Noticing history — a personal view*

David Walden

Abstract

I presume most of us who participated in or watched the TUG 2020 conference are not professional historians but rather are computing practitioners or users of computing technology such as TeX and friends. We have access to memories, papers, and flexibility in what we study, and how we present what we learn, that won't all be available to professional historians. I believe it is our job to help the computing history world capture more computing history while it still exists to be captured.

Introduction

Although I am speaking today about how computing history is done, I am not a formally trained historian. I come to the views expressed in the rest of this paper from a thirty year career in the technology and business of computing and now 25 years of amateur research and writing about computing history. During this time I have been a near-constant user of computing technology — since retirement from business, including LaTeX and other components of the TeX-based-or-derived infrastructure.

Over the past 15 or 20 years of my involvement in researching computing history, I have become acquainted with a number of professional, often academic, historians and have learned something about what they typically do. I have come to believe that the professional historian can't do it alone, and history work might use some help from the likes of us.

For much of this paper I will talk about computing history and the people who work or have worked in computing. Everything I say is equally applicable to typography, typesetting, and printing history and the people who work or have worked in those activities. In this paper I will refer to "we" or "us"; by this I will mean people such as are at this conference and who are typical readers of *TUGboat* — people who are involved in the development of computing, typography, typesetting, and printing technology or closely observe or seriously use it.

A recurring theme of the rest of this article is the distinction and separation of amateur historians who themselves actually experienced, participated in, and

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understood the formations and transformations of various computer-related fields, from the professional historians who report, translate, and interpret the histories of those fields.[1]

I don't mean to be critical of professional computing historians. They have had added essential scholarship, stability, and validation to the field of computing history. While collecting and writing computing history initially was pioneered by computer people themselves who were afraid the history of their field was being lost, it would not have become the vibrant and distinct field it now is had it not become a branch of academic history. I do mean to encourage people from the computing field to engage more in capturing and recording computing history in ways that complement and supplement the work of the professionals and may be valuable in their own right. I also hope to suggest to the professionals how valuable, even essential, our amateur history efforts can be.

In the rest of this paper I will discuss three topics.

1. History is moving fast, and many memories and materials from history are being lost; official historians can't capture and document enough computing history by themselves; and thus the history world needs our help.

2. We have useful skills and abilities to contribute.

3. There are many ways in which we can help.

1 The need

Things have been changing fast in the decades since the 1940s and 1950s.

After centuries of using essentially Gutenberg technology and about 70 years of dependence on Linotype, Monotype, and other forms of mechanical composition, the history of phototypesetting zipped by in a couple of decades, and desktop publishing went from infancy to ubiquity in another couple of decades.

Several generations of people who participated in developments in those years have died or are getting old as are people who closely observed the early developments. While many important pioneers have been interviewed and have sent their papers to archives such as the Charles Babbage Institute (CBI), the Computer History Museum (CHM) or their university or corporate archive, there are other major pioneers and *many lesser pioneers* whose histories need to be captured — now. (As history continues to run along, there will always be more people and projects whose histories should be captured.)

We also need the documents of computing developments: hardware diagrams, program listings,

project plans, company plans, and so on. In some cases such materials have been archived. For example, lots of materials from the Control Data Corporation are in the Charles Babbage Institute archive (`www.cbi.umn.edu`). Some of the Aldus (PageMaker) company's annual reports and other documents are in the archive of the Computer History Museum (`computerhistory.org`). Perhaps more typically, few of the materials of Interleaf Inc., a rival of Aldus in the 1980s, are in a formal archive. Some of the archiving may come from a person possessing material volunteering it to an archive; in perhaps fewer cases, an archive recruits materials from a company or individual. Whatever the case, there is much more that should be collected for which there may be no current plans for collection.

In this digital age, it is more important than ever to capture such materials now. Before, when everything was on paper, there was at least a chance that the material would eventually be able to be collected. Today companies' and individuals' computers get discarded with no one thinking about what they may contain of historical significance that was never on paper.

Professional computing historians cannot possibly do all the desirable history work.

The professionals of course do lots of collection, research into, and publishing of history, including interviewing people from the historian's historical era of interest. But there are many more people who might be interviewed or who might be encouraged to write their memoirs.

