed, and the qualities of its use within a specific computing context. Understanding the characteristics of a digital object can provide grounds for interpreting the object in different contexts and help in prioritizing the aspects of the object that should remain across various translations.

Characterization of a digital object is closely linked to the affordances of the particular computing environment

by which it is accessed. Affordances are the perceivable qualities of an artifact that enable it to be used in specific ways and which highlight the nature of human practices surrounding it.[20] Tools and artifacts are designed by humans with specific uses in mind, and the ways in which humans interact with those technologies are affected by their affordances. The affordances of an object or technology are footholds for both deeper inference concerning its meaning and use and, in the case of digital objects, for the possibility of automating the creation of characterization information.[21]

Characterization information, similar in many ways to Thibodeau's representation information, is considered highly important to digital repository frameworks for ingesting digital objects.[22] In order to preserve the coherence of a digital object over time and across contexts, characterization information must be preserved alongside the object. This means that information important to the integrity of the object, such as header and file type information, checksums, and other authority metadata, must be extracted from various representational levels of the object and stored peripherally in the archives.

Method

This section recounts the process used for recovering data from 122 floppy disks that were acquired from four separate sources. I present the results of the recovery process which yielded electronic versions of the original floppy disks in the form of D64 disk image files.[23]

Recovery Process

In recent years many advances have been made in the development of hardware and software aimed at solving

the problems of access, transmission, and recovery of data at high risk of loss. In addition, technological offerings in the world of data recovery and preservation are increasingly being tailored to the contexts of archives and cultural heritage communities.[24] The purpose of this study was to approach a collection of digital artifacts from the perspective of a small collecting institution, a situation that would require ad hoc solutions to access and preservation challenges and that may not require building an exhaustive infrastructure for ingest, preservation, and long-term access. Nonetheless the implications of my study could be applied to any archives, small or otherwise, that do not have an explicit system in place for recovering data that falls into the domain of digital archaeology.

Many of the options designed for capturing data from Commodore's floppies use software that was developed for Microsoft Windows and require hardware customization of the 1541 disk drive. I decided to use the ZoomFloppy device because it required no specialized installation of an I/O port, as its firmware takes advantage of the native serial connection on the 1541 drive. The C64 emulation software I found to be the most user-friendly, at least in terms of installation and basic navigation, was the Mac-based *Power64* emulator.

Acquiring and Testing Hardware and Software

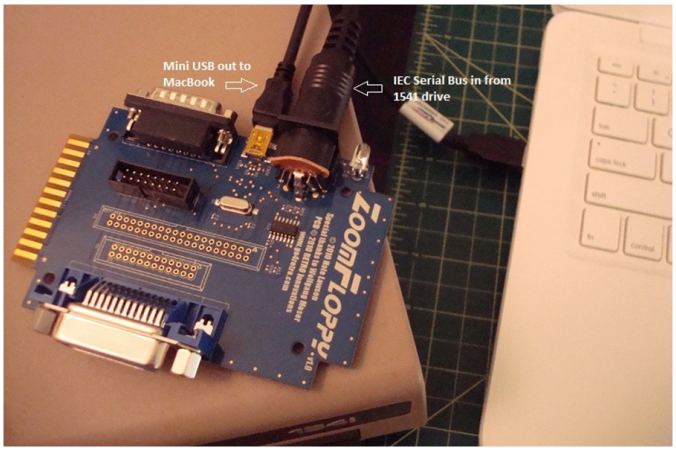
The initial stage of preparation involved gathering the actual legacy hardware and software from a variety of sources. In the setting of the archives or museum one may have hardware available that could potentially access software and various data stored on legacy formats. The question remains of whether that equipment remains

functional today, and more importantly, whether one is capable of getting it to work properly and remembering how to operate it.[25]

In conjunction with the uncertainty surrounding the state of available legacy hardware, the prospect of acquiring sets of random 5¼" floppy disks provided dual concerns in terms of the media's integrity and provenance. Testing floppies (and other media generally) requires knowing how the disks were originally formatted, i.e., knowing what machine(s) and operating system(s) the disks initially ran on and with which they are compatible. Even if the disks have survived over the years with a significant amount of data intact, there is still no guarantee that one will be able read the data, unless one makes special arrangements to acquire multiple drive devices that can read versatile formats or a single drive (or intermediary device) that is format agnostic.

At the start of this project my entire inventory of equipment amounted to three Commodore 64 computers; two VIC-1541 disk drives (one Alps Drive and one Neutronics Drive);[26] one NEC Character Display Monitor; one ZoomFloppy device; and 122 random floppy disks purchased from four separate sources. Testing revealed that all three C64 computers, the NEC monitor, and the Neutronics 1541 disk drive were functional. The only lemon was the Alps 1541 drive and, after verifying that I had a working disk drive, I no longer needed the C64 computers or monitor to perform data recovery. I could now move on to building the OpenCBM library and ZoomFloppy interface necessary for transferring data from the floppy disks to my MacBook.

