THE COMPLETE GUIDE TO PERSONAL DIGITAL ARCHIVING

EDITED BY
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ala editions
AN IMPRINT OF THE AMERICAN LIBRARY ASSOCIATION
CHICAGO 2018

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ISBNs
978-0-8389-1605-6 (paper)
978-0-8389-1683-4 (PDF)
978-0-8389-1682-7 (ePub)
978-0-8389-1684-1 (Kindle)

Library of Congress Cataloging-in-Publication Data

Names: Marshall, Brianna H., editor.
Title: The complete guide to personal digital archiving / edited by Brianna H. Marshall.
Description: First edition. | Chicago : ALA Editions, an imprint of the American Library Association, 2018. | Includes bibliographical references and index.
Identifiers: LCCN 2017031643 | ISBN 9780838916056 (softcover : alk. paper) | ISBN 9780838916827 (ePub) | ISBN 9780838916834 (PDF) | ISBN 9780838916841 (kindle)
Subjects: LCSH: Personal archives—Management. | Electronic records—Management. | Archival materials—Digitization. | Archival materials—Digitization—Study and teaching. | Digital preservation. | Digital preservation—Study and teaching. | Data curation in libraries. | Data curation in libraries—United States—Case studies.
Classification: LCC CD977 .C655 2018 | DDC 025.1/97—dc23 LC record available at https://lccn.loc.gov/2017031643

Text design in the Chaparral Pro, Gotham, and Bell Gothic typefaces.

♾ This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

Printed in the United States of America

22 21 20 19 18 5 4 3 2 1

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BRIANNA H. MARSHALL,
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Preface

I FIRST BECAME INTERESTED IN DIGITAL ARCHIVING for purely personal reasons. From childhood on, I displayed the tendencies of an obsessive, legacy-oriented collector and organizer of cherished mementos. It started with my decision to catalog movie ticket stubs in elementary school. Years later when I got a cell phone, I meticulously hand-transcribed texts in a notebook, lamenting the lack of tools to automate this process. Witnessing the loss of years of family photos due to hard-drive failure was a wake-up call for me that things could and often did go wrong in the digital world. I couldn't avoid technology, so I might as well embrace it. As a teenager, I figured out how to transfer files from dusty floppy disks to recover long-forgotten poems and stories. In college, I tracked down photos dug out of relatives' attics, digitized them, and tested workflows for storing and sharing these new digital images. It probably wasn't a surprise to anyone when I turned my organizational inclinations into a career and became a librarian.

In my first professional job, I was privy to all the trappings of a domain filled with information professionals: fancy scanners, metadata standards, and a frequent assumption of technical literacy. I found myself reciting best practices for data management to researchers and academics—often just digital file management basics like file organization, naming conventions, and storage and backup tips, and I was continually floored by the immediate positive impact these practices could have. However, I also found myself increasingly concerned about my own (and to a broader extent my profession's) ability to translate our rapidly developing standards into useful practices for the everyday user.

At home, I struggled through planning and executing my own digital archiving projects. I was all too aware of my own missteps, and was frequently guilt-ridden when I deflected from the supposed standards to speed things along. I felt mildly fraudulent, as if my credibility as an information professional would be revoked if anyone found out about the admittedly small ways I was cutting corners. I found similar frustrations and self-doubt reflected in my conversations with others, from family members to kindred spirits in the scrapbooking community. Almost everyone was overwhelmed, leaving abandoned projects in the wake of their procrastination.

It soon became apparent that managing digital information was the glue that bound my personal and professional life together. Suddenly, everywhere I looked people needed help wrangling their digital stuff! That realization was the impetus for this book. My hope is that it will help information professionals become not just informed but also *excited* to pass along critical skills so that users will have less painful and more fruitful journeys in personal digital archiving (PDA). I am convinced that sharing even simple principles for how to store, share, and preserve digital objects will benefit our users in both their personal and professional lives.

Personal digital archiving is relevant to information professionals, organizations, and institutions of all types. Empowering individuals often means enabling communities to document their experiences in new ways, potentially with the long-term outcome of this material making its way into an archive. As I reviewed the chapters in this book, I found myself inspired by the work that is underway. Information professionals in diverse roles are increasingly taking the mantle of personal digital archiving advocacy, developing new models for outreach, programming, and services.

There is still a lingering sense of the grassroots nature of PDA in libraries and archives, though year by year I am excited to see it being written about to a greater extent. This book joins excellent recent writing on PDA, including Donald Hawkins's *Personal Archiving: Preserving Our Digital Heritage,* Cal Lee's *I, Digital: Personal Collections in the Digital Era,* and Melody Condron's *Managing the Digital You.* My favorite is perhaps the Library of Congress's *Perspectives on Personal Digital Archiving,* an open-access electronic publication that includes a rich array of stories and narratives about PDA. I highly recommend these books and hope that this volume will be a useful addition to the existing literature.

From the outset, my intention has been for this book to be used as a primer for information professionals who aren't quite sure how to approach personal digital archiving yet. I wanted the book's chapters to feel informed yet personal, like anecdote-filled conversations with brilliant colleagues. The chapters are intentionally practitioner-focused so that after finishing this book, readers will feel ready to start conversations and make amazing things happen within their communities. Enjoy!

CHELSEA GUNN

Introduction

Putting Personal Digital Archives in Context

THE TERM PERSONAL DIGITAL ARCHIVING (PDA) refers to the collection, management, and preservation of personal and family materials created in digital media. These materials can include digital photographs and videos, documents, e-mail, websites, and social media content. For information professionals, PDA encourages collaboration with their publics, with the goals of supporting digital information fluency and assisting individuals in their efforts to preserve their personal and family digital records. In many ways, PDA has grown out of and in response to previous movements and theoretical paradigms in archival and information science history. This chapter sets out to introduce some of these areas—namely early archival theory, personal information management, digital curation, and the digital record life cycle—in order to situate current PDA practices and scholarship within a larger historical and theoretical framework. A contextual understanding of PDA is especially helpful for us as we begin to imagine how this growing area of focus may impact the larger field of information science, and those of us working within it, as we move forward.