Computing historians tend to work on history that is some number of years in the past. I suppose that it is not history unless it is sufficiently in the past. Thus professional historians often won't be involved in what's happening now and won't be collecting it as it happens.

Professional historians also often write for a specialized audience. Computing history for the masses tends to be the domain of authors of books and articles working in a more journalistic style, for instance books such as *The Soul of a New Machine* by Tracy Kidder; *Where Wizards Stay up Late* by Katie Hafner and Matthew Lyon; *The Dream Machine* by M. Mitchell Waldrop; and *The Innovators* by Walter Isaacson. The professionals sometimes are dismissive of such journalistic writing when it comes out; and later, naturally, the historians will consider such writing less useful than primary sources, however contemporaneously written or thoroughly researched a book or article may have been.

There are other problems that lead to computing history not being collected by the professionals.

To some extent the traditional academic history world looks upon computing history as belonging in some other academic department, and computing historians sometimes have had a hard time getting jobs in those academic history departments. They sometimes are in informatics departments or maybe library departments.[2]

Even computer science departments, which one would think should be interested in computing history, are not interested enough to spend a faculty position on a professional historian of computing. Some more-or-less history books come out of computer science departments, for instance *The Multics System* by Elliott Organick and *The Origins of Digital Computers — Selected Papers* edited by Brian Randell, but these tend to come from computer people rather than from official historians.

There is also a lot of history that the professionals tend not to focus on. They are less likely to do research aimed at writing straightforward accounts about what happened with a project or technology — what many of us may think of as the usual way technology history is written. Historians mostly are more interested in the political, social, etc., context of a technology development rather than in the details of the technology.[3] They also tend to work on that for which they can get grant funding and which is done in a way which gains them the respect of other professional historians and eventually tenure at their academic institutions.

There are business forces that lead to computing history being lost.

When new management comes into a company, it may discard lots of historic material as part of its push to clean up the company (Figure 1). Or the new management may not care at all about historical value. I can hear a new owner in the business of asset stripping saying, "We are in this to sell off the company's assets. A bunch of long ago published technical reports done on government contracts and therefore in the public domain aren't worth anything. We are not in the business of saving stuff for its intangible historical value. Shred it." Also, when a project ends, a company is sold, or a when a company goes out of business, the company's materials are often discarded — I have seen this in person; probably you have too. The use of off-site storage by companies as a way to *hold onto* materials despite limited storage space can be another problem. Boxes of documents that go to off-site storage sometimes are never found again — this also has happened to me.

Figure 1: Sights we have seen all too often.

After my talk, Chuck Bigelow noted to me that much of what I am saying is not new. In the history of printing the older information technology was lost.

> In the first centuries of printing, most typographic materials other than books were lost. Books were preserved as valuable information containers accessible to general readers, but book-making tools understood only by a few specialists were rarely preserved. Printers went out of business, type wore out and was melted down to make newer type, presses wore out and were replaced. Technical know-how kept as trade secrets was often lost when the keepers of the secrets passed away. Early type designers, typographers, and printers didn't write about the details of their work. It wasn't until near the end of the 16th century that printing types, matrices, molds, presses, and account books began to be preserved with greater frequency. Historians now pore over ancient records and surviving materials, trying to extract facts from indirect evidence.[4]

The professional historians can't cover history alone. They are not in a position to gather primary source material as it happens; there are materials they may never learn about; and there are aspects of history work they are not motivated to do. The history world needs our help. In his book *History Hunting* (I will say more about it later), James Cortada notes that writing real history always means going to primary documents. People like us are well positioned to collect primary documents. Now is the time to collect them.

2 Our special qualifications

Computing, typography, typesetting, and printing technologists and technology developers and users (like us here at this conference) have some special qualifications that can let us supplement what the professionals are able to cover.

First, there are lots of us and we are in lots of places. Also, more of us are being trained or otherwise going into our fields all the time — in much greater numbers than historians are being trained. There are few of them and they tend to be in academic institutions rather than in the locations where the history is happening.

Second, we are or have been part of or close observers of history unfolding. Today's historian may research and interpret how, for instance, 18-bit minicomputers were used in the 1960s or the impact of early digital typesetting systems. Some of us used those systems, which gives us a different, perhaps complementary, perspective on the history of the technologies.

