

The Winds of Change: Blown to Bits

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This past year, the SAA Council spent a fair amount of time thinking about a number of strategic issues that the profession is facing. In the most recent issue of *Archival Outlook*, Rand Jimerson summarized the top three issues on Council's radar screen: technology, diversity, and public awareness. Today – and during the coming year as SAA President – I will focus on technology.

Management jargon includes dozens of synonyms and euphemisms for 'strategic issues', including challenges, problems, and opportunities. Here in New Orleans, I rather like 'winds of change'. And when talking about the winds of technological change, we may be looking at a hurricane.

In 1991, Margaret Hedstrom observed that "Electronic records, as today's incunabula, present archivists with their greatest challenge in decades." I couldn't agree more with what was then a very astute prediction. Hedstrom goes on to state, "Change will be evolutionary . . . because profound shifts in the production and dissemination of information incorporate some traditional habits and approaches for handling information. . . ." ²

The same year Hedstrom's article was published, Tim Berners-Lee made the web public on an unsuspecting world. ³

Last May, at NARA's celebration of twenty years of independence, Bob Horton did a nice job of summarizing what's happened in the nearly fifteen years since Hedstrom wrote her article and Berners-Lee released the web.

We have collectively experienced a technological revolution in the past decade. . . . We have not experienced the corresponding and overdue institutional and professional revolution that is the appropriate and necessary response. ⁴

When Hedstrom suggested that the change would be evolutionary, she couldn't have known that the web would be the killer app of the 1990s. Indeed in an era when a 2400-baud connection was speedy and a twenty-megabyte hard drive seemed excessive, few guessed at how pervasive technology would become.

The pace of change is so great, it's hard to keep up with what's happening around us, much less what's coming down the pike. Today I want to think about, in Bob's terms, an "appropriate and necessary response" to the technological revolution.

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² "Understanding Electronic Incunabula: A Framework for Research on Electronic Records." *American Archivist* 54:3 (Summer 1991), p. 335. After hearing this paper, Hedstrom commented "If we'd started work when I published the paper, the needed change might very have been evolutionary rather than revolutionary." Conversation with author, 20 August 2005.

³ "Berners-Lee Wins Inaugural Millennium Technology Prize [web page]," Finnish Technology Award Foundation, 15 April 2004. Available online at <http://www.technologyawards.org/index.php?m=1 &news=3&sm=21> [checked 6 August 2005].

⁴ Presented at panel discussion during the celebration of NARA's 20th Anniversary of independence, 20 May 2005. From an unpublished copy provided to the author.

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Our first response is, in my mind, to recognize the urgency of the problem. The brewing storm is not always readily apparent in archives because the flood of electronic records has not yet reached the archival threshold. Some archivists have been heralding the coming storm for years. For many others, however, the work at hand prevents them from recognizing the potential impact of the digital hurricane. The majority of their records are in familiar, tangible formats (paper, photographs, video), and few of the records they're acquiring are in digital formats. As a result, they haven't yet come face to face with the rising storm tide.

The calm is deceptive. The majority of records are created digitally and will never see the light of paper.⁵ Archivists will want to acquire many of these digital records, but unless we take steps to appraise and acquire these records now – while they are still active and accessible – we will lose many of them. We cannot wait and, as Bob said, our response is overdue.

To date, much of the profession's response has come from academia and has been conceptual and theoretical. Much of this work is invaluable. Reading the literature on electronic records has given me a richer understanding of fundamental archival principles. A few key articles, such as Cal Lee's "Guerilla ERM"⁶ and Lucie Paquet's "Appraisal, Acquisition, and Control of Personal Electronic Records"⁷ discuss pragmatic aspects of working with electronic records. While the emphasis on the conceptual has given me a richer understanding of the problem, I'm left without a practical sense of the solution. I have a notion of what needs to be done, but not necessarily how to do it.

I believe that the next step requires us to shift our attention from the conceptual to the practical and empirical, to pay more attention to what needs to happen in the trenches. Archivists and records professionals – as a whole, and not just digital records specialists – must respond by becoming as comfortable working with digital materials as they are with paper. In fact, I believe that in the future, the notion of 'digital archivist' will be useless because all archivists will be digital archivists.

What does it mean to be comfortable with digital materials? Our familiarity with tangible records is based on knowledge that individuals bring to the profession long before they begin to learn about appraisal, processing, and other core archival functions. These are skills that are pervasive in our culture, and they give us a clue to the skills that we need to make work with digital materials transparent. As such, it's easy to overlook them.

LITERACY

We assume literacy. Archivists must be able to read the records and write about them. They must speak the language of the records. Some records demand special languages. Shostakovich's records require the ability to read Russian *and* musical notation.