Information professionals have a stake in the PDA discussion not only because any number of the digital records currently being created by private individuals could one day be acquired by our repositories, but because we ourselves create vast and diverse personal digital archives of our own. As a result of this dual perspective, it has been observed that our own personal practices often deviate from our professional standards.[1] With our feet firmly planted in both worlds, we are uniquely positioned to see that the best practices we adhere to in professional settings simply do not always comply with

the myriad ways we create, use, and save records in our day-to-day lives. The current PDA landscape creates a space for considering issues of personal information management in conjunction with professional archival and records management practices in new and interesting ways.[2] Exploring collaboration and conversation across these disciplinary areas of focus is increasingly necessary as information professionals from different areas find themselves at the same table—and often, occupying multiple seats at that table.

It is, of course, impossible to provide a comprehensive overview of each of the various approaches to and influences on PDA in a single chapter. Rather, what follows is intended to serve as a brief introduction to the professional literature in several areas that are particularly relevant to the current personal digital archiving landscape in order to place current PDA efforts in context, and to point to opportunities for further learning. This introduction begins with the treatment of personal papers in early archival theory and practice, and moves into practices associated with personal information management and digital curation, followed by discussions around the record life cycle and points of archival intervention. It ends with some observations about how PDA, which has grown out of the aforementioned areas of focus, may be signaling changes in the information professions, with particular emphasis on archival outreach, interdisciplinary collaboration, and conceptions of objectivity in the archives.

PERSONAL PAPERS IN ARCHIVAL THEORY

The personal papers of individuals and families from periods throughout history can be found in many archival repositories today. But personal papers have occupied a somewhat tentative position in archival theory and practice throughout the history of the profession. Before elaborating further, it is helpful here to define what is meant by personal archives or papers, and what has distinguished them from other archival records. Public archives refer to collections comprised of records from government and other public institutions, ranging from the federal to the local. These are defined as being systematically created and collected in the course of regular operations, often using mandated, consistent conventions.[3] Personal archives, which have often been defined as a subset of the broader category of private archives, have historically been defined by what they are not; which is to say, by their failure to meet the criteria of public archives as set forth by early archival theorists.[4] An accepted professional definition identifies personal papers simply as:

> (also personal records, private papers), n. ~ 1. Documents created, acquired, or received by an individual in the course of his or her affairs and preserved in their original order (if such an order exists).—2. Nonofficial documents kept by an individual at a place of work.[5]

Traditionally, the private archives of an individual or family have been made up of such record types as diaries, correspondence, commonplace books, manuscript drafts, scrapbooks, photographs, and all variety of ephemera. Today, individuals continue to create these familiar records, but it has increasingly become the case that personal archives are hybrid, consisting of both analog and digital materials. These personal archives might then also include e-mails, social media profiles, multimedia files stored on hard drives or cloud storage accounts, personal websites, and so forth. The introduction of these materials to the archives has required that archivists rethink traditional approaches to the appraisal, preservation, and access of personal papers.

The influential archival scholars Hilary Jenkinson and T. R. Schellenberg considered personal records to fall outside of the purview of proper archives ("proper archives" being those generated in the course of government or corporate activity) for a variety of reasons, tellingly referring to them instead as personal manuscripts, a term that persists to this day.[6] Both Jenkinson and Schellenberg considered these collections to be better suited to the custody of libraries, museums, or historical societies, and indeed, personal archives are still to be found in all of these institutions. But, as Rob Fisher has written, by distinguishing private from public records, and explaining the exclusion of the former from archival theory, both Jenkinson and Schellenberg did have their fair share to say, if implicitly, on the subject of personal papers.[7] This distinction between the public and private archive has continued to impact modern archival theory and practice, as archivists have had to formulate new approaches to personal records. While personal papers have long been collected by a variety of cultural heritage organizations, the exclusion of these materials from early literature has resulted in a disconnect between archival theory and the actual professional practices of archivists working with personal collections.[8]

For Jenkinson, the primary reasons for excluding these types of personal records from archival theory and practice were their potentially faulty provenance and the subjectivity of the records themselves.[9] Personal collections could pass through the hands of many creators before making it to the archives, and the collections could consist of records whose creator was unverifiable; these factors, in addition to the unreliable nature of personal narrative, threatened the objectivity of the historical record produced by the personal collection. For Schellenberg, a primary reason for excluding private records from archival repositories was that of evidence, which personal papers, in his estimation, could not adequately provide.[10] Professional conceptions of subjectivity and objectivity—of archivists as well as of archives—have changed significantly in the history of the archival profession. Modern approaches to archives increasingly reject the notion that objectivity or neutrality in the archives is either possible or desirable, but for Jenkinson and Schellenberg, archival records were intended to reflect, objectively, the activities of public

administrations. Sue McKemmish revisits the idea of evidence in her work on the value of personal records in "Evidence of Me," connecting personal records with the establishment of collective memory, placing greater historical value on the very subjectivity of the personal record. The subjective accounts of many individuals provide a more nuanced (and perhaps more truthful) perspective than does a single dominant narrative of history.

In part, it can be challenging for contemporary information professionals to theorize personal archives because they are so unique to their creators. Where public archiving practices can be standardized according to the terms of government or corporate records management, personal archiving practices may be orderly and consistent, entirely chaotic, or anywhere in between, depending on the practices of the individual.[11] Yet in spite of the diversity of records and their organizational structures, personal archives are not simply a haphazard assemblage of disparate materials; they reflect the life and context of the creator.

Today, many—if not most—archives have adopted what is referred to as the "total archives" approach—one that assumes custody of both public and private archives within the same institution. And for some archivists and researchers, it may be these private or personal collections that drew them to the archives in the first place. These collections have, as Catherine Hobbs has written, an "intimacy . . . not present in the collective, corporate, formalized record-keeping system."[12] And while in the past, the paucity of literature that is focused on personal archives has been lamented, scholarship on this area has flourished in recent times.[13] In addition to the richness and intimacy of personal archives, the rise of born-digital records can be credited with contributing to the increased interest in personal archives.