Third, we have knowledge, skills, or resources the professional computing historians may not have (just as they have skills we do not have). We can write computer programs. We can read computer program and circuit diagrams. Some of us have led or been part of big computer-based projects in business or may be leading or part of significant open source projects, perhaps giving us deeper perspectives on how technology is developed and more able to apply the power of teamwork to get bigger things done (my feeling is that academic historians tend to work more individually or in smaller teams). If retired, we may have time that the professional historians do not have. Some of us may even have money we can contribute to history work or institutions.

Examples of computing history projects that technologists have accomplished, and historians probably would not have, are Zbigniew Stachniak's project to recover what was on Micro Computer Machines cassette tapes[5] and Len Shustek's project for recovering what was on the Computer History Museum's large collection of vintage magnetic tapes.[6]

One might argue that the historians know how to do a lot of things we do not know how to do. But maybe we can learn, for instance from books such James Cortada's *History Hunting — A Guide to Fellow Adventurers* (Figure 2).[7] Cortada had a long successful career at IBM after he was trained in college as a PhD historian. In the later years of his IBM career and since he retired from business, he has done a vast amount of writing about the history of the computer business. His *History Hunting* book provides encouragement and guidance appropriate to other people who have become amateur historians after a technology or technology business career.

More specifically, we can learn to do oral history interviewing. It's one way to ease into collecting history. There are lots of us who have been part
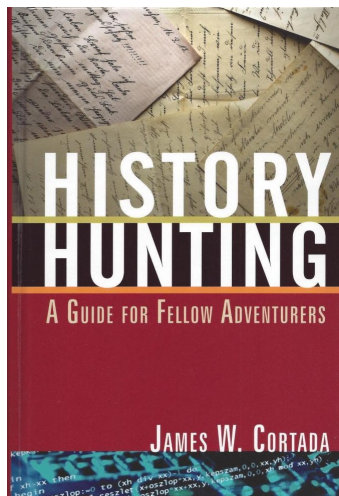
Figure 2: *History Hunting* by James Cortada. This book was highly inspiring to me and first got me thinking seriously about how we can contribute usefully to collecting and distributing computing history.

of interesting computing, typography, typesetting, printing, or publishing history and we can interview each other. Donald Ritchie's book *Doing Oral History — A Practical Guide* is a good reference as one starts doing oral history interviewing.[8,9] (At least in the TeX/TUG world, there are ready places for publishing an interview one has done: our Interview Corner, `tug.org/interviews`, or *TUGboat* and journals of other TeX user groups.)

We can also read history by the professionals and learn about doing history work from that. For instance, take a look at history written by Thomas Haigh (`tomandmaria.com/Tom/AboutMe`); he writes history that is highly scholarly and also lots of fun to read. Take a look at his paper on the history of word processing[10] or the book he co-authored on the history of the ENIAC computer.[11]

Ideally one might hope to collaborate with a professional historian as a way of gaining new skills, but that typically is not the way history is done even when both collaborators are professional historians.[12] More generally, some professional historians seem dismissive of amateur efforts even though we lived through it and we may be as academically qualified in our fields as they are in theirs. They may value hearing about what we saw but not our ability to properly interpret the history.

Historians at museums and archives such as the Computer History Museum, Charles Babbage Institute, the MIT Museum, or MIT Archive (to name just a few) may be more interested in the contributions of amateurs as well as providing service to amateurs. Naturally they may want some of our papers or artifacts. They may also give guidance about collecting history. When a computer person wants to pass historical materials to the museum or archive, the person may be put in contact with an archivist who will be receptive but also enforce the organization's policies regarding ownership, copyright, and so on.

We also can help each other learn. In particular some of us are slightly into the official computing history world, as a history journal editorial board member or leader of a small museum such as the Vintage Computer Festival Museum (`vcfed.org/wp/vcf-museum`) or doing a history project which put a person in touch with the professionals and thus better able to provide pointers for getting involved with collecting and recording history.

3   What we can do

We can create history content.