Fig. 2. The ZoomFloppy device and connectors



OpenCBM build and ZoomFloppy

The ZoomFloppy device allows users to connect an IEC (Serial) device such as the VIC-1541 to a modern computer via the USB port. The ZoomFloppy is manufactured by Jim Brain and is built from a version of the xum1541 firmware (pronounced "zoom") developed by Nate Lawson with help from Wolfgang Moser, Spiro Trikaliotis, and Christian Vogelgsang and provided under the GNU General Public License.[27] In order to control the ZoomFloppy it is necessary to compile the OpenCBM library that includes command line tools that communicate with the VIC drive's IEC bus "at the level of simple TALK and LISTEN commands, similar to the one [sic] provided by the Commodore kernel routines."[28] Once I had successfully compiled OpenCBM and connected the 1541, the ZoomFloppy, and the MacBook I could begin the recovery process. Figure 2 shows the ZoomFloppy device connected

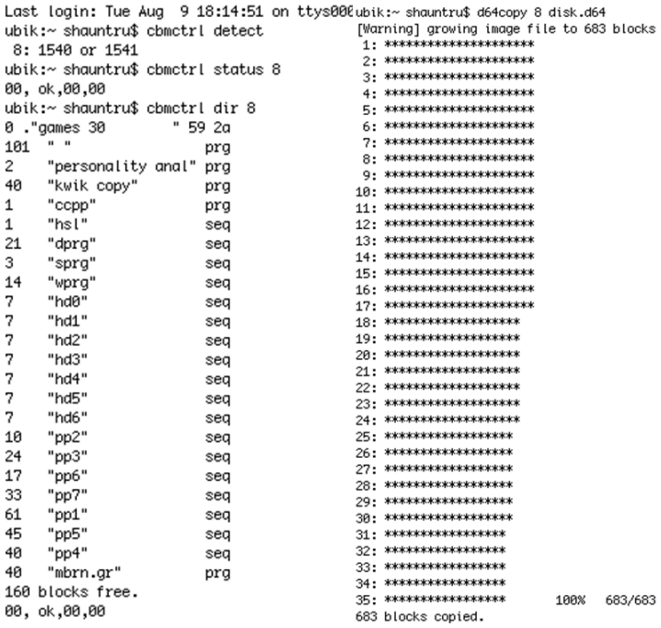
to a 1541 disk drive via an IEC serial cable and a MacBook via a mini USB to USB cable.

Creating disk images with OpenCBM

One of the more popular electronic equivalents of a CBM DOS formatted 5¼" floppy disk, used by the enthusiast community to emulate C64 software, is the D64 image file. This is the file type that OpenCBM creates when it copies the bitstream from a disk being read by the 1541 drive onto the local Mac hard drive. Peter Schepers discusses the D64 disk image among other formats and explains that it "is basically a sector-for-sector copy of a 1540/1541 disk. . . The standard D64 is a 174848 byte file comprised of 256 byte sectors arranged in 35 tracks with a varying number of sectors per track for a total of 683 sectors.[29] The main (negative) difference between the D64 and its floppy disk source is the loss of header information for individual sectors, which includes the ID number and checksum of the sector. The checksum of the sectors are taken into account at the time of conversion, while the disk drive is reading the actual floppy disk, but are not preserved in the D64 bitstream. The exclusion of the ID number can also have an effect on copy protected software, making emulated versions of the disk unusable.[30]

It is simple to create D64 disk images using OpenCBM commands via the Mac Terminal. The regimen of OpenCBM commands consists of "cbmctrl detect" and "cbmctrl status" for checking the connection to the 1541 drive; "cbmctrl dir 8" for reading the contents of the disk's directory; and finally "d64copy 8 *filename.d64*" for copying the contents of the number 8 device, i.e., the 1541 disk drive, to a D64 file within the Mac user's local directory. Figure 3

Fig. 3. Terminal output for disk image creation



shows the Terminal output resulting from the creation of a D64 disk image with OpenCBM.

As the D64 file is created the Terminal displays the sector-by-sector progress - an asterisk appears if the sector is copied successfully and a question mark appears if the sector is skipped. If all goes well, the user sees 683 asterisks divided accordingly between 35 tracks and a final message stating “683 blocks copied.” When there is a read error the OpenCBM reports the track and sector where the error occurred and attaches an error code for the sector at the end of the disk image.[31] The error code matches the built-in CBM DOS error codes for the 1541 drive, and effectively replaces the missing sector header information mentioned above, but does so without creating a new checksum for the sector. If

Fig. 4. Terminal output for read errors

OpenCBM encounters continuous errors on a single track it will eventually give up copying the track and move on to the next. Figure 4 shows an example of an attempt to create a D64 image with OpenCBM that resulted in read errors.

In some cases the 1541 drive is unable to access the contents of a disk, either due to degradation of the media or because the disk is either unformatted or formatted in a way that cannot be interpreted by CBM DOS. Trying to access the directory of a problem disk will result in the 1541 transmitting an error code via the ZoomFloppy to be displayed in the Terminal.

Results

For each set of 5¼" floppy disks I received I assigned an accession number and all four accessions comprise the case study “library.” Figure 5 shows the

Fig. 5. Total number of disks and sides

	Total No. of Disks and Sides				
	Single Sided	Double Sided	Total Disks	Total Sides	
Acc. A	6	3	9	12	
Acc. B	10	5	15	20	
Acc. C	45	12	57	69	
Acc. D	31	10	41	51	
Total	92	30	122	152	

quantity of disks for each accession, as well as the total number of disks and discrete sides in the library.