PERSONAL INFORMATION MANAGEMENT

The increasing rate at which records are created in hybrid and digital forms has required information professionals to reconsider traditional approaches to archival processes and procedures. Often, personal collections, while still in the custody of their creators, have been subject to a form of benign neglect that is often explained by way of the "shoebox metaphor."[14] As the name suggests, the shoebox metaphor is a model in which individuals might store personal papers or records that they consider valuable in a shoebox, perhaps under a bed or in a closet. Untouched, these items remain stable and are generally in good physical condition when the box is eventually accessed, even if years have passed (provided, of course, the box was not stored in damaging environmental conditions like high heat or humidity). However, two important aspects of the shoebox metaphor are complicated by the presence of materials created and stored in digital forms: first, in the shoebox model most, if not

all, items are collocated in a single physical space; and second, fragile physical items benefit when left alone, not subjected to the wear and tear of regular use. But a personal digital archive is likely to be distributed across many locations: perhaps on e-mail account servers, hard drives, old computers, and multiple social media platforms, to name only a few of the myriad possibilities. And as scholarship in digital preservation has demonstrated, if digital objects are left alone for too long, with neither updating nor migrating, they are liable to be significantly degraded, if not lost completely.[15] In thinking through the complications posed by the introduction of digital records to the shoebox metaphor, we begin to see how personal information management (PIM) and digital preservation methods stand to benefit PDA.

Some scholars have suggested that "archival literature about personal archiving mainly revolves around the management and care of personal papers [that have been acquired by collecting institutions] and thus lacks the individual focus" of PIM behaviors associated with archiving.[16] PIM is defined as "the practice and study of the activities people perform to acquire, organize, maintain, retrieve, use and control the distribution of information items such as documents (paper-based and digital), web pages and e-mail messages for everyday use to complete tasks (work-related or not)," and it is primarily concerned with the relationship between the creator and the record, rather than the relationship between the record and the archives.[17] PIM scholarship examines the information seeking, information storing, and usage of individuals working with active records. Considering PIM alongside archival practice, then, enables us to take a more holistic view of the record in all stages of its life cycle, considering creation and active use as well as preservation.[18]

Intersectional work across the areas of archives and PIM creates a space to address more comprehensively the challenges of managing and preserving personal digital archives in a variety of contexts. While private or personal papers are now considered to be significant to collecting archives, it is also important to bear in mind that for many individual creators of records, the imagined or intended publics of their personal collections are not necessarily the archives and researchers; rather, they may be relatives, friends, or community members. Regardless of the intentions for future use, the knowledge and skills of the information professional nonetheless remain important factors for the preservation of personal collections. The more a collection's imagined uses and users are understood, the easier it will be to tailor a situation-specific preservation strategy for it. Emphasizing education and outreach around PIM for individuals and communities preserving collections for their own purposes relieves those interested in PDA of the notion that accession into a professional archives is necessarily the end goal of preserving personal records.

As personal archives have been created more frequently in digital formats, and in greater quantities, information professionals have been given cause to reimagine traditional approaches to their work in order to meet the needs of

personal digital collections, including the incorporation of PIM scholarship and methods and the inclusion of citizen archivists.[19] In this reimagining, archivists are encouraged to learn about and work with record creators, assisting them in the creation of stable, well-organized, and accessible personal digital collections. In this area, the work of researchers like Catherine C. Marshall has been extremely revealing, particularly in regard to better understanding how private individuals store, update, and migrate their digital files, or, in many cases, how they don't.

RECORD LIFE CYCLES AND THE ARCHIVAL INTERVENTION

In some respects, just as archival theory began with public records and has been adapted to suit private records, practices related to digital archives and preservation have been developed for institutional or public records and subsequently adapted to meet the needs of the everyday digital assets of private individuals.[20] Richard J. Cox has written that growing concerns around digital preservation would likely direct increased attention to personal papers.[21] Indeed, this does appear to be the case. Cox uses the examples of digital photographs and camera phones to illustrate this point. As the practice of using digital or cell phone cameras has grown, so too has the availability of software designed to help individuals store, manage, and share their personal digital photographs. Likewise, information professionals and technologists have developed and maintained digital image preservation standards that continue to address emerging equipment and file formats.[22]

As discussed above, PDA workshops and tutorials create a space in which information professionals can communicate those standards and best practices to users based on their current PIM strategies and level of comfort with technology. This increased emphasis on public outreach and education has underlined a professional debate about the proper point in the record life cycle at which information professionals ought to intervene for preservation purposes. For those new to the concept, the records life cycle comes from records management and digital curation. It has been illustrated with a cradle-to-grave metaphor, encompassing creation, classification, use, storage, and disposal.[23] This concept serves as a critical reminder that digital records are almost constantly in flux; they are created, used, edited or revised, saved, and sometimes deleted. Using the record life cycle model, we can consider the specific features and requirements of our records at each stage more precisely. In this framework, records are not static or stagnant; rather, they occupy many forms and may have many different needs between the time when they are created and the time when they are either preserved or destroyed.