For instance, we can interview people, even lesser contributors to computing history or the narrower history of the TeX world. We can and should write our memories down rather than just telling them to each other on discussion lists. Much interesting history is exchanged, for instance, on the Internet History list (`elists.isoc.org/mailman/listinfo/internet-history`), but it is not being processed to make it better organized or more accessible beyond the raw messages being exchanged. I believe there are many interesting volunteer or academic projects that could be developed out of the ih archive. *TUGboat*'s editors seem receptive to history-oriented papers — I can point you to examples. The *IEEE Annals of the History of Computing* is all about history and always looking for submissions; quite a few *Annals* publications have been on topics close to what TUG is about. Some of those have been peer reviewed publications (including from practitioners of computing rather than historians), but the *Annals* also has a department for non-academic submissions — the Anecdotes Department (`annals-extras.org/anecdotes`); I will be happy to talk to anyone about a possible anecdote submission to the *Annals*. Finally, non-academic historians among us who are serious enough and research deeply enough can write papers that are just as scholarly as those by professional historians, albeit perhaps a somewhat different kind of history writing. Charles Bigelow, who is well known to the TeX community, has provided a recent example of scholarly writing with his history of digital fonts.[13] If writing is hard, we instead can record memories with digital audio or digital video.

We can create a website and post things there. For instance, take a look at Tom Van Vleck's wonderful `multicians.org` website. Spend some time looking around it if you don't know it already. It includes discussion about how to maintain a history website. If you do create a website, think about inheritance planning for your website and the valuable history material you collect. Another example of creating useful history material is Nelson Beebe's massive database of bibliographic information (`math.utah.edu/~beebe/bibliographies.html`). A third example is Luc Devroye's encyclopedic website compilation on typography (`luc.devroye.org/fonts.html`). If a website is too big a job, we can at least create web pages and find somewhere to post them. For instance, a web archive of material uncovered in writing a history of (the previously-mentioned) Interleaf is at `annals-extras.org/dtp/interleaf`. Another example is Paul McJones's web page of research into the history of Fortran (`softwarepreservation.org/projects/FORTRAN`). We can make unpublished or public domain materials we uncover in writing history easily available to the next researcher — not just cite existence of the materials.

We can give presentations. The Vintage Computer Festivals are annual conferences with interesting presentations. Someone has to give those presentations. It could be you. Of course, TUG also has an annual conference at which history presentations could be made, and there are half a dozen other annual TEX user group conferences that may be seeking presentations.[14]

An example I recently became aware of technologists collecting and publishing history is the Tampere International Center for Signal Processing (`annals-extras.org/pubs/TICSP.pdf`) where they have collected copious histories in various areas related to signal processing and published what they have collected. Radomir Stanković writes:

> We were guided by the general idea that looking into past helps to determine roads to the future. We believe this also is correct in the more specific case of technology — knowing the ways of thinking of scholars in the past might help reveal new ideas or avoid unfruitful approaches. We believe that a researcher needs to know the work and activities of current colleagues — equally important, know the work of "previous" colleagues — to know to some level of depth the history of the field.

We can save and/or organize historical content to which we have access, either formally or informally.

Save your papers, and find a place to send them or at least scan them and offer the scan to a stable archive.[15] Post scans of your papers and stories you write on the web in an organized way; then it at least goes to the Internet Archive (you can tell them to do a pass over your stuff).

Grab stuff when a project or system is being shut down. Roger Roach, the last CTSS system administrator, captured all of the CTSS documentation and digitized it when MIT's CTSS system was shut down in 1973. Grab stuff being thrown out. Jake Feinler was with the Network Information Center at the Stanford Research Institute. When the activity was shut down, she took all the documentation the NIC had collected over the years home to her garage. Eventually she was able to give this extensive and valuable part of Internet history to the Computer History Museum where she spent time organizing the material for the user of future researchers.[16]

Gather material that other people contribute; for instance, become the website maintainer for an organization so you can organize the organization's materials and make sure it has some place to go in the long term. Gathering other people's materials may seem like second class work, but I think I have heard at least three great people, Daniel Boorstin, Stephen Jay Gould, and E.O. Wilson, make the observation that aggregation and taxonomy can be just as valuable as original work.

Place the history you have or can capture in some stable location. David Brock of CHM and Jeff Yost of CBI assure me that they accept paper documents, scans of paper documents, and documents born digital. CHM also accepts non-paper artifacts.

Whatever you collect, organizing it to make it more accessible is important. Maybe you can take the time to create a finding guide, or organize it so it is searchable in a more sophisticated way than a Google-type search.

