Intangible histories and the invisible technician

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Abstract

It is the technicians in a university science department who often provide the most continuity: they have a permanence and a range of activities that, in the course of their time at a single lab, they often see come and go a series of research groups and instruments. In a fundamental sense, it is these technicians who in fact control the material substrate of university memory. By building on case studies from oral histories with technicians at the University of Cambridge, this paper will explore what their perspectives offer the preservation of university heritage.

Introduction

Much work has been done in exploring the intangible and invisible aspects of objects.[1] In the case of scientific material, collection and display would ideally include such aspects, for example information about the sites of both production and use; the uses of the objects and how these changed; how the instruments themselves were adapted for changing research and teaching demand; relationships to other instruments and perhaps other research groups or; how successful or otherwise they were; and, crucially, in my own research, the attitudes and feelings of the users towards them – the scientists, technicians, craftsmen, and students.

This paper concentrates on the role of the technician in the preservation of scientific objects, and also as a repository of intangible histories of the objects. The "invisible technician" of my title refers to the seminal paper by Steven Shapin about the unacknowledged roles played by technicians in the 17th century, focused on the crowd of 'extras' around Robert Boyle.[2] Published in 1985, the paper concludes with reflections on 'modern' (that is, the situation in 1985) distinctions between the roles of scientists and technicians, noting the variations between theoretical and practical disciplines, different sized laboratories, different countries and political and organizational structures.[3] He notes the range of attitudes to and roles of technicians that these differences of context result in, but says that his are only "speculations and impressionistic remarks" because of "our systematic ignorance about the scientist-technician relationship in modern science".[4] Happily, since his paper (and perhaps in part thanks to it), technicians have been increasingly studied by historians of science in terms of hidden forces shaping scientific practice, culture and results.[5]

I draw on these ideas to explore how technicians are shaping the history of science itself, that is, how their actions fundamentally affect what material heritage is preserved for the future as a direct result of their role in departments. These roles, as Shapin points out, vary widely, but commonly include the control of the transit of objects between research projects, and from research to teaching labs, and, ultimately, from the lab (whether research or teaching) to the disposal skip. They thus have an overview of the full life-span of these objects which scientists mostly do not have. They also have a detailed knowledge of the different uses and problems of the instruments which is invaluable in contextualizing instruments for historical research or teaching purposes; an overview which is aided by a chronological continuity in their institution which scientists generally do not, given the nature of

[1] For perhaps the most intangible aspect of objects, that is, their emotional contexts and reception, see TURKLE 2007; TURKLE 2008.
[2] SHAPIN 1989.
[3] Ibid., 562.
[4] Ibid.
[5] See, for example, BARLEY & BECHKY 1994; LATOUR & WOOLGAR 1986; KNORR-CETINA 1981. For work accomplished by non-scientists more generally, see STAR & GRIESEMER 1989; SECORD 1994.

academic careers. "[T]he price of technicians' continued invisibility is an impoverished understanding of the nature of scientific practice"[6] says Shapin, and this is still the case for an understanding of the nature of preservation of the material culture for future historians of science.

With the typical career mobility of a scientist comes a lack of institutional memory, especially in such issues as heritage, which are not always perceived as central to a science department and so there are not internal preservation mechanisms and policies in place. There is also a tension in many departments between recognizing a successful past and facing a competitive future. An example is the case of a department which will remain nameless: the last head of department was very heritage minded and provided funding and impetus for a variety of projects including a permanent exhibition space in a seminar room, the provision of a permanent storage room for heritage objects and setting up a cataloguing project for these objects. With the new head of department these initiatives have stalled; there has been no more work on cataloguing, and funding for upkeep has lapsed. When interviewed, he said that funding bodies were not interested in past Nobel prizes but future ones, and that it was his job to sell the department as a modern, forward-looking research institution and not somewhere living only on its past reputation. There are many other instances of the shortness of institutional memory, and one of the major challenges of preservation of university heritage is how to provide stability and continuity. In terms of the preservation of intangible history – that is, the contexts of the material heritage – technicians are key.

The technician's role in this process of preservation is often unconscious – after all, it is not their job to think about history, but to run a lab, which includes periodically making space for new equipment and thus disposal of the old. Of course, some *are* interested specifically in object preservation, though this is not the majority in my experience of visits to the science departments of the University of Cambridge. This does not mean, however, that they are not interested in historical matters more broadly defined. In my experience it is quite the opposite; technicians are full of information and stories about the history of their department. One of the aims of my research is to find out their attitudes to their equipment and its history aside from their actions, or what they claim to be important to them, in their everyday work.