Archival records, for the most part, arrive at a repository at an inactive stage in their life cycle, and in some cases, at specific points designated prior to their creation. Those inactive records are then maintained and often made available to researchers according to predetermined schedules. Personal records may be acquired at a greater variety of stages in the records life cycle, and may have any number of privacy or legal restrictions based on the materials themselves and the instruction of their creators. And as previously noted, with digital records in particular, "if archivists waited for the individual creator to approach the archive, records would be lost, a collection would be incomplete."[24]

For this reason, many have advocated for intervention earlier in the life cycle of the personal record. This, early-intervention advocates suggest, will better ensure the long-term viability of the digital object. Some go further, suggesting that it is important to intervene prior even to the creation of digital records. If digital materials are created with preservation in mind, creators will choose the most sustainable file formats, documentation practices, and storage solutions. The idea of early intervention recalls Marshall's assertion that archiving must be intentional, not merely a side effect of record creation and use.[25]

Some researchers and practitioners of archives have warned against early intervention on the part of the archivist, however, because it has the potential to influence or altogether change records in unanticipated ways, thereby compromising the integrity of the evidence they provide.[26] This was of particular concern to Jenkinson, who put considerable stock in the objectivity of archival records.[27] Similar arguments have been made about the very existence of the archive itself, suggesting that if we know about the archive, we create and self-edit our records with posterity in mind. In fact, this is a concept that persists beyond any formal sense of the archive, much less the digital archive. Thomas Mallon has written of diaries, for example, that perhaps we always write in our diaries with some reader in mind, even if that reader is an unknown figure in the future.[28] While debates about the optimal points of intervention will likely continue, it is probably safe to suggest that those engaged in PDA see the value in providing the public with the skill set required to create personal digital records that will be accessible at least during their own lifetimes, if not beyond.

IMPLICATIONS FOR STUDENTS, EDUCATORS, AND PRACTITIONERS

The growth of the personal digital archiving movement poses a number of potential questions and opportunities for current and future information professionals. Building upon the theoretical frameworks, methods, and skills

described in this introduction will be not only useful but necessary for librarians and archivists moving forward within a new paradigm of digital and hybrid personal collections.

One significant implication of the growing emphasis on PDA outreach is that librarians and archivists will likely work more and more in direct collaboration with their publics. Librarians and archivists, as both creators of digital personal records and professionals trained in information behavior, digital preservation, and archival management, are uniquely poised to work with members of the public, and to assist them in making the best possible choices for saving their own personal digital collections. This gestures toward a continuing shift from historical models of the librarian or archivist as a "gatekeeper" of information toward a more user-focused approach to collections.[29] Providing public outreach and education is, of course, far from being a new responsibility for many information professionals; nonetheless, the nature of PDA workshops, labs, and instruction sessions thus far demonstrates a very open form of communication between archives in particular and their publics. In these settings, individuals may learn strategies and techniques from the professionals, but at the same time, the professionals have an invaluable opportunity to learn directly from individuals how they create, use, and save the digital objects that matter to them. If the preservation of digital objects begins at their point of creation, as has been suggested, a comprehensive PIM-archival approach is especially beneficial, since it considers all stages of the record life cycle.

PDA also requires information professionals to take a flexible, scalable, and collaborative approach to their work. Collaboration with researchers and practitioners from other disciplines and information professionals from other areas of focus is a critical component of an effective outreach strategy. Information professionals in these roles must meet people where they are and help them develop practical, tailored strategies that will work for them. In other words, the best PDA strategy is not necessarily the same preservation policy adhered to within professional archives, but rather the preservation policy that an individual can consistently implement and sustain. This may mean incorporating new skills and technologies that are geared toward the casual individual user rather than the professional archivist into information science curricula or continuing education workshops where they are not already taught—for example, creating a digital oral history, personal photo management, or community organizing. Preserving the digital records of many individuals with many disparate goals requires not only a solid grasp of current and past personal computing technologies, but a variety of soft skills, from public speaking to asking helpful questions to presenting information in a clear, concise manner.

Work in the area of PDA also has, perhaps most meaningfully, the potential to continue to challenge professional notions of the objectivity and neutrality

of both archivists and archival records. The notion, supported by Jenkinson and other early archival theorists, that archivists should assume a professional position free of subjectivity has been largely rejected by modern archival scholarship. Working directly with record creators and potentially influencing their processes is a departure from the more passive, neutral custody described in early professional manuals. As Sue McKemmish has written, through preserving the records of individuals, we collaboratively build the record of a community.[30] The more we know about our publics, the better we are able to meaningfully partner with and support them. As we work with and learn from our constituents, we stand to learn more about our personal and professional practices and biases. Through this work, we may begin to better identify and address existing gaps and silences in the archives.

CONCLUSION

While we can't predict what the future holds for the personal digital archiving labs, workshops, and tutorials that have begun to emerge at institutions throughout the country, our turning to previous moments and movements in the history of archives and records management, PIM, and digital curation gives us some insight into the evolution of professional practice and theory. Thinking about PDA as one area of focus within a dynamic, evolving field lends us a framework for considering how current practices may lay the groundwork for new developments in libraries and archives. Through this lens, we can see PDA workshops and labs as a current iteration of the archival profession's ever-evolving treatment of personal archives. We can also see how archivists continue to expand our practice to incorporate concepts and strategies from other subsets of information science. PDA provides us with opportunities to reconsider personal digital archives from the perspectives of individual record creators as well as those of professionals in many specialized areas of information science, and to make new meaning in the middle ground of these points of view.

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PART I

Learning about Personal Digital Archives Best Practices

SARAH SEVERSON

1
Archiving Digital Photographs

OVER THE COURSE OF THE TWENTIETH CENTURY, photography established itself as a ubiquitous technology in our daily lives. From the introduction of the Kodak Brownie camera in 1900 to the invention of the instant Polaroid cameras of the 1970s, and then the introduction of digital cameras in the 1990s, photography in all its forms has become one of the most popular ways to document our everyday personal histories. Now, thanks to the rising popularity of cell phone cameras, more and more people have a camera with them wherever they go, dramatically increasing the number of photographs we take. A study by InfoTrends projects that the number of photographs taken in a year will reach 1.3 trillion in 2017.[1]

With numbers like these, there is a real concern about how we're going to manage and save all of these images for the future. Vint Cerf, chief evangelist at Google, warns of a potential digital dark age,[2] a future where it will be difficult to read historical electronic media because they were left in obsolete or obscure file formats. The sheer amount of photographs now being produced makes older print-based archival practices, like hand-selecting or keeping everything, impractical. Digital collections are increasingly easy to lose,

compared to their analog counterparts. A single computer failure can wipe out an entire digital photograph collection, destroying years of a family's carefully curated memories. There is also the very real danger of accidents happening when migrating data from an old computer to a new one. Another practical concern is how easy it is to lose context for what is shown in photographs: now that we can no longer sit down and write on the back of a photo, it's harder to keep valuable contextual information associated with a photograph. Finally, even with precautions taken against all these hazards, there is still the risk of hardware obsolescence making a digital collection inaccessible in only ten or twenty years, let alone a hundred years.