Regarding documents that are created as part of an effort on which you are working, numbering them sequentially with a listing of all their titles, authors, and dates that gets updated every time a new document is written improves the odds of the material being saved. The RFC list is an example of this. Had they not been numbered and rather just been a lot of documents, I doubt they would have been as successful and long lived as they are. While the documents may never be important enough to collect, if the project turns out to have been important its numbered documents have a bigger change of still existing.

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We can publish historical content more or less formally. I already mentioned submitting papers to *TUGboat* or the *Annals*. We also can self-publish monographs; one example is the "commemorative brochure" written for the 50th anniversary of the CTSS system (`tug.org/l/walden-ctss`).

Another possibility is to post your memories at the Engineering, Technology, and History Wiki (`ethw.org/Main_Page`). This history resource is sponsored by half a dozen or so professional societies and is managed by the IEEE History Center. They want technologists to contribute to the site. Go look at it.

The TeX community is world wide. Among us, we are in a good position to report histories from each of our counties. More of this would be highly interesting.

We can also self-publish our memoirs; for example see the memoir of Severo Ornstein, *Computing in the Middle Ages — A View from the Trenches, 1955–1983*, which is posted at the Computer History Museum.[17] The Engineering, Technology, and History Wiki mentioned just above is very welcoming of memories of people who come from the work the wiki covers. I posted a partial memoir there. You can too.

We can join relevant organizations and do what we can to help.

We can subscribe to journals such as the *Annals*, contribute, and perhaps one day be appointed to the editorial board (this happened for me[18]). SIGCIS (`sigcis.org`) (nominally a part of the Society for the History of Technology[19]) is where professional and amateur computing historians from all over the world communicate with each other about their projects, post calls for papers, discuss book releases, and so on. If you are researching a history topic and wanted to know where to find something or how other people view what you are thinking, SIGCIS is the place to ask your question. Britain's Computer Conservation Society (`computerconservationsociety.org`) is a good organization to know about, and it has an excellent free journal called Resurrections. It is loaded with examples of stories from history that demonstrate that any of us can write up a bit of history.

One can become a docent, or join a committee,[20] or help with a project at someplace like the Computer History Museum.[21] A few years ago, my friend Guy Fedorkow began thinking about what he would do after he retired from his position as a computer system architect in a router company. Work took him between home in Boston where he lives and Silicon Valley many times each year. He introduced himself to the curators of the Computer History Museum and did a volunteer project with the IBM 1401 restoration team.[22] Having understood Guy's capabilities, the CHM curators introduced him to curators at the MIT Museum. From there, a project evolved to combine the many Whirlwind computer paper and magnetic tapes in the CHM archive with MIT's deep collection of Whirlwind project reports and notes in order to learn more about the history of software on the machine.[23,24,25]

Guy, with help of many others at both MIT and CHM, has figured out how to read the old magnetic tapes,[6] has written a Whirlwind simulator, and now is writing a paper about the effort which he is submitting for publication to the *IEEE Annals of the History of Computing*. This is another project that most professional historians probably would not have undertaken.

Let me make explicit the underlying theme of my presentation at TUG 2020 and this paper derived from it. *Much can be done to capture and publish history (e.g., of computing generally or TeX/TUG-related topics more specifically) if someone wants to do it.* It is no different than any of the projects we heard about at TUG 2020. Someone got interested in a topic, eventually put lots of time into it, perhaps recruited some help, and got something big done, e.g., Pandoc or LaTeX 2$_\varepsilon$ and its successors.

Another good examples of this comes from the activities of Luanne Johnson and Burt Grad (Figure 3). They saw a need a few decades ago to save the histories of companies in various software business. Companies came and went and their histories were being lost. They started working on it. They organized meetings of pioneers in various software business areas. They interviewed them. They transcribed meeting discussions. They got software business pioneers to write papers for the *Annals of the History of Computing*. Of course, they didn't do it alone; over time they developed a little organization. There is a website at `annals-extras.org/pubs/2020-06-22-lij-sisig-website.pdf` that summarizes their activities over the years.[26] Now, as they grow older, they have arranged for the Computer History Museum to take over their archive and some of their work. Being from the computing industry, they saw the need and they did something about it which eventually became a major computing history research resource. Their most recent effort (2017–2020) was in a TeX-related area — the history of desktop publishing (`annals-extras.org/dtp`).