Another problem is in the definition of 'heritage', which is often more broadly defined by a historian than by a scientist or technician; objects connected to 'normal' scientific practice or to teaching are often not valued given their 'ordinary' identity, often mass-produced natures, and sometimes low monetary value. But the opposite is the case for many different audiences of scientific heritage: knowing how science is or has been taught is crucial for historians of science to understand the day-to-day functioning of science. Moreover, from the museological point of view, teaching equipment, for example teaching models, is relatively accessible to the public, designed as it is to explain scientific principles and processes to beginners, and often of convenient size.

Two case studies of technicians in different departments of the University of Cambridge are outlined below, both illustrative of the continuity already mentioned. The techniques I use to gain insight into these contexts are drawn from oral history. Given that many interviewees do not react well to formalized interviews, informal chats, on some occasions, be more productive. In the future, a photo archive will be created, which ideally would portray certain relationships between object (the instruments, specimens, models or material), person (scientists, technicians or students) and environment (the lab or technician's office).

[6] SHAPIN 1989, 563.

Case study 1: Chemical engineering

The categorization of 'heritage' is particularly problematic in the Department of Chemical Engineering and Biotechnology, where hardware lasts a long time and there are many short-term student research projects each year, requiring a large stock of functioning equipment which may or may not be used again for years. Thus some items that we might view as potentially heritage items, or just plain 'old', are not old in terms of the technician's job; 'old' in this context, for the technicians, means obsolete, which mostly means broken. Even then, bits and pieces can be rescued and recycled, making the preservation of scientific heritage of this department a challenging task.

One of the two technicians in the department is a hoarder and meticulous cataloguer. As he sees it, these are both fundamental duties of his job. He proudly claims that he can always lay his hands on what a student might need even if it was last used in the 1960s. But he says that his hoarding is for scientific purposes only and he has no qualms in getting rid of things which are broken. He claims not to be interested in preserving objects for historical purposes, an attitude which, later in the interview, is contradicted. For example, I asked him to show me his favorite piece of equipment – a request I often finish visits with, in order to get a more spontaneous reaction. "Come into the basement" was the intriguing response, where he showed me a big metal case, perhaps 2 meters by 1 by 1, with many multicolored wires inside. It was hard for me to give a response, because its function was opaque to me, a novice, but he didn't seem to need one; instead, he told me that his colleague had suggested cannibalizing it for its parts as it took up valuable room. He replied to his colleague: "you can't chuck that out! I told him – I made it myself! It's my baby!" and so on. Thus he does hold onto equipment for reasons other than the purely functional: he showed, with this example, a clear emotional attachment to an object.

This attachment to objects is encouraging from the point of view of preservation, but how are we to build on it? The technician's input is crucial if a specific instrument is chosen to be kept for historical reasons,[7] as are his memories covering construction (including the background of the constituent parts, so carefully catalogued and stored), use (by himself, scientists and students) and adaptation. He is the only person in the department who knows the full story of a piece of (to me, indecipherable) equipment in the basement. Furthermore, it sheds light onto my research concerning attitudes to equipment in science departments in general, but that is for another paper.

What is clear from the example is that oral testimony is invaluable, even indispensable in certain cases, to preserving material heritage. If considerable scientific expertise is required to understand the function of an object, or if the object is 'black box', as is the case with the technician's instrument in the basement, or both, the value of preservation without supporting contextual material is diminished: this example shows that it is the technician who is the repository of this requisite knowledge.

Case study 2: Quaternary Research

The subject of Quaternary Research (that is, research into the last 2.6 million years) has had a long and tumultuous history at Cambridge. Founded as a sub-department in the Department of Botany under the aegis of Harry Godwin in 1948, it was dispersed in the 1970s to a large number of departments (earth sciences, geography, archaeology, zoology and the Scott Polar Research Institute being the main recipients of researchers). In 1995 the Godwin Institute of Quaternary Research was formed, but rather than being placed in a single building or department, this new institute had a flexible

[7] The aspect of choice in the preservation of scientific heritage is a whole other can of worms which I will not open here. Much work is being done on this all over the world, for example at the University of Toronto, the University of Leeds, the University of Lisbon, the Scientific Heritage Project at the University of Cambridge and many others; research into these initiatives is one line of enquiry being pursued by the newly-formed Universeum Working Group for the Preservation of Recent University Scientific Heritage. I look forward to the results from this Working Group.

structure involving collaboration between all the departments with Quaternary content. In 2005 an even more informal structure, Cambridge Quaternary, replaced the Godwin Institute.[8]

