Re-defining 'evidence':
Appraising for historical value as historians turn to media and materiality

Alistair Kwan
University of Auckland

Evidence has always been a slippery concept, and historians have been changing their minds about it at what seems to be an ever-increasing rate. There was once a time when 'texts' generally meant respectable, official (or at least authenticated) handwritten or printed documents, and they had a well-defined home in archives and libraries. Material sources like coins, tombstones, and archaeological spolia tended to be separated off into museums, along with many of the curators who researched them. Old documents, necessitating knowledge of things like diplomatics, heraldry and palaeography, overlapped the institutional divide somewhat. Herbert Putnam, faced with organising the Minneapolis Public Library and the Library of Congress, relegated all of those source-establishment problems to a single subject class for "the auxiliary sciences of history," with the classes for history immediately following. Where antiquarians had tackled source establishment themselves, the new modern historian tended to be a high-minded synthetic thinker who left auxiliary studies to specialists in their own right.[1]

Over the past century or so, historians have gradually claimed those auxiliary disciplines back. Through much of the twentieth century, for example, historians drew close with bibliography: Donald Wing's catalogue of early English books is perhaps the best-known of projects that challenged what counts as an authoritative text. Now that bibliography is falling back into fashion, many historians are re-discovering that printed books come in variant copies (even today), and that typist, editor, censor, compositor, impositor and even the bookbinder, librarian and owner all exercise authorial agency whether they mean to or not. We have learnt, for example, that when a typist missed a comma and hit the key alongside, 'resembled' became into 'rese,bled'. Working from the typescript, an editor or compositor corrected it wrongly, inadvertently styling one of William Faulkner's nicer passages: "the valley rose, bled a river choked with down timber and drowned livestock until not even a

horse could have crossed it in darkness to reach a telephone and fetch the doctor back."[2] Once, we asked, what did Faulkner write? Practically anyone in search of Faulkner's intent would have to correct the text back to 'resembled'. But the line is beautiful and the text has taken on a life of its own: in addition to thinking about Faulkner as sole author of the manuscript, we must think also of Faulkner as one link in a production chain, Faulkner as an author-branded syndicate, and Faulkner as a readers' and critics' construction.

Literary collectors have long treasured and preserved many manuscripts and typescripts, often in multiple drafts, that precede the published work. Evidence thereby survives for textual scholarship, at least for literature, even though that kind of research and that kind of evidence were not necessarily the collectors' initial intentions.

The printer's hand is evidenced in other ways, too. Damaged type, for example, is recorded by using it. Working through books to count up identical deformities has allowed us to estimate how much type a printer had, and sometimes who an un-named printer was.[3] Done predominantly in English Departments, such work has naturally emphasised literary output. In principle, similar work could be done on numerical tables in mathematical texts: printers whose businesses focussed on literature and broadsides might have had enough numeric type to print a price list or a newspaper, but it requires a hundred times as much to print even a single page of logarithms for a much thinner market. But who among us collects documents for their deformed print? This evidence survived because it inheres in documents collected for other reasons.

In the same way, we can identify woodcuts by grain, cracks and insect damage. Their impressions show how stock image pieces got circulated and adapted: windows in the wood let printers fill empty speech bubbles for specific needs, and partial modifications to the image itself show how woodcuts were adapted to denominational difference as they crossed between Catholic and Protestant lands. As for conducting research on the tens of thousands of extant woodcuts, plates, lithographic stones and type galleys, that is difficult: we still have no good way to catalogue it, not even a consistent vocabulary.

Marginalia is also deemed damage but, being due to readers, was actively regretted. Even now, it often reduces a dealer's price, and many will clean marginalia away when they can, as an act of restoration. Yet marginalia has its uses. Marginalia proved that Copernicus's great cosmological treatise was not, as had long been supposed, "the book nobody read." Many copies are heavily annotated in all sorts of ways that demonstrate not just correction to fulfil censorship demands, but

serious intellectual engagement.[4] Marginalia have often fallen victim to trimming as libraries rebound and trimmed their books but enough survives, along with underlining and insertions and wear, to nourish a new branch of history that recognises readers as agents in the process of making meaning: the history of reading.

