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Artifacts & Opportunity

Science and Technology Collections in Canada

Artéfacts et opportunités

Collections sur la science et la technologie au Canada

Victoria Fisher  et Erich Weidenhammer

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Artifacts and Opportunity: Science and Technology Collections in Canada

Artéfacts et opportunités : collections de sciences et de technologies au Canada

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Résumé de l'article

Partout au Canada, des dizaines de petites collections d'artefacts - qu'elles soient conservées dans des musées nationaux, des institutions plus petites ou simplement rangées dans le placard d'un couloir d'université - constituent un témoignage important, mais largement inexploité, de l'histoire canadienne. Rassemblées dans des laboratoires, des hôpitaux, des maisons, des usines, des fermes et sur le terrain, ces collections nous permettent d'explorer des aspects de la pratique, de l'innovation et du travail scientifiques et technologiques canadiens qui pourraient être inaccessibles par le seul biais des textes.

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Artifacts & Opportunity: Science and Technology Collections in Canada

Victoria Fisher, Erich Weidenhammer

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Artifacts & Opportunity: Science and Technology Collections in Canada
Science et technologie en contexte militaire

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Abstract: Across Canada, dozens of small artifact collections—whether hosted by national museums, smaller institutions, or simply stored in a university hallway cupboard—form an important yet largely untapped record of Canadian history. Assembled from laboratories, hospitals, homes, factories, farms, and fieldwork, such collections permit us to explore aspects of Canadian scientific and technological practice, innovation and labour that may be inaccessible through texts alone.

Keywords: artifact collections, science and technology, Canada, museums

Résumé : Partout au Canada, des dizaines de petites collections d'artefacts - qu'elles soient hébergées par des musées nationaux, des institutions plus petites ou simplement rangées dans un placard de couloir d'université - constituent un témoignage important, mais largement inexploité, de l'histoire du Canada. Rassemblées dans des laboratoires, des hôpitaux, des maisons, des usines, des fermes et sur le terrain, ces collections nous permettent d'explorer des aspects de la pratique scientifique et technologique, de l'innovation et du travail au Canada qui pourraient être inaccessibles par le seul biais des textes.

Mots clés : collections d'artefacts, science et technologie, Canada, musées

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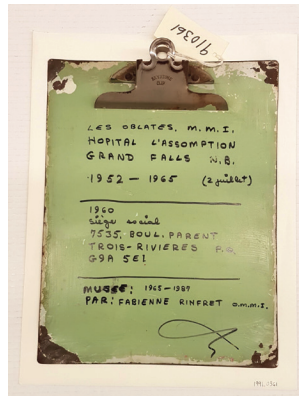


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Introduction: Special Issue

Artifacts & Opportunity: Science and Technology Collections in Canada

Victoria Fisher and Erich Weidenhammer



Left to right: An MCM/70 computer, York University Computer Museum; Clipboard, Ingenium collection, (1991.0361), photograph by Sarah Jaworski; Sputum cup (1934.29.2), Kingston Museum of Health Care collection.

Across Canada, dozens of small artifact collections—whether hosted by national museums, smaller institutions, or simply stored in a university hallway cupboard—form an important yet largely untapped record of Canadian history. Assembled from laboratories, hospitals, homes, factories, farms, and fieldwork, such collections permit us to explore aspects of Canadian scientific and technological practice, innovation and labour that may be inaccessible through texts alone.

Outside of well-established museums, however, many of these collections are at risk. Often little known and used, with limited oversight and comprehension of their content, they can face issues of careless storage, dispersion or even destruction. The loss and erosion of collections and artifacts in Canada can happen quickly, quietly, and even under a watchful eye. A small set of glass instruments designed and used by mid-century Toronto biologist Dorothy Forward, and displayed for decades in a university hallway, disappeared during a renovation sometime between 2020 and 2022, erasing an important way we might understand her work—and the work of a female scientists of her era. Such losses are irreversible and far too common.

Through highlighting the efforts of those who work with artifacts in Canada, this special issue of *Scientia Canadensis* seeks to direct attention to, and begin a conversation about, such collections, exploring both the challenges they present, and the opportunities they offer to researchers. In doing so, we hope to make the case that Canada's material heritage of science and technology deserves greater protection. Representing diverse perspectives, the articles gathered in this issue seek to answer the question: What can collections of historical artifacts teach us about science and technology in Canada, and why should we keep them?