The importance of this case study from my point of view is that throughout all these shifts a collection of objects and documents has been accumulated and preserved, and is now housed together in one room in the Department of Geography.[9] It is being carefully guarded from the constant threats of space requirements by two long-term members of the research group, one a lab technician, who are also cataloguing and researching and putting material up online.[10]

This technician is passionate about the preservation of the history of the research group, and works hard in his spare time to organize, catalogue and photograph the store-room of rescued items going back to the foundation of the sub-department in 1948 (a collection which includes specimens, field notebooks, reports and minutes of the department, microscopes, lecture slides, recording equipment, and much more). He seems to have the entire history, including knowledge of objects and materials held in a store-room (labeled 'museum' on both the door and the website), at his fingertips and is thus a crucial source for the contextualization of objects preserved. Why the marked difference to chemical engineering? Perhaps one difference is that he has a PhD in the field and so a personal academic connection with the discipline. But I think it has more to do with the specific, tumultuous history of Quaternary Research in Cambridge, including political difficulties. This socio-political context of the struggle to survive has also affected other major players in the discipline who are working hard to preserve its history, with a sense of responsibility for material that is threatened by a lack of institutional recognition. This has been made explicit by the current group coordinator of Cambridge Quaternary, who says that they are the guardians of the history and heritage of the whole endeavor of Quaternary Research in Cambridge.

This technician's work on history of Quaternary Research is entirely separate from his regular duties. It is encouraging that virtually nothing has been thrown away in the process of the multiple moves (and the rare items that have been thrown out are mourned), but again, even in this historically-sensitive environment there is the assumption that much of the modern material, especially the teaching equipment, is not interesting or valuable; the emphasis is on the equipment, specimens and so on which were used by major researchers who are no longer working i.e. material over 20–30 years old. This example thus works as a reminder to those concerned with preservation of more recent science: policies or guidelines for disposal of very recently obsolete equipment are essential even in those departments looking after their history.

Conclusion

There are many people across the University of Cambridge working hard, often in their spare time, in looking after the material heritage of the sciences in one aspect or another, from one point of view or another. They may be 'invisible' to historians of recent science, but they and their activities are often well-known in their departments, as is clear from responses to my enquiries to the heads of department, who virtually always know instantly who will be able to help me, whether that is a technician, librarian, archivist (both official and unofficial, that is, trained archivists employed as such, or members of the department who take on the role and title), scientist or retired member of the department. There are countless hoarding scientists whom I stumble upon from time to time, and many collections, catalogued and uncatalogued, throughout the university.[11]

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[8] For more information to flesh out this very brief sketch see, for example, www.quaternary.group.cam.ac.uk/history/ (accessed November 22, 2011); SMITH 1997; SMITH 2009.
[9] For more on this case study, see WILSON 2012.
[10] See www.quaternary.group.cam.ac.uk/museum/ (accessed November 22, 2011).
[11] For more information see WILSON 2012.

There are many more similar examples – and it is encouraging that there is so much laudable activity throughout the University of Cambridge – but what I hope I have shown in this paper is that, whatever else may be happening, technicians are involved in all aspects of the lives of objects in scientific departments and need to be recognized when collecting and preserving scientific material heritage. They cannibalize instruments, and as a result are often the only people who remember the full range of past uses of equipment. They will talk of the not-so-successful experiments that scientists will often avoid mentioning, or think are unimportant to the history of science. They are involved in day-to-day teaching and research across large numbers of research topics and crucially over large time spans, thus providing continuity of contextual knowledge over areas of research, type of activity (that is, teaching, research and maintenance) and time.

A further line of enquiry stemming from these observations would be to explore the relationship between scientist and technician (as Shapin suggests in the context of scientific practice) for an increased understanding of attitudes to and practices of preservation. There is often a sense of shared history, work and ownership between scientists and the technicians they rely on, though this seems to be diminishing with increased workloads of the technicians, and their increasingly thinly spread expertise over more research groups than they previously had responsibility for. Conversely, there can be tensions between division of labor, expertise and ownership of research and equipment. This is not an area in which I have much data yet, but from initial interviews I feel it is worthy of further consideration.

For all those concerned with the preservation of scientific heritage, technicians are an immensely valuable resource. As I have argued, they are repositories of valuable knowledge of intangible contexts of use and production, vital to history of science and museology alike. But it is also imperative that this expertise be utilized in another aspect of scientific heritage, and that is the establishment and implementation of preservation and disposal policies. Technicians thus have a range of roles, some absolutely vital, in the task of preserving university heritage; to ignore them is to impoverish this endeavor.

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