Figure 3: Len Shustek, Chairman of the Computer History Museum, presenting an Achievement award to Burt Grad (remotely in the Beam robot) and Luanne Johnson in March 2017 — photo credit to © Douglas Fairbairn Photography. (Photo used with permission of the individuals in the picture.)

The third person in the image is Len Shustek, who founded the Computer History Museum — another example of an individual who is not a professional historian but who has had a major effect on the world of computing history (the CHM founding is described at `tug.org/l/shustek-museum`).

In the typography and printing field, Frank Romano started his career at Linotype, continued it in phototypesetting, and now is collecting history — now of digital typesetting.[27] Most of us will not do as much history work as Frank; he can be an inspiration to us to do what we can.

The entire TeX infrastructure (CTAN, TeX Live, LaTeX, *TUGboat*, conferences on all manner or topics, and so on) is an example of one or a few people deciding to do something, doing it, being joined by other people, and the result being an important contribution to the world. Maybe there could be a bit more explicit infrastructure for collecting history. More specifically, perhaps it could be an explicit goal to have more history articles in *TUGboat* and more history presentations, panels, and sessions at TUG conferences.

People like us can make contributions to capturing, organizing, and publicizing computing history or the history of our special area of interest. These contributions may be big or small.

No one can know what aspects of computing history and how it has been collected and interpreted will be important in the future. Ultimately it may not matter who managed to save the historical record. As the Bigelow quote on page 162 suggests, it just

matters that somehow the history gets passed along from the people who "experienced, participated in, and understood the technological formations and transformations".[28] I claim that we practitioners and users are in as good a position as anyone to decide what should be saved and may be in the best position to contribute to the passing along. Systematically collecting, organizing, somehow archiving, and writing about what seems important to us is (1) better than indiscriminate collection of everything (for instance the Library of Congress's effort through 2017 to collect every public Twitter tweet), and (2) better than collecting nothing because it's the job of someone else.

Acknowledgments

Notes

[1] Paraphrasing slightly an observation made by Charles Bigelow, email of 2020-08-01.

[2] David Hemmendinger has reminded me that university history departments being fussy about what constitutes "real" history goes beyond computing history. History of science and history of technology scholars sometimes have been relegated to a department different than the main history department. Alex Magoun noted further to me that History of Science departments initially did not want technology history tainting their departments. It's human nature, I suppose. Each established discipline is unwelcoming to new branches of the discipline.

[3] Something about how writing computing history has evolved may be found in Martin Campbell-Kelly's paper The History of the History of Software (*IEEE Annals of the History of Computing*, vol. 29, no. 4, 2007, pp. 40–51). In it he notes that over time writing about software history moved from writing primarily about

technology to increasingly writing about what he called "supply-side industry", applications, or institutional, social, political aspects of software. Donald Knuth took exception to Campbell-Kelly's view in public lectures in 2009 and 2014, preferring the more traditional technology focused approach and worried about the "dumbing down" of computing history writing. The 2014 lecture (`youtube.com/watch?v=gAXdDEQveKw`) in which Knuth said the changed direction of history caused him to cry also caused a big stir among computing historians and was extensively discussed and denigrated in discussions at `sigcis.org`. Campbell-Kelly explained in a follow-up comment (Knuth and the Spectrum of History, *IEEE Annals of the History of Computing*, vol. 36, no. 3, 2014, p. 96) that he felt he was halfway between what Knuth wanted and what people with a more social science perspective want. Thomas Haigh wrote a follow-up article on the debate: The Tears of Donald Knuth, *Communications of the ACM*, vol. 58, no. 1, 2015, pp. 44–44, `tomandmaria.com/Tom/Writing/CACMKnuthTears.pdf`.

[4] Email of 2020-07-24.

[5] Software Recovery and Beyond, *IEEE Annals of the History of Computing*, vol. 41, no. 4, 2019, pp. 110–118.

[6] Magnetic Tape Data Recovery, Vintage Computer Festival West 2020, August 1, 2020, streamed via YouTube, available at `youtube.com/watch?v=sKvwjYwvN2U`.