Conservators have long known of another kind of evidence: the waste that lines covers and spines, and the cartonnage that covers mummies. Spine linings are now an important source of rare texts but, when smashed bindings are repaired, such evidence sometimes along with evidence of rearrangements, insertions and removals becomes secret once more. Library practice has swung heavily towards boxing in order not to destroy evidence through repair.[5]

Recycling also sometimes preserves evidence. Our earliest attestation of Archimedes' work was scraped off its parchment to make space for work judged more important. The ink sinks more deeply than scribes scrape, and, in the right light, the old words still shine gently from behind the prayers written on top.[6]

Even fading has proven its worth. Benford's Law, which describes a peculiar distribution of digits in naturally occurring quantities, arose from noticing "how much faster the first pages [of logarithm tables] wear out than the last ones".[7] Like many mathematical curiosities, Benford's Law finds extensive practical application. But what of the evidence — who archives obsolete logarithm tables? Who keeps a book of tables in circulation to further build its meaning through the readers' continued touch, or transfers the worn old volumes to special collections when a clean, new edition comes along? The text here is not the numerical values but the physical traces of use.

A new generation of historians is making the problem more complicated still. They call themselves 'eclectic', to distinguish themselves from a generation somewhat factionalised by method. Eclectic historians pick and choose whatever methods match the sources. I do not think of myself as one: my methodological identity is attached to old-fashioned bibliography. Perhaps I am worse than an eclectic: I also studied material culture and architectural history, so I treat buildings and scientific instruments as primary texts alongside what's written.

I take particular interest in the scratches, stretches and repairs on laboratory apparatus that attest to their use. Curators and collectors have long preferred to restore those away; their interest is in manufacturers and designers rather than the scientific process.[8] I hence echo the bibliographers in saying that there is no such thing as a duplicate. If you find two common undergraduate voltmeters the same in every way, that's

evidence that the class had at least some uniform equipment. Having worked for a while in a physics teaching laboratory, and conducted research in many historical instrumentation collections, I have seen that apparatus is more usually not that consistent. One of the technician's roles is to ensure that every group of students has a combination of apparatus – which may be different between groups – that coheres to permit the work. Keeping only one voltmeter erases those realities of the laboratory, and erases the technician from the laboratory's history.

Could there be such a thing as an 'archive' of scientific apparatus, recording a laboratory's state? It is tricky to imagine one because apparatus gets re-used and progressively accumulates meaning in collocated layers a chronotope whereas logbooks and diaries are more open to being treated as conveniently sequential.[9] Apparatus is often disposable, like the scrap paper and blotters that archives usually don't receive, and used apparatus can be dangerous so must be disposed of. Strong solvents, toxic substances, and materials that will decay into volatile, corrosive or otherwise difficult products pose problems to be addressed in the laboratory even before they get appraised for museum-grade storage. But at least one such archive does exist: the Archivio Scientifico e Tecnologico at the University di Torino. When a major project ends, the laboratory is cleaned up and its apparatus added to this sprawling complex in the city's former tobacco factory. Nothing much is cleaned or fixed, and this is what I like to read.

Buildings prove challenging, too. Without restorations and adaptations, obsolete venues are condemned to decay, and some were not built to last anyway. A key astronomical observatory in Denmark, for instance, the Observatorium Tusculanum, was designed with only one kind of observation in mind and is famed for observations taken in a mere three-day window. All that survives now is its post-holes. Their survival is unusual. The costs of maintaining an historic site generally necessitate reconfiguration as a museum, apartment block or reception centre.

Reconfiguration and repurposing makes buildings tricky to read. There was once a time when horticulturalists looked forwards to establishing a pineapple industry in seventeenth-century London. I tracked down one of their heated growing-beds; it looked exactly as I had imagined from written attestations, except for one thing: the owners, puzzled by its design, had added a low roof and were using the heating cavity as a working space to stand in. My searches for Enlightenment greenhouse heaters have always been stymied by the metals being long ago recycled, so I look for the pipe-niches remaining in the brickwork. Original glass

greenhouse panes, and their precursor, oiled paper, generally do not survive. Worn steps get replaced to allay a safety hazard, or simply because they look bad. Returning to observatories, windows broken apart to accommodate a telescope three hundred years ago get repaired if the building survives at all; no one puts up with a draft for that long.