Accession A included nine disks, three of which were double-sided. Accession B, C, and D contained fifteen, fifty-seven, and forty-one disks respectively. Accession B included five double-sided disks, whereas accession C included twelve and D included ten. The combined library amounted to 122 disks with a total of 152 discrete sides.

I made at least one attempt to create a D64 image for the contents of every side of every disk in the library. Figure 6 shows the resulting percentages of successful image creation, corrupted image creation due to partial read errors and failure due to total read errors for each.

Of the total 152 sides of data I was able to create 111 disk images. Sixty-seven disk images represent complete copies of the bitstream from the original floppy disk. Forty-four of the images include one or more sectors of corrupt data that could not be confirmed by checksums during the transfer process, in which case the component files may

Fig. 6.

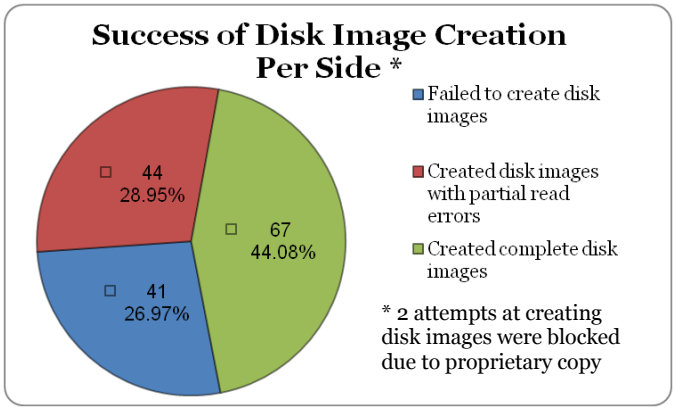
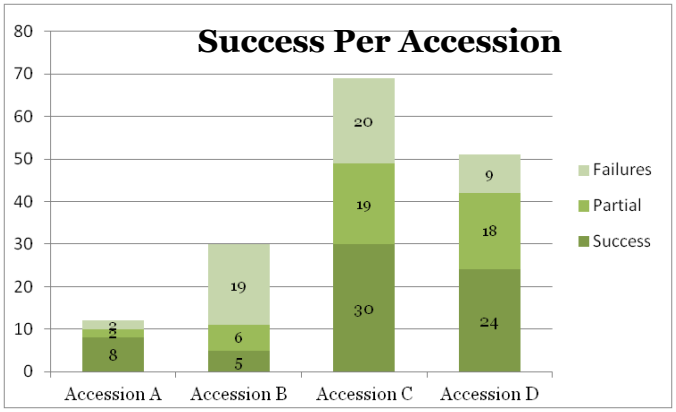


Fig. 7.



remain accessible, in part or in whole via emulation. Forty-one disks remained completely inaccessible and failed to copy. The overall success rate for complete disk image creation was 44.07 percent while the overall failure rate was 26.97 percent.

Breaking down the library to its subsequent accessions we see varying rates of successful data recovery for each. Figure 7 shows the total number of entries, i.e.

sides, in each accession and the number of successfully completed disk images.

Accession A included twelve possible entries, eight of which were fully copied for a 66.7 percent success rate and only two of which failed for a 16.7 failure rate. Five out of thirty entries in Accession B were completely copied for a 16.7 percent success rate while nineteen failed resulting in a 66.3 failure rate. Accession C, which included the most entries, yielded thirty complete disk images out of a possible sixty-nine for a 43.48 percent rate of success, while twenty entries remained inaccessible for a failure rate of 28.98 percent. Accession D consisted of fifty-one entries, twenty-four of which were perfectly copied for a 47.06 percent success rate, and nine of which failed resulting in a 17.64 failure rate. The average success rate between all four accessions was 43.46 percent, slightly higher than the overall success rate for the library. The average failure rate was 32.42 percent, again slightly higher than the overall failure rate.

Analyzing the Content of Disk Images

One of the first things I noticed when looking at the directories of the fully intact disk images was the abundance of files on each disk. This is not to say that there were a large amount of programs per disk, rather there were on average four to five bootable programs each of which were followed by a series of component files that were necessary to run the program. Even disks that were dedicated to a single program could have upwards of one hundred files. User-generated content created by a specific program was rarely stored on the same disk as that program, and some disks were dedicated to nothing but subcomponents of other