© The Authors, 2024. "Victoria Fisher and Erich Weidenhammer, "Challenge and Opportunity: Pursuing the History of Science and Technology Through Collections," *Scientia Canadensis* 45, no. 2 (2024): i-viii. This work is licensed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0 International License.

Scientific instruments, technological antiques and charismatic machines have long served as a focal point for investigation and learning about the history of science. The formation of public, private and university collections for preservation and display also prompted academic interest among curators and collectors. For instance, historians such as Gerard L'Estrange Turner, who worked at the History of Science Museum in Oxford from 1963 through the late 1980s, explored the development of and design of instruments through reference to historical equipment.¹ In the 1980s, the “pragmatic turn” in the history of science brought experiments, laboratories, instruments and makers into a more central position in the discipline.²

The last few decades have seen an increase in the use of material artifacts for historical research in this community, including the adoption of methodologies from material culture studies, such as object reading³ and the object biography or itinerary. The 2000s and early 2010s saw several major journals running special issues focused on materiality, collections or museums of science and those working with historical artifacts.⁴

Despite this, the use of artifacts as primary sources or as the guiding focus of historical investigations remains a niche methodology among historians. The study of the material artifacts of science and technology is not well integrated into the broader field, and the community of active researchers working with what Liba Taub described as “actual artifacts in actual collections”⁵ is not much bigger than it was twenty years ago.

Still, the Canadian community is vibrant, with dozens of artifact collections in active use, and a community involved in training a new generation. The Ingenium Research Institute, where, at the time of writing, both Erich and I are affiliated, plays an important role in supporting this kind of artifact-centric work. In September 2024, Ingenium hosted the annual gathering of Scientific Instrument Commission conference. This brought together an international community of those interested in scientific artifacts to Canada, and provided an opportunity to showcase recent Canadian research in the field. You will find a sample of that diverse research in this volume.

With many historians having very little experience with artifacts, and collections sometimes difficult to access in comparison with the textual and visual records in archives, many of those investigating material artifacts as historical evidence have appointments which involve responsibility for collections, such as curators or collections managers. Their perspective tends to characterise and shape much of contemporary artifact-centric scholarship in the history of science and technology.

In this special issue, the curator’s dominance in the research of artifacts holds. The majority of the contributors—including Erich and I—either hold, or have held, positions with direct responsibility for the collections they chose to write about. Our scholarship and historical gaze is mediated and directed by material artifacts and collections; they guide how we approach history, the questions we ask, the methodologies we use, and the answers we get.

Although curators’ work with collections—with its unique perspective and closeness to artifacts—is crucial to the field, we believe that collections should also receive broader attention among historians of science and technology. Shifting from their current ‘specialist’ position, artifacts should commonly appear alongside textual and visual records as pieces of historical evidence. We have found that material collections and

archival records mutually support and enrich each other, offering insights through interconnections surrounding materiality, makers, and a variety of other details.⁶ These interactions mean consciously and robustly including artifacts in historical research alongside other types of sources is worth overcoming difficulties, and is a powerful historical tool.

We hope that the work in this issue helps dispel some of the barriers, and offer some inspiration, as to how more historians of science can engage with collections. The authors here explore collections and artifacts as an essential component of historical research and the source of insights and inspiration. They point to the importance of considering relationships among objects, the intersections among collections, and the challenges collections present to researchers. Above all, they invite us to consider the multitude of ways collections may enrich, complicate and refigure the history of science and technology in Canada.

Artifacts and Collections

If we let them, artifacts may lead us on journeys through history that are very different from those offered by textual sources.⁷ They may feature different protagonists, highlight different facets of scientific practice, and challenge the accuracy, veracity or completeness of written accounts. Such journeys permit us to revisit histories that may be obscured in other types of records. In the history of science, examining an apparatus used for an experiment—perhaps covered in wax, hastily repaired, or marked with calibration settings or warnings—may reveal difficulties faced by the researchers that went unmentioned in a published report.

Yet materiality is often difficult. Record keeping in many formal and informal science and technology collections can be limited due to a variety of circumstances, including early attitudes to such artifacts as solely records of technological development over time, rather than also of the people that used them and the places they were used.⁸ This can mean the historical contexts of many artifacts are inscrutable, especially at first glance. Even when we possess a good account of their provenance, artifacts can be recalcitrant and troublesome, leaving important questions frustratingly unanswerable. Such struggles are discussed in the articles within this issue: Sarah Jaworski sought to understand whether a photographic tray, acquired as part of a medical collection, was used as intended, or was enlisted as an affordable replacement for a similar medical equivalent, perhaps representing a context of institutional poverty? Objects may likewise resist pursuit of specific historical actors, events, places, restricting us to more general conclusions. In her investigation of tuberculosis sputum flasks, Rowena McGowan cannot necessarily determine who owned or used particular examples; rather, comparing multiple flasks reveals functional details and facets of how this technology fitted into people's lives.