[7] Published by M. E. Sharpe in 2012; a review is at `tug.org/l/cortada-review`.

[8] Oxford University Press, paperback edition 2014.

[9] There is also various online instruction in interviewing, for instance from the IEEE History Center: `ieee.org/about/history-center`.

[10] Remembering the Office of the Future: The Origins of Word Processing and Office Automation, *IEEE Annals of the History of Computing*, vol. 28 no. 4.

[11] Thomas Haigh, Mark Priestley and Crispin Rope, *ENIAC in Action — Making and Remaking the Modern Computer*, MIT Press, 2016.

[12] Thomas Haigh, mentioned in the prior paragraph, has been increasingly working in the non-traditional collaborative way, and his co-author Mark Priestly comes from the practitioner rather than professional historian world. Maybe it's the beginning of a trend.

[13] Charles Bigelow, The Font Wars, parts 1 and 2, *IEEE Annals of the History of Computing* vol. 42, no. 1, 2020, pp. 7–40, `computer.org/csdl/magazine/an/2020/01`.

[14] Presentations at our various TeX-related conferences (e.g., for ConTeXt, DANTE e.V., etc.) may be more varied and thus easier to become a speaker at than at conferences of more specialized groups such as the American Printing History Association or the Society of Typographic Aficionados. Our TeX-related journals may also be easier to get published in than more specialized journals. TeX of course is a fairly specialized topic, but we appear to use it as a jumping off point to whatever we want to talk or write about.

[15] Lots of famous people, knowing their papers are important, have sent their papers to archives. Less famous people can also contribute. We can too. My friend Alex McKenzie was involved in the early days of the Internet — not at the level of impact of Bob Kahn or Vint Cerf — but still his papers get plenty of use at the Charles Babbage Institute (`archives.lib.umn.edu/repositories/3/resources/242`)

[16] Elizabeth Feinler, The Network Information Center and its Archives, *IEEE Annals of the History of Computing*, vol. 32, no. 3, 2010.

[17] Severo Ornstein, Computing in the Middle Ages, `computerhistory.org/collections/catalog/102785079`. Ornstein started computing on MIT's pioneering Whirlwind computer, was part of the team that developed the LINC computer, was an Internet pioneer, was involved in developing one of the earliest music transcription programs (Mockingbird, `computerhistory.org/blog/rediscovering-mockingbird-a-composers-amanuensis/`), and was part of the Alto development team at Xerox PARC.

[18] `walden-family.com/ieee/my-history.html`

[19] The Society for the History of Technology itself has an interesting history with respect to what this paper is about: `vqronline.org/essay/technology-history-and-culture-appreciation-melvin-kranzberg`

[20] See for instance `softwarepreservation.org`.

[21] As I sat in the virtual TUG 2020 conference, I wondered, "How is what a docent does going to change in this days of COVID-19 and Zoom-based communication. Will docents only be leading virtual tours of museums?"

[22] Guy Fedorkow, About the Computer History Museum's IBM 1401 Machines, `tug.org/l/fedorkow-1401`; IBM 1401, A Modern Theory of Operation, `ibm-1401.info/IBM-1401-Theory-of-Operation-GF.pdf`

[23] Guy Fedorkow, The Whirlwind Computer at CHM, `computerhistory.org/blog/the-whirlwind-computer-at-chm`

[24] Guy Fedorkow and David Brock, Jingle Bits: Auditory Maintenance, Whirlwind Holiday Songs & the Dawn of Computer Music, `tug.org/l/fedorkow-jingle`

[25] Guy Fedorkow, Gambling on Whirlwind: How the US Navy Spent $3 Million+ and Got a Computer Game, `tug.org/l/fedorkow-whirlwind-gambling`

[26] Luanne and Burt also recently had descriptions of their work published in the third 2020 issue of the *IEEE of the Annals of Computing*: Preserving the History of the Software History by Luanne Johnson; In Search of Software History by Burt Grad; and Finding Software Industry History also by Burt Grad.

[27] `tug.org/TUGboat/tb36-1/tb112reviews-romano.pdf` and `tug.org/TUGboat/tb41-1/tb127reviews-romano.pdf`

[28] Charles Bigelow email of 2020-07-31.

⋄ David Walden
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