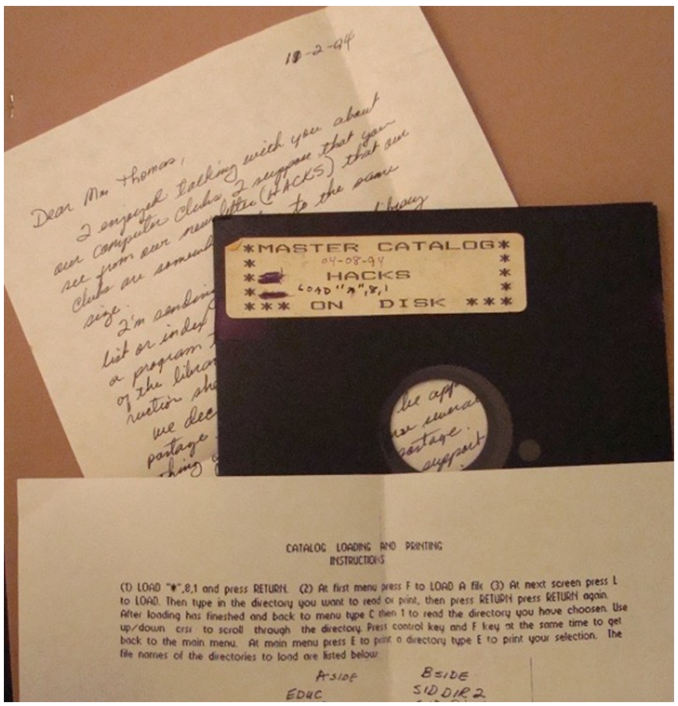
applications such as font and clip-art files, spreadsheets and data templates.

With only sixty-seven complete disk images, each carrying at the most 167 kB of data, I was still confronted by the difficulty involved in interpreting their content. Using the *Power64* emulator was useful only for listing the contents of a disk's directory and for accessing bootable games and utilities. Very few, if any, of the disks provided directions for using their programs or accessing their files. Traces of useful metadata describing the function and use of a particular file at the *conceptual level*,[32] i.e., instructions and contextual information within programs or menus, were also rare.

There were three primary sources I turned to in order to make headway with interpreting a file. The first source was the disk label, which may seem obvious, but could be overlooked once the digital contents of a disk were separated from the physical artifact of the floppy disk. The label on the floppy disk was always a good place to start making inferences about the contents of a disk. Sometimes the label also contained directions for how to boot the primary program on a disk, which is not always the first PRG file in a directory. Among other examples of disk label metadata, Figure 8 shows an instance in which the disk sleeve of a particular floppy contained a handwritten letter from one Commodore enthusiast club to another that when read carefully explained the context of the disk's creation, its contents, and the exact instructions for interacting with the files on the disk.

The next logical resource for interpreting the D64 images was the Internet. Often knowing the name of an application was enough to find a scan of the original user's manual on a forum or at least an overview of the program

Fig. 8. Label, sleeve, and attached metadata



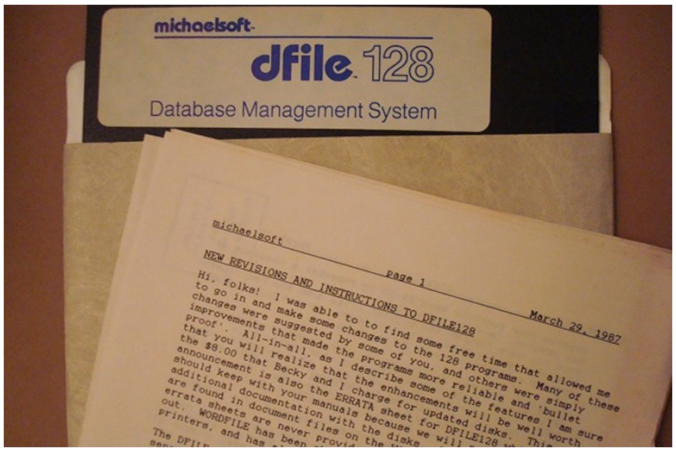
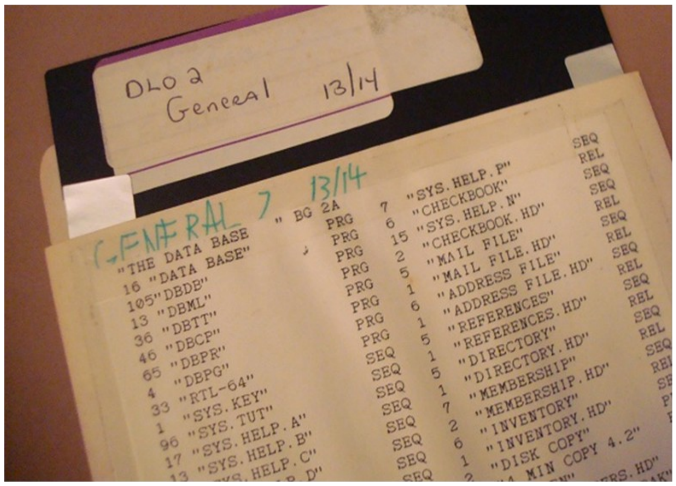