In this way, opaque artifacts may become more comprehensible when studied within the context of their surrounding collection. While “collection” is often used to imply the entirety of an institution's holdings, or perhaps a formalised sub-set representing the holdings of a museum department, “collections” come in many forms, embodying a variety of underlying relationships between artifacts: A collection may be objects

acquired together, or from a single source; artifacts that were once owned by the same institution, organisation or person; or those with a related purpose, use, maker, or design. This variety is of special interest to the theme of this volume.

Taking collections explicitly as a unit of study is unusual even among historians of science who do work with artifacts. In 2013, Robert Bud, a curator at The Science Museum in London, responding to this oversight, argued that artifacts “should not been seen in isolation but rather as members of existing meaning-laden collections which have histories, cultures and uses.”⁹ He highlighted the importance of understand “local ecologies” of collecting and the “cultural-freightedness” of artifacts within collections and sub-collections. Like an artifact, a museum collection has a rich biography that can reveal the circumstances under which it developed.

I employed a collection-first methodology in my doctoral dissertation. Diverging from Bud’s museum focus, my subject was the surviving historical artifacts at Canadian university physics departments. Some of the collections I examined existed in museum-like formal settings, deliberately gathered to form a “historical collection.” But even where such formal collections existed, they were always accompanied by more informal caches of objects—artifacts assembled more-or-less haphazardly in storage rooms, corridors and offices, perhaps deliberately set aside for later use, or perhaps simply not yet thrown away. Such informal collections may exist only in the mind of the person who knows of their existence.¹⁰

Through my research, I came to recognise the value of this collections-focused approach. A more deliberately gathered collection may reveal the changing disciplinary interests of the institution, curators or collectors. A more informal one will represent the ebbs and flows of the acquisition and disposal of items through their use and disuse in the changing environment of a particular place.¹¹

Even in established museums with significant curatorial resources, many collections exhibit some of both these traits, as they may consist of sets of objects acquired together from a single historic site, which therefore share a history that may have included both types of preservation. Most of the collections explored in this issue, including the ones examined by William Knight and Erin Aults, are examples. Such commonality among artifacts allows us to understand the identity of a particular place—the silences, biases, and approaches reveal the ideas and ideals of the people who interacted with the artifacts during their active lives, and those who preserved (or didn’t dispose of) them once they fell out of use.

Understanding collections also helps us correctly situate individual artifacts, and therefore better understand their significance. Moreover, artifacts may take on *new* significance when understood as part of a large set—to borrow Robert Bud’s language, they become part of a journey or a story, where the connections, similarities and differences between artifacts is useful information.¹² An artifact bearing a numerical indicator may be difficult to interpret alone; cross referencing among the whole collection Dalhousie University’s physics department points to ways in which scientific equipment was grouped, organised, and understood by its users.¹³

This can be true *between* collections as well: One better understands the Dalhousie organisational systems upon realizing that they emerged around the same time, in the

1920s, hinting an effort towards organisation and efficiency in growing departments.¹⁴ Alternatively, the significance of a particular artifact may not become apparent unless one considers their appearance in similar collections—the 20th century acoustics instruments of the physics collection at the University of Manitoba set that collection apart from its peers, pointing to a particular departmental interest in that field.¹⁵

With such wide-ranging possibilities for study, the potential of artifact collections in the study of the history of science and technology is certainly underappreciated. We asked the authors participating in this Special Issue to either discuss collections through selected artifacts that belong to them, or to explore histories through collections. In fact, the authors have taken more diverse paths regarding the collections they discuss and the ways in which they approach the collection. The variety represented here captures the many ways in which researchers can engage with artifacts and collections, as well as the quantity and range of Canadian artifact collections available for the study of the history of science and technology.

The Special Issue: Tackling Collections

The collections examined here range from the entire former artifactual holdings of an institution, to those made up by a small set of author-selected artifacts chosen for their shared purpose. The artifacts discussed range from laboratory instruments to scientific images and catalogues; from computers to medical supplies and tools. The range of disciplines represented is also wide—horticulture, physics, nursing, and design are all included.