THE ROLE OF THE INFORMATIONAL PROFESSIONAL

The Library of Congress reports that questions about archiving personal photograph collections are among the most frequent questions they receive.[3] This demonstrates that people are aware of the urgent need for archival work, and they want to be more involved in archiving their own digital collections. There are also amateur and professional photography communities that have a vested interest in managing and preserving their photograph collections. They have collectively created an extensive body of literature documenting their work to that end. These range from personal websites with extensive blog posts detailing personal systems to the American Society of Media Photographers' Digital Photography Best Practices and Workflow, an initiative funded by the Library of Congress.

As such, it's important that the library and archives community knows how to support personal digital archiving processes, and also that we share this knowledge with the general public. The nature of library and archival work equips us professionals with unique perspectives and insights into the preservation of electronic records. It is important that we share this knowledge to raise awareness of the importance of preservation and, hopefully, help more people to start their own personal digital archives before so much material accumulates that they are overwhelmed by the task.

Simple steps can be taken to help people adopt practices that will help them to better manage their own digital archives. The most important thing in archiving digital photographs is developing a workflow that addresses the capture, organizing, and storing of photographs. This chapter will look at best practices in personal photo archiving, as well as tools and processes which can be used and implemented to assist in archiving personal digital photograph collections. It is intended as a primer for librarians and archivists to assist their user communities in these tasks.

COMMON TERMS

JPEG (Joint Photographic Experts Group) was a file format developed in the 1980s to handle color digital images, and it is the most common format you'll encounter. *JPEG2000* (JP2, JPF, JPX) is a newer (introduced in 2000) version of JPEG which includes a lossless setting.

TIFF (Tag Image File Format) is the U.S. Library of Congress's digital preservation standard.

RAW file formats, such as CRW, CR2, .NEF and DNG, preserve the original raw sensor data captured by the camera.

Technical metadata refers to the information that is automatically recorded in the file by the camera or scanner, such as the height and width of the image, color space, and image compression. Technical metadata is recorded using the *Exchangeable Image File Format* (EXIF), which was launched to encourage interoperability between devices and is now recognized as a de facto standard for technical metadata. It is supported by the majority of leading camera manufacturers.

Descriptive metadata is information that describes the image and is used for discovery and identification. Most descriptive metadata has to be manually inputted using a photo management system. Ideally, descriptive metadata will provide a sense of context, such as who created the image, when and where it was taken, and why. It might even describe the content, like the people or subject matter represented in the image. Essentially, it's very similar to the explanatory notes we used to write on the back of photographs, and it can be useful for easily finding and retrieving specific images.

Embedded metadata refers to descriptive metadata that has been embedded using the International Press Telecommunications Council (IPTC) metadata schema and is persistently linked to an image.

Digital asset management (DAM) comprises robust image management systems that allow you to store, organize, search, view, and usually process digital photographs.

Cloud-based photo management and/or storage systems allow you to use photo management processes, such as organizing, searching, and editing photographs, through a web-based application. The files are hosted in the cloud, not stored locally. Examples include Dropbox, Google Drive, or Flickr.

HOW TO ARCHIVE DIGITAL PHOTOGRAPHS

Planning: What Are You Going to Keep?

The first step in helping someone to set up an archival process starts earlier than most people imagine—it is important to start by understanding what is going to be archived. Knowing what they are going to keep, and for what reasons, will help people to decide what the most appropriate method is for archiving their collection. With digital photographs, you will need to help people identify exactly what kinds of images are in their collections and what the patron wants to be able do with them in the future.

Questions you can ask patrons include:

- Are they pictures they took themselves?
- Are they photographs they were sent, or photographs they've digitized?
- Do they want to be able to search and find photographs from specific events?
- Are they planning on passing the photographic collection on to family or friends for safekeeping, or do they want to share them right away?
- Are they planning on leaving the collection to an institutional archive?

Starting from an understanding of each of these basic uses is important. The process of patrons thinking through what they want to do with their archive will help to create an archival process that is best suited to their needs and capabilities.

The final step in planning is to make sure patrons have the best-quality photographs possible. It is difficult to predict what uses will be made of the photographs over a fifty-year time frame, and getting the highest-quality images at the start of the process, when the picture is first taken, can only help future access and long-term preservation. This means taking photographs at the highest resolution possible and choosing the best file format.

What Is the Best File Format?

For preservation purposes, you will want to recommend the use of file formats that have the best chance of being readable in the future. To ensure this, the structure and nature of the format should be openly documented and supported by multiple applications. The three most commonly used file formats are JPEG, TIFF, and RAW, each of which has its own advantages and disadvantages.

For most personal archives, a JPEG file will be the best preservation file format. It's the most common format that is captured by cameras[4] and is

openly documented. It's a relatively lightweight file size, meaning that less storage space is required for archiving images in this format. The major disadvantage to this format is that JPEG uses lossy data compression, meaning it reduces the file size of an image by merging similar or "redundant" pixels, so less information is kept overall. For most people and most uses, however, this is not a significant issue. However, JPEG2000, which is a newer version of JPEG, is not widely supported or used. This makes it a poor choice for preservation.

While TIFF is a proprietary file format, it is well documented and broadly supported. It is a lossless image format, and a good choice for people who are looking to preserve the highest possible image quality. The major disadvantage of this format is that TIFFs generally result in very large file sizes for only a small gain in image quality. It is therefore the best choice for professionals, but not necessarily for the rest of us.