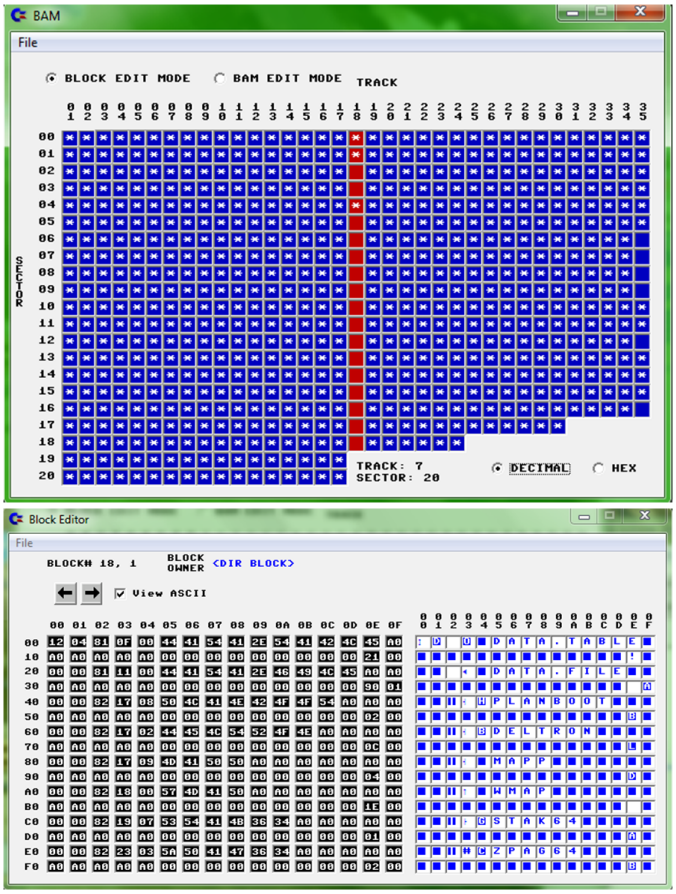
Fig. 8 (continued)



that could help me understand if I was looking at a database management system, a word processing application, or a disk utility. In instances where I would recover files created by a particular program, but not a working copy of the actual program, enthusiast communities provided an invaluable resource since so many C64 applications have been converted into D64 files and cataloged online. These disk images can be easily downloaded and used to access user-created content.

Finally, in instances when there were no external cues or resources for understanding the contents of a disk, I had to turn to the D64 images themselves and access them "beneath" the user-interface level. To accomplish this I utilized software called *D64 Editor* that is similar in some ways to forensic applications like *FTK Imager* and generic hex editors, but designed specifically to access D64 images and alter them at the bit level. Using *D64 Editor* it is possible to access the disk directory and BAM to see how files are

Fig. 9. Block allocation map as shown by D64 editor



partitioned across the disk, and to analyze the hexadecimal content of files in interpretable ASCII and PETSCII characters. Figure 9 shows the BAM and a block of data from the directory rendered by *D64 Editor* in decimal and hexadecimal form respectively.

Constraints to Accessing User Created Content

In the previous section I discussed some of the strategies that I implemented to deal with constraints to accessing disk content. In this section I illustrate several specific instances of constraints for accessing user-created content and question their broader implications to digital curation practices.

Supporting Software Constraint

Accession D included several disks of user-created word processing documents that I was able to infer were created with the PaperClip program.[33] I could view portions of the content of the files with a hex editor, but the ASCII conversion of the text did not capture all of the PETSCII characters, let alone the proper formatting of the document which the user originally implemented in PaperClip using program codes. In order to reduce the noise of the hex view and access a version of the file with sufficient fidelity to its original content I needed to find an electronic version of PaperClip online.[34] If I were unable to find this program I would be forced to accept the ASCII representation of the file and lose much of the content and text formatting information in the process. This dilemma led me to question the point at which a digital curator must decide if a file is either too important to allow for a compromised representation of its content or is not worth preserving if it cannot be properly accessed.

Supporting Metadata Constraint

Fully accessing and manipulating the word processing documents created by PaperClip required that I download the user's manual.[35] In these particular instances

Fig. 10. Contrasting levels of representation of user-generated content

reading the manual allowed me to "print" the user-generated documents which the *Power64* emulator could then export as text files, resulting in a simplified method for migrating the documents. What if this manual was not readily available online? What characteristics of a file or a collection would justify experimenting with a program or vigorously researching its use until positive results were obtained? The difference between a portion of a word processing document as represented with a hex viewer and as represented in its original context is illustrated in Figure 10.

Discussion

This project represents a first attempt at addressing an area of digital preservation and data recovery that is not extensively addressed in the archives and digital curation literature. Generally, digital preservation models and policies tend to discuss the characterization of file formats and data objects in terms of relatively common file types, e.g., PDF, Word, and Computer Assisted Design files, common image formats like JPEG and TIFF, etc. These file types are predominantly the product of increased processing power and efforts towards interoperability across systems, but also rely in part on the medium of their capture and storage, namely high-capacity hard disk drives. Furthermore, digital preservation initiatives tend to focus on ingesting digital objects into repositories in the form of secured bitstreams rather than considering the means of recovering digital objects from storage media. Very little is written on files and formats predating the staples of modern computing, and in the case of Commodore's BASIC file types there are no examples of recovery and preservation recommendations that

I have come across in the schemas developed by large-scale preservation initiatives.[36]

Perhaps this is partly because the remaining C64 storage media, i.e. 5¼" floppies, have exceeded their expiration date while data created by systems more recently, and which require abundantly more memory and storage space, necessarily take precedence over a relatively small body of personal digital information. Perhaps too the Commodore's reputation as a gaming system overshadows its role in introducing many individuals to personal computing in the 1980s and providing an early test bed for post-market consumer devices, system customization and other hardware and software add-ons. Several of the enthusiast archives online claim to have created disk images for 99% of the proprietary software offered for the C64 as well as a sizable chunk of the specialized software created by the devoted cottage industry of freelance programmers. If the legacy of the C64 is interpreted primarily to be a pioneering entertainment platform, perhaps due diligence has been performed already and integrating special characterization of the C64's file types into preservation models would be an effort of diminishing returns.