Drawing on their curatorial experience, the researchers take widely different methods and approaches that engage with keystones of curatorial work such as provenance, materiality, record-keeping, preservation, and public access and experience. These include the close reading of artifacts and catalogue entries, technical replication and analysis, and the digital humanities. In pursuing these approaches, the authors challenge accepted narratives, highlight silences, biases and aspirations, and to develop intersectional understandings of a represented community that bring new depth and vibrancy to our understanding of the past or present.

Some of the articles ask what scientific artifacts can offer us when we centre them within our histories and make the most of their complexity and challenge through close analysis and exploration. Erin Aults and William Knight's history of Canadian horticulture situates its discussion around three important collections of botanical artifacts, asking how those collections, and the ways they intersect, enrich and inform our understanding of the history to which they relate—and how they might do so in the future. Taking a different approach, Erich Weidenhammer, Victoria Fisher and their coauthors take a multi-pronged approach to the history of physics and engineering at the University of Toronto, pairing close artifact and archive study with experimental replication all centred around a collection made from a set of instruments crucial to electrical research and training in the 20th century—the galvanometer.

Other papers take a close-up view of how particular artifacts reflect and relate to the collection to which they belong. Rowena McGowan examines sputum flasks at the Museum of Health Care in Kingston to investigate what this common medical

device can tell us about the human experience of tuberculosis in the 19th century. Sarah Jaworski digs into the provenance of a mid-20th century collection of hospital equipment, investigating the complications and silences of museum catalogues when dealing with marginal patients and communities and exploring the potential of re-examinations of these collections with fresh and contemporary eyes. Zbigniew Stachniak describes the challenges—technical and otherwise—in preserving and understanding computer heritage through an exploration of the component pieces that form an MCM/70 microcomputer. His account demonstrates what a close technical investigation can reveal about computing equipment. It also shows the urgent need to develop methods and the capacity to preserve Canadian computing heritage.

Michael Windover and Jan Hadlaw also discuss complications of preservation in their account of a project to digitally reconstitute the former Design Exchange collections. They point to the potential of collections—even in digital form—to serve as points of creative interaction between researchers, students and the public in order to develop vibrant understandings of the history of design and technology.

Michael and Jan's discussion of the Design Exchange (DX) points to the tenuous lives of artifact collections, something that reoccurs as a theme in many of these articles. Many collections and museums in Canada are undergoing a difficult period, with straitened circumstances and reduced budgets challenging funders such as universities, companies, municipalities, and provinces. Funding gaps can mean the loss of caretakers with the responsibility to care for, conduct research for, and even provide meaningful access to, a particular collection. Some collections, particularly those in universities and private organisations, rely substantially on volunteers. While some universities do hire collections specialists, scientific and technology collections are often not important priorities for such collections, and little active collecting or research occurs. It is worth adding that while it is true that their often more established status means they are less likely to encounter complete dissolution, Canadian archival collections can and do suffer from similar difficulties during funding downturns.

Without a reliably funded caretaker, collections are especially vulnerable—access can become difficult, awareness of their contents and value can sink, records can be lost or separated from artifacts, accidental damage or destruction can occur, or the collection can be discarded entirely. For example, following a burst of interest in the formation of a scientific artifact collection at the University of Toronto in the late 1970s, interest waned until the late 1990s. During that intervening period, a significant portion of the catalogued items were discarded without assessment of their historical significance.¹⁶

Unfortunately, this is not a new phenomenon for collections in Canada. Some of the collections featured reflect the outcomes of some previous collections that underwent an uncertain period: the “Oblate collection” described by Sarah Jaworski was acquired by Ingenium following the closure of a New Brunswick hospital museum. Others, such as the former collection of the Design Exchange, have survived in a fragmentary form; the individual artifacts are preserved, but split between numerous locations. Many such collections end this way; another example is the at the Academy of Medicine's collection, which was first transferred in 1991 to the Toronto Hospital and then broken up to multiple different museums, including Ingenium and the Museum of Health Care at

Kingston.¹⁷ This preservation method scatters artifacts that may have related histories, and often without good record keeping of the original collection, making them more difficult to understand as a group. Other collections featured in this Special Issue—going unnamed to avoid complicating their futures even further—are actively at risk at the time of writing.

An important element of the survival of endangered collections is awareness of their existence, their contents, and their value. Collections that remain on the radar of the community of collections specialists, curators and historians, at-risk collections, collections can survive difficult periods. Active collections benefit from communities that can share resources, skills and even time to conduct crucial activities such as cataloguing and publication that can help create and maintain access to collections, even through difficult periods.