RAW file formats can be compared to a digital negative, since they contain all the information used to render a digital image. Working with RAW files is more difficult—they are read-only files that require additional software to access and edit. With the exception of DNG, they are all proprietary formats that are specific to certain camera models; DNG is openly documented and supported by Adobe. In almost all cases, RAW files are not appropriate for personal photographic archives. They should only be used in the rare cases where there is a need to make substantial edits in the future that require all of the information captured in this format.

Consolidating: Where Are All the Photographs?

Before creating an archive with someone, it is important to gather all their photographs into one place. When working with people, you will likely find that this is the first big hurdle you encounter, but it can be overcome with careful planning.

First, identify all the image sources being used. This includes all the devices that both they and their families are using to take photographs, such as cell phones and cameras, and also any printed photographs that they have already or will be scanning. When it comes to cell phones, it is important to understand where photographs are stored in order to ensure they are all transferred. The camera function inside an application, such as Facebook or Instagram, for example, may not store photographs in the same place as the native camera application.

The goal at this stage is to make sure that all their photographs are stored in the same location on their computer. This principle is often referred to as the "Rule of One." This location contains the master versions of a user's photographs, and is used as the source for all backup copies.

Regularly transferring photographs to the master location is critical, given the vulnerability of portable devices such as smartphones and cameras

to theft, loss, or damage. Encourage people to get into the habit of transferring photographs from portable devices to their computer on a regular basis. The simplest method is to use the default software that comes with their camera or their phone. Another option is to use photo management software, which we'll talk more about in the section on organizing photographs.

The next step is equivalent to the archival appraisal process; it involves selecting what to keep and what to discard. Although it may seem simple enough to just keep everything, *encourage people not to ignore this step.* A smaller photograph collection is significantly easier to organize and maintain, and makes it much easier to find specific photographs. If someone you are helping is hesitant to do this, you can remind them that the price of film and of having photographs printed used to limit the number of photographs we took. There used to be a selection process that happened before we even took a picture, and that helped to keep the number of photographs in our collections under control. In addition to these usability concerns, there are also technical advantages to smaller collections. The larger the collection, the greater the risk of file corruption when migrating the collection to new storage media.

FILE-NAMING BEST PRACTICES

This is also a good time to suggest thinking about the naming of files, and how this can help with preservation and access. A good file-naming system should be easy to communicate and self-evident when looking through files.

File-Naming Tips

1. Ensure that your file names are unique. Your photo or camera will typically assign file names using sequential numbering, but these will eventually be repeated. Adding something before or after the file names when transferring images to your computer will help prevent duplicate file names.
2. Adding meaningful and descriptive file names will help you browse and search for photographs. Adding a level of description in the file name also allows you to take advantage of the sorting capabilities of built-in file systems.
3. Be concise: long file names can cause issues in the future with migrations between media and computers.
4. Avoid complex or illegal characters. Avoid using blank spaces, capital letters, and special characters in your file names because certain computers have trouble reading them and they can cause problems when moving files between computing environments.

Renaming files individually isn't practical, but when transferring files to a computer, there is often an option to add a prefix to the file names of all the photographs being transferred. This can help designate an event (such as a birthday or a holiday), a location, or a date.

ORGANIZING
Putting Things in Order

Once you've helped someone gather all their photographs in the same place, they will need to have a system to organize them. There are any number of ways to organize photographs, and choosing between them comes down to what works best for the owner of the collection. Identifying what the owner wants to do with the archive will make it easier to decide how to best organize the person's collection. Like file-naming, the best organization method is one that is consistent, self-evident, and expandable. A good place to start is using the default structure that is created when photographs are downloaded from the camera to the computer. Often these programs will automagically organize photographs using embedded technical metadata, such as creation date. Using this structure as a base, you can create sub-directories based on other meaningful information, such as subject or event.

SOFTWARE

The easiest way to organize and manage a digital photograph collection is to use photo management software. Common features of these programs include generating thumbnail previews, organizing images into folders or collections, and creating basic metadata. Most of these programs also support simple editing, e-mailing, and exporting of photographs.

Photo Management

The first category of software is the built-in photo management applications that come with most computers, such as Apple's Image Capture, iPhoto/Photos,[5] and Windows Explorer Gallery. All of these provide good, basic infrastructure to be able to browse images and add basic file-level metadata, such as descriptions and tags. In addition, Apple Photos supports the recognition of "Faces," where you can identify people appearing in your photographs, and it reads embedded GPS location data if available.

A free and popular photograph management alternative is Google Photos. This application is the replacement for their popular desktop application

One small point of concern with Apple's iPhoto/Photos application is that it automatically creates a separate file library to store all of your photographs, which makes it difficult to locate individual files on your hard drive. This makes it more complicated to create backups and migrate user data. Apple is also pushing the integration of the Photos software with iCloud photo sharing and warns about possible syncing issues if you store your library on online storage services, such as Dropbox or Google drive. This is contributing to an increasingly closed and proprietary computing environment, which makes it more difficult to implement good archival practices.

Picasa, which was officially retired in March 2016. Like iPhoto/Photos, it supports adding descriptions, tagging people in photographs, and reading embedded GPS location data. Other software options include XnView MP and FastStone.

Digital Asset Management

Digital asset management programs represent the next level up in terms of features and complexity. These are robust applications with extensive photo-to-editing and processing features and excellent support for standards-based descriptive metadata. There is a great deal of information available online about how to use these programs to effectively organize photography collections. They are commonly used by advanced amateurs and professional photographers. Popular examples of these programs include Adobe Bridge, Adobe Lightroom, and Extensis Portfolio.

Cloud-Based Photo Management

A new trend is to use specialized web-based applications to organize and store photographic collections. These include the previously mentioned Google Photos and iCloud photo storage. There are also photo-exclusive sites, like Shutterfly, SmugMug, Mylio, and Flickr, that let users upload and archive an unlimited number of photographs either for free or for small fees. One thing to note when using cloud-based programs to organize and store your photographs is that these require a fast and stable Internet connection in order to operate effectively.