There is another kind of bias, too, well known to historians of women and children: official records tend to exclude unimportant people. In many cases, this is because women's and children's voices never made it into an archivist's hands; they were filtered out at earlier stages, or never manifested in tangible media. Sometimes they are represented in someone else's voice, reduced to residence counts, maintenance costs or labour units. Often, however, exclusion is the archivist's decision. Sometimes this is what institutional policy or business needs demand: records generated by patients, students, teachers and technicians are not germane to an institution's administrative processes, or must be destroyed to meet confidentiality or privacy commitments. Working in the history of education, I encounter such loss often. The student laboratory apparatus is all thrown out, though a few attractive lecture demonstrations or classroom models might survive. I'm often enthusiastically told that there are extensive records of what was taught, but it usually turns out to be mostly the brief synopses in course catalogues and perhaps some administrative registers that include class sizes and grade distributions. Some institutions also have the exams, and very rarely lecture notes, but no one kept assignments or syllabuses, the lecture slides (though there are generic lantern slide collections), nor specimens of student work.

We often lack records of what was in the libraries, too. Few institutional libraries are in a position to provide records of withdrawn material, and may not have good records for internal use either. I once travelled for a day to see a book that a particular student had borrowed four times in one year (he had kept his library slips). I received the book in the special collections reading room and saw a different owner's bookplate dated too late for this to be the right copy. The catalogue entry showed me no hint of this, and showed nothing more when the librarian looked at the raw data fields that modern user interface design protects me from: only the bare minimum had been transcribed. I asked whether the card catalogue might have clues. The librarian was too new to know of one, and I told her that I'd been browsing through it in a stairwell, looking at the handwriting and notational changes in how periodicals had been recorded over the years. Suddenly excited, she bounded off and soon returned triumphant from her first-ever use of a card catalogue. We examined the card together. It recorded the donation and also the

first copy's withdrawal in a year when a space-saving effort sought to remove duplicates. But this was no duplicate: it was the historic object associated with an individual whose collected personal papers survived in the same university's archives. The chances of discovering that provenance by accident are minimal; we cannot blame the archivists or librarians for missing it. But bravo for keeping the old card catalogue! It records not only metadata that did not make it into the on-line database, but rich data like handwriting shifts and notational conventions that cannot be transcribed in any case. Accession registers prove wonderful for the same reason.

Why would this particular copy matter? It is a matter of evidence: I had hoped that a student, whose borrowing slips show that he'd taken that book out four times in a single year, might have left some trace of his reading process in it – annotations that I could match with his handwriting, or notes that matched the courses he was enrolled in when he monopolised that book. Those borrowing slips, like most of the records I use, are one-off oddities that survive in personal papers. I find lecture and laboratory notes, assignments, exams, and very occasionally, mathematical homework problems. Some notebooks contain blueprints and machine-drawn charts that a student actually produced. Some include fossils and pressed plants. Some have coloured pencil, but most are written with stiff-nibbed fountain pens and, in spite of the cheap exercise book paper, ink that does not run. As well as exercise books, I find loose sheets gathered with split pins and bootlaces and spring-backed folders, sometimes with improvised force-spreaders to ease the stress. At other times, a preservationist has removed many of those traces of note-keeping practice, replacing them with pH-neutral folders and paperclips, and I try to surmise the original arrangement and handling by looking at holes, tears, stretches and differential fading in the paper. These documents survived not as fine primary sources on learning and teaching, but for mere association with a great surgeon or politician. Scientific learning artefacts are hard to come by. Doggerel, on the other hand, endures well, regardless of literary worth.

Student work has never attracted much interest, and the features I describe do not lend themselves to 'traditional' historical methods. A key distinction is that, being material, such information cannot be transcribed. Some of it resists photographic representation. It does not always have a name. It may not be amenable to a well-defined order for storage and searching. I do not work on the digital age but, if I did, I would be just as interested in the tape reels and punch cards and the apparatus for reading them, much more than in the data encoded

within transfer to a new, more durable medium does not serve the kind of research that I do. One could go further: current discussions of archive-appropriate encoding format generally miss the historical significance of the encoding that was actually in use.