However, the fact that user-generated content and personal digital information created with the C64 is minimized alongside the commercial offerings of the system, and that in large part it is the software and programs that have survived rather than the products of their use, underscores a broader concern regarding most of the micro and personal computing platforms from the late 1970s to the early 1990s. My goal in looking at the contents of an assortment of 5¼" floppies was to show that the data that will ultimately be most interesting to archives and to

preserving cultural heritage will also be the least available and the most difficult to recover and access. One of the reasons I was able to investigate this problem is that the C64 has an incredibly rich base of support in the form of online enthusiast networks. Numerous groups actively preserve not only the C64's programs, but also their supporting materials such as manuals, utilities and even original hardware. I was able to identify problematic and at-risk personal files – to access and in some cases migrate them with relative ease – only because I could find the necessary software and metadata to do so online. I can see much greater challenges for preserving the output of less popular systems of the age and other abandonware media. How far back and how extensively will archives be willing to search for meaning encased in obscure digital contexts? Is it a fair compromise to allow some systems, and their dependent body of user-generated data, to go extinct or to be relegated to the role of unused artifacts in a hardware museum while others enjoy an extended afterglow of use and reuse online and in the archives via emulation and migration? Will the contents of these kinds of media warrant the effort it takes to recover them?

In many ways these are questions that transcend media types altogether and are thoroughly grounded in discourse in archival science, differing only slightly in that more emphasis is placed on access in archival contexts than on recovery. Archivists have long asked what, according to the quality and character of each collection, are the reasonable ends towards making documents and materials accessible. To answer this question archivists rely in part on their instincts about the inherent value of a collection and defer to a complex paradigm that balances the environment

of their institution, the requirements of their patrons, and the contents of the archives. In the world of digital forensics and data recovery, however, the question revolves primarily around how far one is willing to go in terms of techne. The potential for automatically retrieving certain kinds of content or characterization information from a mass of digital bits is almost always feasible if the proper technical groundwork is in place. In this regard, the diversity of possible file types within digital accessions may warrant an alternative to the archival principle that states that less process results in more product.[37] Securing access to the most essential products in digital accessions will require new and more extensive processing methods that are grounded in characterizing personal digital information in relationship to the affordances of particular media and systems and in developing tools and strategies for rendering this information in a contemporary context.

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33. See review of PaperClip software: Michael Ciraolo and Nat Friedland, "Paperclip," *Antic* 4:1 (1985): 24, accessed May 30, 2012, http://www.atarimagazines.com/v4n1/paperclip.html.
34. See details of download: "Document details | PaperClip Word Processor," accessed May 30, 2012, http://dreamsteep.com/component/docman/doc_details/171-paperclip-word-processor.html?tmpl=component&Itemid=30.
35. I referred to this forum to find the manual: hurminator, (November 22, 2010, 12:47 a.m.), comment on moesboy, "Paperclip 64," May 30, 2012, http://www.lemon64.com/forum/viewtopic.php?t=35936.
36. File registries also have little to bear on Commodore files (PRG, REL, USR, etc.) created with BASIC. PRONOM includes no file types related to the Commodore system nor does the Library of Congress registry located at http://www.digitalpreservation.gov/formats/intro/intro.shtml. Preservation modules such as JHOVE also overlook early micro-computing legacy formats.
37. Mark A. Greene and Dennis E. Meissner, "More Product, Less Process: Revamping Traditional Archival Processing." *American Archivist* 68:2 (2005).

REVIEWS

Lyz Bly and Kelly Wooten, eds. *Make Your Own History: Documenting Feminist and Queer Activism in the 21st Century.* Los Angeles: Litwin Books, 2012. 180p. Index, notes. $30.

In *Make Your Own History: Documenting Feminist and Queer Activism in the 21st Century*, editors Lyz Bly and Kelly Wooten have brought together a diverse range of voices from archivists, activists, and scholars to explore the challenges and opportunities that arise when archives intersect with feminist and queer activism. The twelve essays in the book are organized around four topics: "Zines and Riot Grrrl," "LGBT Archives," "Electronic Records," and "Second Wave," but all of the contributions are grounded in the idea that archivists's work is potentially, if not inherently, political. As Alison Piepmeier states in her preface, "it's a political decision to collect things that women, girls, and other underprivileged groups have produced" (ix). Bly's introduction expands on this to argue that archivists's and librarians's contributions can actually help create change: "collaboratively, scholars, archivists, and librarians effect change by collecting, preserving, writing, and sharing stories that complicate historical metanarratives" (2). The essays that follow in this volume seek to investigate the relationships between archivists, scholars, and activists, and how those groups can collaborate to shape history.