For people who use these programs, it's strongly recommended that they maintain an additional backup of their files. A number of these companies, such as 1000memories and PictureLife, have disappeared over the past few years, taking their users' photographs with them. The sudden closure of PictureLife and the attempts of users to get their photographs back was documented in

How to Choose the Best Tools

Since software changes so rapidly, it's tricky to recommend specific software or online tools. It's better to communicate how to evaluate the tools out there. Some good questions to ask include:

Sustainability: Is the tool you are using proprietary or open source? Just like file formats, we want to encourage people to use open and well-documented tools to account for future obsolescence.

Cost: Is it free or is it a paid service? Is it a one-time payment for software or is it a subscription? Many services offer a free account with limited storage that is useful to try out software. If you pay for the service, what happens to your photographs if you miss a payment?

Security: Does the service offer secure storage and transfer? How secure? If you use cloud storage, do you know what security measures/encryption they use to keep your photographs safe?

Exporting your photographs: How easy is it to retrieve your photographs from the service? If you want to change software, can you easily migrate your photographs? What if the tool disappears; are the photographs still retrievable? If you pass away, can designated people retrieve the photographs and associated metadata?

Metadata: If you use the software to add metadata, where is it stored? If you stop using the software, will you lose all your labels or tags? When you export your photographs, is the metadata exported with them? Does the tool change the metadata in your photographs? For example, when you upload a photo to Facebook, it changes the embedded creation date to the date you uploaded the photo. Even if you are only uploading copies of your photographs, changing the metadata can create confusion later on.

an episode of the Reply All podcast.[6] These difficulties are a powerful example of some of the issues with web-based organization solutions.

DESCRIBING
Adding Context and Information

Ensuring that a photograph has accurate and thorough metadata is critical to preservation. Without good metadata, even if a photograph is saved in an archive, it may not be possible to actually find it again, and that defeats the

purpose of having an archive in the first place. During the process of creation, both technical and descriptive metadata can be attached to and embedded in the photograph, and additional descriptive metadata can be added.

Technical metadata refers to the information that is automatically recorded in the file by the camera, and you can see this information by clicking on the "File Information" option in most computer file-management systems.

Descriptive metadata is information that describes the image and is used for discovery and identification.

While the value of metadata is high, it also takes a lot of work to create. While it's possible to be overwhelmed by the act of describing each photograph, it's important to emphasize that simple things, like adding event names at the start of file names or creating simple captions, can have a huge benefit and be of great help in finding photographs again in the future.

Embedded Metadata

Embedded metadata refers to descriptive metadata that has been embedded using the International Press Telecommunications Council (IPTC) metadata schema and is persistently linked to an image. Since its release in 1991, IPTC has been the de facto standard to transfer information, and it includes extensive fields to capture granular information such as the photographer's name, contact information, and copyright statement. Upgraded in 2011, the schema is now based on Adobe's Extensible Metadata Platform (XMP) framework[7] and is compatible with Extensible Markup Language (XML). IPTC is an open format, supported by both Adobe products and over seventy other programs.[8] An advantage of using widely available image file formats, such as JPEG and TIFF as opposed to proprietary RAW files, is that they support embedding metadata into the image file.

Adding Metadata

The simplest way to embed information into the file is to select a file on any computer (Mac or PC) and then select File > Get Info, where you will find a text field that you can write comments in, much like the back of a photograph. One thing to note is that field names and terminology, such as "caption" and "description," are sometimes different from program to program.

Photography professionals routinely use photo-editing software to add metadata to their digital photos for copyright and business reasons. Most of the photo management systems that we talked about in the "Organizing" section also have the ability to add descriptions and other information to a photograph.

Another advantage of adding descriptions that are embedded is that they can be read by websites when you want to publish and share photographs online. For example, both Flickr and Facebook read embedded descriptions and display them as captions when you post the photos. Unfortunately, this is still not very standardized. The Embedded Metadata Manifesto initiative created by the IPTC and supported by a number of other photography associations has been doing tests to determine which online services read the metadata and preserve it in the file when downloaded.

STORING
Where Should You Keep All the Files?

After helping someone to consolidate and organize all of their files, it is vitally important to then help them set up a system to back up their photographs. The reality is that computer hard disks fail, and files can be lost in natural disasters, or as a result of a power surge or theft. Without a backup, any of these scenarios would mean they would lose all of their photographs—but it would not take much effort to prevent this with backups.

How many backups should you encourage someone to have? A popular recommendation is the 3-2-1 approach. This means recommending keeping three complete copies of all files, with at least one copy at an off-site location. In my personal archive I have a system where I regularly copy my photos to my computer master folder (first copy). Once a month or so I'll make a copy of the entire photo folder from my computer onto a portable hard drive (second copy), and I use a program to run nightly cloud backups automatically (the third copy, at an off-site location). Instead of using cloud storage, you can recommend storing an external hard drive off-site, like at a relative's home or in a safety deposit box. This off-site copy is critical in the event of a catastrophe (flood, fire) that could destroy any locally stored backups. Even in that worst-case scenario, the photographic archive would survive.

HOW DO YOU CREATE A BACKUP?

Backups can be tedious and time-consuming to make. Using software to automate the process can be extremely helpful. Backup software makes it easy to synchronize selected files on a storage system separate from your main hard drive, and then replicate file changes when they occur. Most backup software can schedule regular scans of a hard drive for new and changed files on a daily, weekly, or monthly basis, or the software can continually monitor the computer for changed or new files. It is likely to take a long time to perform the first synchronization, since all the data in the archive has to be read and

copied. After that first sync only the differences in the data are synchronized, which makes for a much quicker process.

While this makes backups easier, it also means that any changes made to the master files will almost immediately be made to the backup as well, since the files are mirrored. This means that the backup files are as vulnerable to accidental changes and deletions as the master files. Examples of local backup software include GoodSync and Chronosync.