At the same time, networks build competencies, provide structure, and create community among people with shared goals and interests. As at the Scientific Instruments Commission conference in Ottawa in September 2024, the coming together of collections specialists interested in scientific and technological artifacts in Canada created new collections and new awareness of collections, both within and beyond Canada. In the same way, this special issue hopes to spark new and fruitful interactions between those interested in Canadian scientific and technological collections, highlighting the value of this important and sometimes endangered resource.

In approaching collections under challenging conditions and expectations, Canadians are pushing the boundaries of collections research. By rebuilding a scattered collection in digital form, Michael Windover and Jan Hadlaw are showing how such collections may still be reassembled and used—this is an important project in a world of falling museum funding. In their efforts to locate overlooked voices and communities in artifacts acquired decades ago, Sarah Jaworski is employing methodologies to increase the diversity and accessibility of existing collections not previously expected or intended to tell these stories.

Each of the projects in this Issue hint at what is to come in this field, and what Canadians might contribute to the history of science and technology through the investigation of collections and artifacts. Some of these are practical: we must tackle the challenges of recent scientific heritage and embrace the significant challenges and opportunities of digital preservation. At the same time, we must address the complex, biased, racist, or otherwise problematic natures of our collections. We must explore more fully the material embodiment of colonialism in science, engage with difficult questions of identity, modernity, and nation-making, and explore how our collections may be tools of education and empowerment in the climate crisis.

The six projects presented in this special issue are just a sampling of the journeys on which collections and artifacts may take us—and many of them are just getting started. We hope with this issue to demystify the process of examining collections and encourage historians towards this rewarding source of insight about our scientific and technological journey.

Victoria Fisher (victoria.fisher@utoronto.ca) was awarded her PhD in the History of Science in March 2023 by the University of Toronto, with the thesis “Getting Down to Brass & Wax: The Material Culture of Physics at Canadian Universities, 1890–1939.” In 2023–2024, she held a Postdoctoral Fellowship at Ingenium, Canada’s Museums of Science and Innovation, focused on the history of precision and scientific instrument making in Canada. She has been working with the University of Toronto Scientific Instruments Collection since 2015 and currently is Historian in Residence at the Department of Astronomy & Astrophysics at the University of Toronto.

Erich Weidenhammer (erich.weidenhammer@utoronto.ca) received his PhD from the University of Toronto in 2014. His doctoral research focused on the legacy of the Scottish-born physician Dr. John Pringle (1707-1782), whose support for investigations into the chemical nature of putrid air provides important insight into the relationship between learned medicine and experimental culture in the period preceding the Chemical Revolution. He is curator of the collection of artifacts related to research and teaching in science and technology at the University of Toronto and affiliate hospitals (utsic.utoronto.ca). He is also Adjunct Curator for Scientific Processes at Ingenium: Canada’s Museums of Science & Innovation. Erich is especially interested in various approaches that seek to reenact historical experiments and experiences, especially those involving recreated materials and artifacts.

Endnotes

- 1 See Gerard L'Estrange Turner, *Antique Scientific Instruments* (Blandford Press, 1980).
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- 3 K., M. Frappier, E. Neswald, E., H. Trim, “Reading Instruments: Objects, Texts and Museums,” *Science & Education* 22 (2013): 1167–1189.
- 4 Such as *Studies in History and Philosophy of Science* 44 (2013); *Isis* 96 ,No. 4 (December 2005).
- 5 Liba Taub, “Reengaging with Instruments,” *Isis* 102, No. 4 (December 2011): 691.
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- 8 Fisher, “Getting Down to Brass & Wax,” 191–195.
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- 10 Fisher, “Getting Down to Brass & Wax,” 87–89.
- 11 Fisher, “Getting Down to Brass & Wax,” 67–113.
- 12 Bud, “Embodied Odysseys,” 640
- 13 Fisher, “Getting Down to Brass & Wax,” 516–520.
- 14 Fisher, “Getting Down to Brass & Wax,” 520–523.
- 15 Fisher, “Getting Down to Brass & Wax,” 691.
- 16 Fisher, “Getting Down to Brass & Wax,” 154–155; 755.
- 17 Michelle A. Hamilton, Rebecca Woods, “‘A Wealth of Historical Interest:’ The Medical Artifact Collection at the University of Western Ontario,” *The Public Historian* 29, No.1 (Winter 2007): 90.