Wooten writes in her introduction, "we've got zines covered," with regard to archivists and librarians being aware of the importance of zines and collecting them accordingly,

but as the five essays of the first section, "Zines and Riot Grrrl: Cut and Paste Your Own History," demonstrate, there are still conversations to be had about the position and meaning of zines in archives and libraries (5). Those who are familiar with these highly personal, self-published periodicals will likely also be familiar with some of the points made by essays in this section, but for the uninitiated these essays serve as a good introduction to riot grrrl (the underground feminist punk rock movement that began in the 1990s) and feminist zines. Kate Eichhorn seeks to reconsider some of the assumptions people make about riot grrrl and zines in her essay "Archiving the Movement." Eichhorn critiques the scholarly and archival models that contextualize riot rrrrl in the personal experiences of "every day" girls, arguing that these approaches obscure the fact that founders and leading figures in the riot grrrl movement were taking part in larger cultural conversations and engaged with academia, theory, and the avant-garde. The section is balanced by Wooten's concluding contribution, which shows that critical discourse and personal attachment do not need to be mutually exclusive within the archives. Wooten demonstrates how archives can become sites for "critical conversations" and scholarly research as well as for "personal connections, activism, and even entertainment" through thoughtful and creative outreach and instruction by archivists and librarians (40, 44).

The section on LGBT archives and activism continues exploring the ways in which theory and the personal come together in the archives. In their respective essays, Alexis Pauline Gumbs and Alana Kumbier both explore the possibilities and limits of archives, specifically in relation to queer feminist African American history, and the

ways in which LGBT activists engage with their community's history , both inside and outside of the archives. Angela DiVeglia's contribution on LGBT community archives pairs nicely with Gumbs's and Kumbier's essays. DiVeglia argues that if archivists want to succeed in documenting and serving LGBT communities, they should look to LGBT community archives as a model to learn from. Based on her research and interviews with LGBT donors and potential donors, DiVeglia identifies five qualities LGBT community archives offer their donors and researchers that archivists at formal archives can integrate into their work: visibility, self-determination, accessibility, privacy, and accountability. While DiVeglia's focus is LGBT activists, archivists working with other activists can also benefit from her recommendation to follow the lead of the community archivists in terms of what to document.

While there are only two essays devoted to electronic records, this is one of the most valuable parts of the book. As Erin O'Meara points out in her essay, few archivists have written about their experiences and strategies in collecting the born-digital material of activists. O'Meara's "Perfecting the New Wave of Collecting" and "No Documents, No History: Traditional Genres, New Formats" by Amy Benson and Kathryn Allamong Jacob are welcome contributions that address the challenges the authors have faced in collecting the electronic records of both individual activists and activist organizations. O'Meara shares how she has successfully adapted the strategy of Pre-Custodial Intervention to be useful even in working with activist groups that tend to have transitory membership, maintain records and communications in a variety of formats, electronic and otherwise, and are concerned about the

privacy and security of their records. While O'Meara focuses on building relationships with creators and donors, "No Documents, No History" looks closely at the formats of blogs and emails, and does a good job of articulating why these born digital materials are important to save, as well as explaining the techniques the Schlesinger Library has used to preserve these newer formats activists are using to document their lives. Both pieces offer concrete strategies that can be adopted by archivists at institutions large and small.

A theme that comes up throughout *Make Your Own History* is the importance of preserving activist history so that activists can learn from their predecessors rather than starting the struggle from the beginning. Similarly, archivists can learn from the strategies of those who have preceded them in documenting activist and marginalized communities, so it is fitting that the book concludes with a section on second wave feminism. In particular, Elizabeth A. Myers's piece on the necessity and logistics of cooperation between archival institutions in documenting the second wave has useful lessons and examples for archivists documenting contemporary activist movements.

While *Make Your Own History* should be of interest to archivists, activists, and scholars alike, it is a particularly valuable resource for archivists who are documenting or wish to document the work of contemporary feminist and queer activists or other activist and historically marginalized communities. As *Make Your Own History* shows, it takes intention and understanding on the part of archivists not only to document but also serve these communities. Fortunately, *Make Your Own History* is helpful guide for the practical advice from archivists and librarians, and also for the perspectives of scholars and activists which help illustrate

the importance and value of archivists undertaking this work.

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Pam Hackbart-Dean and Elizabeth Slomba. *How to Manage Processing in an Archive or Special Collections*. Chicago: Society of American Archivists, 2012. 147p. Appendices, bibliography, illustrations, index, and notes. $69.95 (non-member); $49.95 (member).

Often, the complexity and nuance of archival processing is flattened. There can be a perception that processing is simply organizing items into categories, housing them in acid-free containers, weeding out the printed and duplicate material, and typing folder titles into a finding aid. Pam Hackbart-Dean and Elizabeth Slomba in their book, *How to Manage Processing in an Archive or Special Collection*, argue that there is more to it and the more can be considered magical. They define processing as "the alchemical means of facilitating access to materials that do not come with predetermined access points, a list of contents, an index, or any sort of description" (4) Current thinking on processing is that archivists work efficiently to reduce backlogs of inaccessible materials; outputs adhere to national standards; electronic records are incorporated into our workflows; and we spend time assessing our effectiveness at doing all of this. *How to Manage Processing* addresses all of these issues to some degree and seeks to round out the complexities involved in this work.