Returning to the evidence shortage for women and children offers us another perspective on why such evidence matters. Without records by women and children, historians struggle to recover their experiences. Women and children were obviously never absent – they contributed and participated in many ways but only rarely is their contribution recorded as a decisive, substantial action. Even when they are praised by others, the voice in the records is often not their own. We can surmise values and life practicalities, for example, from children's literature and etiquette guides written by people who knew better. In the history of science, the apparent absence of women and children has practical consequences today: explaining the origins of science and the reasons behind our current beliefs commonly conveys messages that we do not want. Learners surmise that science is advanced by older, white men, usually singular geniuses. In other words, learners surmise that science is not for them.[10]

Historians, and educators more generally, accept the ethical duty to address such messages. We craft our class reading lists and published stories to show that, while being born wealthy might obviously helps, it isn't a necessary pre-requisite to doing worthwhile work. We also work to avoid depicting group membership (e.g. ethnicity) as the cause of being always sick, always victims, always criminal, always needing to be managed by someone superior. In the history of science, making that shift has involved reconstruing what science is and who does it: no longer a chain of great triumphs by occasional champions, but lots of work, most of it ordinary, by lots of ordinary individuals who include un-named collaborators, assistants, family members, students, cleaners.

My approach is to focus on the learners and teachers, by far the largest populations in science and in education, yet largely omitted from the history of education. I include technicians, too. By telling classroom-scale stories about learning and teaching, I can show what learning and knowledge really entail. I can hence inform curricular debate in a way that has not previously been possible, by bringing coal-face realities to the fore without the baggage of present-day practicalities. There are rich layers of knowledge recorded in things like scratches on old apparatus and worn-out pages in log tables.

The research that I do is supported by two articles in the International Council of Museum's code of ethics:[11]

> Article 3.1: The museum collections policy should indicate clearly the significance of collections as primary evidence. The policy should not be governed only by current intellectual trends or present museum usage.
> Article 8.4: Members of the museum profession should promote the investigation, preservation, and use of information inherent in the collections. They should, therefore, refrain from any activity or circumstance that might result in the loss of such academic and scientific data.

The International Council on Archives maintains comparable principles, expanding further on how to interpret them.[12] Interpreting is fraught: how is an appraiser look ahead to historical value that even historians have not yet seen? How is an archivist to preserve historical integrity without making a choice about which layers of authorship, and hence which authors, do and do not matter?

In summary, my dilemma has two parts. First, there is a broadening of "text" to include spatiality, materiality and process. The practices and amenities of archives, libraries and museums are of course tied to materiality: the specialised needs of media like magnetic tape, nitrocellulose cine film and even early woodpulp paper illustrate the impracticability of every institution keeping everything; the design of shelving and boxes presumes the materiality of what is to be stored. We are biased towards flat print media. Decades after Marshal McLuhan argued that "the medium is the message", our re-encoding, re-mastering and digitisation practices still privilege encoded data (i.e. language and image) in favour of material data. It is of course good to preserve what we can, and to make it replicable. But we need to ask ourselves how authenticity is changed by re-encoding, re-formatting and re-presenting. Many ask what is lost; we must also ask what's added.

Second, there is a broadening of whose history matters. Invisible people like technicians and women, whose records are usually not kept in ways that go naturally into archives. It is not necessarily through lack of contribution: it may be a matter of media choices rather than active exclusion. We need to ask whose history we are preserving evidence for, and who gets to decide. Sometimes, we get to decide, and we should embrace the ethical complexities of doing so.

As an historian outside the appraisal process, I am mostly limited to observing what I do and do not find, and writing new histories that, by demonstrating new kinds of historicity and new kinds of authorship, may inform future practice. I am lucky: I get to venture a short distance

into the archive, library and museum, often much more than many of my historian peers. As for archivists, librarians and curators, on the other hand, I have seen even over my short years that job descriptions rarely include opportunities to spend time doing the history that I remember being part of my most helpful librarians', archivists' and curators' duties, and job contracts are often only a year or two long – nowhere near long enough to know a collection well. Are we perhaps reviving Putnam's