Archivists must be literate in the languages of digital records. Although many e-records display their content in human language, we must remember that there is significant code hidden beneath the

⁵ See Peter Lyman and Hal R. Varian, "How Much Information? 2003." Online at <http://www.sims.berkeley.edu/research/projects/how-much-info-2003/> (checked 25 August 2005).

⁶ "Guerilla ERM: Lessons Learned from Some Time in the Trenches." Online at http://www-personal.si.umich.edu/~calz/guerrilla_erm.htm (checked 8 August 2005). Also published in *Ohio Archivist* (Spring 2001), pp. 3-7. A revised and expanded version was published as Christopher Lee, "Guerilla Electronic Records Management: Lessons Learned," *Records and Information Management Report* 18:5 (2002), p. 1-13.

⁷ "Appraisal, Acquisition, and Control of Personal Electronic Records: From Myth to Reality," *Archives & Manuscripts* 28:2 (November 2000), pp. 71-91.

presentation layer. We must recognize that XML is becoming the lingua franca of cyberspace, although some record formats will require a knowledge of special computer languages. For example, work with land records will likely require a familiarity with geographic information systems.

```
10 0 *** df -k | mail -s 'SafetyNet Disk Stats' rpm@lib.az.us
30 0 5 ** df -k /opt/ppa/DocRoot | mail -s 'SafetyNet DocRoot stats' rpm@lib.az.us
30 0 6 ** df -k /opt/ppa/CvsRepositories/AZ | mail -s 'SafetyNet CvsRepo stats' rpm@lib.az.us
```

FLUENCY

We assume fluency. Archivists need more than the ability to read and write; they must be able to interpret the records and understand them in a larger cultural context. For example, we were able to recognize basic record forms and genres long before we considered ourselves archivists: we know what letters, diaries, photographs, videotapes, scrapbooks without any special training.

Similarly, we must become equally familiar with digital forms and genres. We must be able to recognize word processing, database, and other file formats. We must also be able to understand how genres have been transformed in cyberspace; letters are now email and text messages, and diaries are now blogs.

Text	Databases	Web
WPD	MDB	HTM/HTML
DOC	DBF/DBM	ASP
TXT	SQL	PHP
PDF		CFM

ORGANIZATION

We assume some basic ability to organize materials and to recognize patterns. Minimally, we expect people to be able to understand the concept of filing. At a minimum, they must be able to alphabetize.

In order to survey digital records, archivists must be able to navigate a file system, not a file cabinet. Rather than scanning headings on folders, they need to know how to query the operating system for a directory of files. To look in files to get a sense of records' content you might use the head or tail command.

```
find / -name *.xml -print | grep 200508 > spiders_2005-08_TOC
head TOC
cd /opt/ppa/CvsRepositories/AZ
vi ADOA_2005081402.xml
```

ORIGINAL ORDER

But what does original order mean in the context of a database, where records may be retrieved and sorted on an ad hoc basis? To be able to access these records at all, archivists will probably need to know Structured Query Language, both to recreate the manner in which the records were commonly accessed in the office of origin and to facilitate researchers' secondary uses of the data.

```
SELECT AgencyName FROM Agencies
RIGHT JOIN Document ON Agencies.AKey = Docs.DKey
ORDER BY Agencies.AgencyName;
```

THE AFFORDANCES OF PAPER

Qualities of paper make some tasks easy, but the equivalent tasks become much more difficult in a digital environment. When making preservation photocopies of fragile paper documents, it's generally apparent that the process is working: we can read the copies as they come out of the machine.

Creating a preservation copy of digital records is less transparent. As you copy the files to tape or disk, it's not readily apparent that the copy is reliable; we can't "see" the binary copies on tape. The system may report that the copy command is complete, but it may not realize the tape was defective and the copy useless. We have to take the extra step of comparing the copy to the original to assure ourselves of the quality of the copy. This is equivalent to inspecting microfilm after processing.

```
for XX in [A-Z]*; do tar -cZf $XX.tar; done
ls *.tar | cpio -cf /dev/st0
mv *.tar *.tar.original
cpio -xf /dev/st0 *.tar
for XX in [A-Z]*.tar; cmp $XX $XX.tar.original > TapeVerify_2005-08-0
```

ARCHIVISTS IN THE DIGITAL ERA

As I show you these snippets of code, I want to assure you that I don't think that archivists must become professional programmers or be able to read paper tape from a teletype. At the same time, I don't want you to think these snippets are spurious examples intended to intimidate. I took them all from my recent work on a project to preserve state agency publications on the web. Nor do I want you to think that I've got this down pat and am completely comfortable working with digital materials. In fact, I was sweating bullets, reading manuals, and saying a few prayers last week.