Many steps, intense planning, and lots of decision-making are involved in getting materials from the accession shelf to the researcher's hands. Hackbart-Dean and Slomba begin their how-to manual by defining a processing program, calling for processing archivists to develop a mission statement, and discussing the formulation of processing priorities. Then they get into the ins and outs of the hands-on work of processing, introducing each aspect. They outline a basic workflow for processing a collection and touch on processing manuals, team processing, processing plans, re-processing, dealing with additions, legacy collections, and collections that are intentionally assembled. The authors also address audiovisual materials, electronic records, and objects in archival collections. They present an overview of preservation activities as they relate to processing, including preservation assessment tools. The creation of access tools, standards, collection management systems, digitization, Web 2.0, supplementary indices and subject guides are also addressed. There is a chapter on managing staff, from initial training to keeping them up to speed. The final chapter covers evaluation and assessment, fitting this work squarely into the current culture. There is a thorough bibliographic essay following each of the chapters.

In the preface, the authors tell us that "although the anticipated audience for this manual is beginning archivists, shops with small non-professional processing staff, and the lone arranger, it addresses common elements in all processing programs"(iv). The book does present a broad overview and introduction to the breadth of topics surrounding processing. A more experienced processor, however, might not find anything revelatory here. Nevertheless, the wide scope of topics presented as well and

the sources cited and bibliographic essay makes the manual worth checking out for those beyond the intended audience.

Sound advice is embedded throughout the text. For example, there is a list of resources needed for setting up a processing program, well-described criteria for determining a collection's processing priority, good questions to consider when selecting a collection management system, and a nice training checklist for new staff members. The authors also emphasize the importance of institutional context in considering processing decisions in several places throughout the text and they recognize the primacy of using archival principles when dealing with audio/visual items, digital, and digitized items. The authors' characterization of the work of processing archivists throughout the text is on target. In the conclusion they write that "academic knowledge and practical experience work together and are inseparable in the life of a processing archivist" and that processing archivists "need good judgment and critical thinking skills (and the freedom to apply them) in their tool sets to balance the various competing critical factors in managing the processing process" (108-109).

Unfortunately, some of the advice is incomplete, or missing. For dealing with electronic media, the authors outline a specific workflow to follow. They provide enough description here to demystify electronic records processing and give details about virus checking, opening files, file registries, and file conversions. However, it seems that some significant considerations are not addressed. The authors do not mention check-sums, write blocking, disk images, and backed-up storage. They touch upon the unique nature of metadata issues surrounding electronic records, but do not give the reader any idea of what this metadata looks like.

Again, examples might help as we all work to get our minds around these complicated issues.

There are other surprising omissions to the manual. There is no discussion of *Describing Archives: A Content Standard*; the leading standard for archival description is relegated to a couple of passing references. In the section on digitization, there is no mention of mass or large-scale digitization projects. This seems strange since these projects put the finding aid and processing front and center. The most disconcerting omission, though, is the lack of examples throughout. It seems odd that examples are the exception rather than the rule here. Kathleen Roe's *Arranging and Describing Archives and Manuscripts* in the SAA Fundamentals II series covers similar ground as *How to Manage Processing*, especially in her chapter on The Practice of Arrangement and Description. Roe's approach is different from Hackbart-Dean and Slomba's in that her book is chockablock with examples.

How to Manage Processing also misses the opportunity to dispel the misreading and misunderstanding of Dennis Meissner and Mark Green's MPLP (More Product Less Process) processing. Streamlined processing is considered here as an alternative to traditional processing. The authors provide a chart that shows what can be streamlined out of processing when you are doing this style of work. This either you are doing it or you are not take on MPLP seems to blunt the message of thinking flexibly and creatively about what each collection needs to make it usable and suggests replacing one set of prescribed behaviors for another. To be fair, the authors acknowledge several times that all collections need not be processed to the same level and that series within collections can be treated differently,

but there is not further elaboration of what this means in practice.

Although *How to Manage Processing* is at times uneven, its real strength is its emphasis on having a processing program. The authors suggest that "to make the most of your processing efforts and to plan for desired results, you should look at your processing work as a processing program, which reflects the complex nature of the planning, workflows, access decisions, and everything else that goes into processing "(5). They call for the development of mission statements as part of the processing program and advocate for the creation of processing priority policies. In neither case, however, are examples provided of these programmatic documents. The concepts here are significant and essential, but I suspect somewhat less familiar to readers. Some concrete examples would clarify this type of thinking about managing processing.

Part and parcel with having a processing program is determining if it is successful. The final chapter of the book on evaluation and assessment is more robust than the opening chapters on processing programs and priorities. There is technical information here that is not grounded by examples, but some concepts, namely statistics and rubrics, are presented with a connection to processing activities and with implementation examples. These sections are very successful and make tracking these measurements feel possible and desirable.

How to Manage Processing in Archives and Special Collections does not shy away from presenting the multitude of aspects involved in transforming materials acquired by archives into valuable information resources. The authors take the how-to suggestions beyond the typical hands-on

processing procedures and advocate for well-planned processing programs that assess their success. It is unclear whether their intended audience of new archivists, those in small shops, and lone arrangers will find enough detail here to implement the authors's directions. Perhaps this text is best considered as an overview and can be applauded for its efforts to divine the alchemy of archival processing.

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