You should also be able to recommend appropriate storage media. An external solid-state drive is a good option; they are easy to use, inexpensive, and provide sufficient capacity for many people. An external drive used for backup should be used exclusively for backups and stored in a safe, secure place. It should not be used to transport files. This minimizes the possibility of damage to the drive and data loss. If you need to recommend more storage than an external drive provides, consider suggesting a NAS device (network attached storage), which is a small computer with a lot of storage capacity designed to operate as an appliance for storing and sharing files over a network. It is a more advanced and more flexible option, but it is also more expensive. CD-Rs or DVD-Rs are not recommended for backing up photographic collections. The transfer time is more time-consuming and the limited capacity of these media may result in splitting data over several disks.

Cloud-Based Storage Options

There are a number of cloud-based storage options, where storage is provided by a commercial data center. The obvious advantage of storing photos in the cloud is that they are accessible from anywhere. Like all Internet services, they require a high-speed connection and a large data allotment to make them practical options. This is a real concern when thinking of the digital divide and rural communities. As with cloud-based photo management applications, you also need to be aware of security and longevity issues, and the same questions about choosing the best tool apply here. Some examples of online backup services that back up your data to the cloud include CrashPlan, Mozy, and Backblaze.

When looking at and evaluating cloud-based tools, there are differences between the ones that focus on general storage and the ones that are geared toward photography. General cloud storage sites not only offer folder and file syncing, but also media-playing and device syncing. Examples of these are Apple's iCloud, Google Drive, Microsoft OneDrive, and Dropbox. Photography-specific sites such as Flickr and Google Photo support only image and video files, but they include more storage and provide more features, such as built-in editing and management tools. For example, Flickr offers one terabyte of free storage, and SmugMug, which is aimed at professional photographers, has unlimited storage for only forty dollars a year.

Refreshing Archival Data

All current storage media (CDs, DVDs, memory keys, HDs) have a shelf life and will eventually fail due to physical degradation. In any archival system, the data must be migrated to new storage media on a regular basis. This means checking the integrity of your archival storage and replacing your archival storage media with new media at regular intervals (every 5 to 10 years). One type of archival media that should not be forgotten is printing photos. If properly produced and cared for, printed images can last for hundreds of years—much longer than contemporary digital storage media.

CONCLUSION

While this chapter presents the archival process as a neat chronology, I would argue that it doesn't all need to be done in the order presented here. If someone is overwhelmed by a hard drive that feels like it is overflowing with photographs—and anecdotal evidence suggests that many people are in this position!—then we can start by helping them get all of their photographs in the same place and then backed up. From there, encouraging them to commit to regularly transferring their photographs to their computer and then to subscribe to a cloud backup service can have a huge impact with only minimal effort. After that, the conversations about deleting photographs and planning can happen more calmly. When their collection has been slimmed down to a more manageable size, introduce the concepts behind describing key moments and identifying people, and how this can help to better organize their collection. Finally, look into current software with them and offer advice on what tools they can use to support their archiving process. If enough people adopt these best practices, it will have a profound impact on the quality and quantity of our future visual historical record.

Preserving the ever-increasing number of digital photographs that are being produced is a growing concern shared by the public, photographers, and cultural institutions alike. Recently we've started to see a paradigm shift, where preservation and archiving are being recognized as something that needs to start with the creator, at the beginning of his workflow when a photograph is first taken. Institutionally, we can take a number of useful steps: we can encourage the standardization of procedures for creating, managing, and storing born-digital images; we can support the development of image metadata to further improve existing profiles; and we can foster the development of open and nonproprietary technologies. But our work depends on creators adopting these best practices and implementing them in their own personal

photograph collections. The work of preserving our prolific photographic output for the historical record depends on all of us.

FURTHER RESOURCES

The *Library of Congress website* is a good resource for accessible introductions to the topic of personal digital archiving.

The section on archiving digital photographs gives a good simple overview that can be shared with the nonspecialist: www.digitalpreservation.gov/personalarchiving/photos.html

They also have some excellent videos.

- An overview of scanning photographs: www.digitalpreservation.gov/multimedia/videos/scanner.html
- How to add descriptions to your digital photographs: www.digitalpreservation.gov/multimedia/videos/personalarchiving-photometadata.html

The Signal, the Library of Congress blog on digital preservation, has a category for personal digital archiving which is a good up-to-date source on many issues: https://blogs.loc.gov/thesignal/category/personal-archiving/. Notable posts on archiving digital photographs include:

- Ashenfelder, Mike. 2011. "Adding Descriptions to Digital Photos | *The Signal*." Web page. October 28. //blogs.loc.gov/thesignal/2011/10/mission-possible-an-easy-way-to-add-descriptions-to-digital-photos/.
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- Lazorchak, Butch. 2011. "Four Easy Tips for Preserving Your Digital Photographs | *The Signal*." Web page. October 24. //blogs.loc.gov/thesignal/2011/10/four-easy-tips-for-preserving-your-digital-photographs/.
- Manus, Susan. 2011. "Photo Sharing Sites as Digital Preservation Tools | *The Signal*." Web page. November 2. //blogs.loc.gov/thesignal/2011/11/photo-sharing-sites-as-digital-preservation-tools/.

Perspectives on Personal Digital Archiving is an e-book that is a compilation of some of the best posts from *The Signal* blog: www.digitalpreservation.gov/documents/ebookpdf_march18.pdf.

For a more in-depth introduction, I would recommend reading the Digital Preservation Coalition report on "Personal Digital Archiving." While there is no specific section dedicated to photographs, it has many good tips and resources that are applicable:

- Gabriela, Redwine. n.d. "Personal Digital Archiving." *DPC Technology Watch Report*. http://dx.doi.org/10.7207/twr15–01

For more in-depth information and resources on image management and metadata, the website http://controlledvocabulary.com/ is maintained by David Riecks, who has been a featured speaker at a number of image management and archiving conferences and webinars.

NOTES

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6. "#71 The Picture Taker," 2016, Reply All: Gimlet Media, https://gimletmedia.com/episode/71-the-picture-taker/.
7. As per the International Press Telecommunications Council, https://iptc.org/standards/photo-metadata/iptc-standard/.
8. As per W3 Schools, www.w3schools.com/xml/xml_whatis.asp.

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