Endnotes

1. For a case study of early modern antiquarianism framed around the nature of evidence and collection, see Vittoria Feola, *Elias Ashmole and the Uses of Antiquity*, (Blanchard: Paris, 2012).
2. Marita Mathijsen, "The Concept of Authorisation," Text 14 (2002): 90.
3. G. Thomas Tanselle, "The Use of Type Damage as Evidence in Bibliographical Description", The Library 5 (1968): 328–351. Intact type is also studied; see an application in e.g. Jos Bouman and Paul Vriesma, "Harmen Janszoon Muller, Printer and Publisher in Amsterdam, c. 1538–1617," *Quaerendo* 8 (1978): 243.
4. Owen Gingerich, *The Book Nobody Read: Chasing the Revolutions of Nicolaus Copernicus* (New York: Walker & Company, 2004).
5. For a compact but usefully illustrative study of printer's waste that accounts for font, collation, binding and paper, see Oliver Pickering, "Two Pynson Editions of the Life of St Katherine of Alexandria," *The Library* 9 (2008): 471–478.
6. Abigail Quant, "The Archimedes Palimpsest: Conservation Treatment, Digital Imaging and the Transcription of a Rare Mediaeval Manuscript," *Studies in Conservation* 47 (2002): 165–170.
7. Simon Newcomb, "Note on the Frequency of Use of the Different Digits in Natural Numbers," *American Journal of Mathematics* 4 (1881): 39.
8. See an application in Alistair Kwan, "'Do Not Kill Guinea Pig Before Setting Up Apparatus': the Kymograph's Lost Educational Context," *Teorie Vedy* 38 (2016): 301–335.
9. Non-sequential notebook entries abound. Identifying the inks in Galileo's notebooks, for example, has shown how he often went back to re-engage with earlier entries, and how far back he went. Such information is normally not represented in photographic scans. See L. Giuntini et al., "Galileo's Writings: Chronology by PIXE," *Nuclear Instruments and Methods in Physics Research B* 95 (1995), 389–392.
10. For a broad view on how historical perspective impinges upon education and policy, see e.g. Lindy Orthia, "What's Wrong with Talking about the Scientific Revolution? Applying Lessons from History of Science to Applied Fields of Science Studies," *Minerva* 54 (2016), 353–373.
11. International Council of Museums, "Code of Ethics," ICOM.museum, http://icom. museum/the-vision/code-of-ethics/ (accessed June 8, 2016).
12. International Council on Archives, "Code of Ethics", ICA.org, http://www.ica.org/en/ica-code-ethics.

References

Feola, Vittoria. *Elias Ashmole and the Uses of Antiquity* (Blanchard: Paris, 2012).

Gingerich, Owen. *The Book Nobody Read: Chasing the Revolutions of Nicolaus Copernicus* (New York: Walker & Company, 2004).

Giuntini, L., F. Lucarelli, P.A. Mand, and P.H. Barker. "Galileo's Writings: Chronology by PIXE," *Nuclear Instruments and Methods in Physics Research B* 95 (1995), 389–392.

International Council of Museums. "Code of Ethics," ICOM.museum, http://icom.museum/the-vision/code-of-ethics/ (accessed June 8, 2016).

International Council on Archives, "Code of Ethics", ICA.org, http://www.ica.org/en/ica-code-ethics (accessed June 8, 2016).

Kwan, Alistair. "'Do Not Kill Guinea Pig Before Setting Up Apparatus': the Kymograph's Lost Educational Context," *Teorie Vedy* 38 (2016): 301–335.

Mathijsen, Marita. "The Concept of Authorisation," *Text* 14 (2002): 77–90, 90.

Newcomb, Simon. "Note on the Frequency of Use of the Different Digits in Natural Numbers," *American Journal of Mathematics* 4 (1881): 39–40.

Orthia, Lindy. "What's Wrong with Talking about the Scientific Revolution? Applying Lessons from History of Science to Applied Fields of Science Studies," *Minerva* 54 (2016), 353–373.

Pickering, Oliver. "Two Pynson Editions of the Life of St Katherine of Alexandria," *Library* 9 (2008): 471–478.

Quant, Abigail. "The Archimedes Palimpsest: Conservation Treatment, Digital Imaging and the Transcription of a Rare Mediaeval Manuscript," *Studies in Conservation* 47 (2002): 165–170.

Tanselle, G. Thomas. "The Use of Type Damage as Evidence in Bibliographical Description", *The Library* 5 (1968): 328–351.