Archivists must find the right balance of expertise in respect to the medium and the message. Archivists do this now, but in the more familiar context of tangible records. While we brought the basics of literacy, fluency, and organization to the profession, archival education builds on these concepts. For example, we can use our knowledge of photographs to supply a date for a carte-de-visite; the format was common between the 1860s and the 1880s, and the process, number of plies, and ornamentation allows us to narrow the date considerably. Similarly, we can date a collection of digital records on a 5¼" floppy in WordStar from the mid-1980s.

THE ARCANE AND THE ESSENTIAL

Our challenge is to discern what is arcane from what is essential, and we cannot assume that anything alien or complex – like Bourne shell scripts or public key infrastructure – is necessarily arcane. Few archivists will need to know the difference between big-endian and little-endian systems (although a few may recognize the Lilliputian reference). The skills that are essential are those that support the core archival functions: appraisal and acquisition, arrangement and description, reference and access, and preservation. *What* we do remains the same. *How* we do it changes radically, and we must become comfortable with a new way of working.

```
big-endian, adj ~ Storing the most significant byte of a multi-byte number at the lowest address.
little-endian, adj.~ Storing the least significant byte of a multi-byte number at the lowest address.
```

We will not transfer records by moving boxes, but through copy and file transfer functions. Arrangement will not be physical, but logical, sorts. Description will not list folder titles in finding aids, but embed a SQL query to list all documents with full-text searches. Reference rooms may be in homes and offices, with researchers working remotely.

CONCLUSION

As a profession, we have much to do. The good news is that there is much we can do now.

Individually you can do a lot to prepare yourself to work with digital materials.

- + Assess your own level of readiness, your own comfort with working with digital materials. If you don't have a good understanding of the general issues of electronic records, read the literature. Don't limit yourself to archival literature; a lot of important work is being done in other fields. Ask your friends to recommend articles, especially if you're starting out. Start a reading group so you don't work in isolation.
- + Continuing education is no longer a luxury we indulge in once in a while; it's a necessity. Take a workshop or course to help you hone your skills. SAA is offering a number of workshops on PC hardware and software, databases, and markup languages. Take an introductory computer course at a community college.
- + One of the best ways to learn is to dive in. As an experiment, take a copy of a small collection of electronic records – maybe the files on your PC – and follow your repository's procedures to accession, process, and reference that collection. You may spot basic skills you need to acquire (How do I get the files off this computer and onto a server?), and you may also identify policies and procedures that should be revised.
- + Feeling really adventurous? Take an older PC, install Linux, and get the Apache web server up and running. This may sound ridiculous and an odd choice for a hobby, but I found it gave me a lot of experience that I now use almost every day.

As a Society, we have many possibilities, and the SAA Council will identify and prioritize specific projects to meet members' needs. Among the possibilities are new workshops and publications. In the coming year, I will be working on three specific initiatives.

- + First, the National Archives and the Arizona State Library and Archives, with support from SAA, the Academy of Certified Archivists, the Council of State Archivists, NAGARA, and the Chief Officers of State Library Agencies (COSLA) are planning a conference this spring to address the issue of new skills for the digital era. I believe the conference proceedings will provide a strong foundation for a coordinated professional response.
- + Second, I am asking every SAA section, roundtable, committee, and working group in the Society to consider the question of technological impact on the profession in the coming year. I am encouraging each group to write a short essay describing its perspective on the challenges and opportunities of new technologies, and the best will be published in *Archival Outlook*.
- + Next year, at the 2006 Joint Annual Meeting in Washington, DC, I am planning a special pre-conference session that will bring together leaders in the Society to share their insights into the skills we need to be comfortable working with digital materials. The forum will be modeled on the very successful leadership meeting at Montreal in 1992 that served to focus the attention of the Society on its new strategic plan. That meeting was critical to my own formation as a leader and I hope that repeating the experience in a new context will be as energizing for the Society as it was for me personally. Paul Conway has agreed to help, so I know it's in good hand. Please plan on attending!

These winds of change may be dark and ominous. But they may also bring much-needed rain. The storm may blow away some things that are old and familiar, but that may be exactly what we need to build anew. What we need is courage. Courage to break out of our routines. Courage to learn things that are radically different from what we are accustomed to and that are sometimes hard and confusing. We need to redirect at least some of our time and attention from the world of paper to the world of digits.

One of the most important things to know is where you can get help, who you can turn to when you get stuck on a hard problem. I suggest that you look around this room. In many ways, the Society of American Archivists is the foundation of my archival knowledge. Its publication program, its annual meetings, and its workshops provided me with core knowledge. But more than anything, it's the Society's members who have made me a better archivist. I rely on them for information, support, and – most importantly – friendship.

I look forward to working with all of you this coming year. We have a lot to do. While I've focused on technology, we cannot ignore the issues of diversity and public awareness. So I encourage each of you to find your passion, muster up your courage, and get involved.