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Scaling Up Collaboration Online: Toward a Collaboratory for Research on Canadian Writing

Abstract

This article asks researchers of Canadian writing to reflect on collaboration as increasingly crucial to how we do our work in the context of digital environments that increasingly shape our work through their tools and resources. Scholars are in a position to help address major gaps in both online cultural content and digital infrastructure in Canada, both of which are vital to the continuing study of literature. Given the lack of a national digitization initiative and increasing government cuts, the need for high-quality Canadian web content and the interests of scholars in Canadian writing converge. The article describes the Canadian Writing Research Collaboratory as one attempt to addressing these gaps, while also outlining the substantial challenges—which are finally cultural rather than technical—associated with developing incentives to collaboration, fostering adherence to best practices, and demonstrating value in virtual research environments and the work that supports them. However, if emerging digital research infrastructures can foster collaboration, open access, and sustainability, they will make a historical difference to the cultural infrastructure and cultural memory of Canada.

Résumé

Le présent article suggère à ceux qui font de la recherche sur les écrits du Canada de considérer la collaboration de plus en plus cruciale en ce qui a trait à la façon dont nous nous acquittons de notre travail dans le contexte des milieux numériques dont les outils et les ressources ont une incidence de plus en plus grande sur notre travail. Les universitaires sont positionnés pour aider à régler les écarts majeurs tant du contenu culturel en ligne que de l'infrastructure numérique au Canada, les deux étant essentiels à la poursuite de l'étude de la littérature. Étant donné le manque d'initiative nationale en matière de numérisation et l'accroissement des compressions budgétaires du gouvernement, il s'est établi une convergence entre le besoin de contenu Web canadien de haute qualité et les intérêts des intellectuels universitaires dans les écrits du Canada. Le présent article décrit le Collaboratoire scientifique des écrits du Canada et tente de régler ces écarts, a tout en soulignant les défis substantiels – qui sont finalement culturels plutôt que techniques – associés à l'élaboration d'incitatifs à la collaboration, à l'encouragement aux meilleures pratiques, et à la démonstration de la valeur dans les milieux de recherche virtuels et le travail qui les soutient. Toutefois, si les bases de recherche numérique émergentes peuvent favoriser la collaboration, le droit d'accès, et la

durabilité, elles feront une différence historique dans la mémoire et les infrastructures culturelles du Canada.

This article is an invitation to dwell in possibility. It is a call to those who research writing in Canada to consider where literary research is headed, and to reflect carefully on a couple of invisible, apparently immaterial, factors in the way we do our work: infrastructure and collaboration. We need as a community to become more mindful and purposeful about the ways that emergent digital environments shape our activities. Those environments shape it directly, through the digital tools and resources we employ, and also by shaping the digital representations of culture on which our scholarly work increasingly depends. In the context of these larger questions, I describe one approach to meeting the challenges within the Canadian context of shaping digital technologies to serve evolving academic practices, arguing that doing so is vital to the continuing study of literature in Canada.

Of these two factors, infrastructure is undoubtedly the one that feels more foreign to the concerns of most of us in the humanities when we consider what we require to do our work. That is because the infrastructure on which our work has depended until recently is centuries old: the book, the periodical, the printing press, the library, the pencil or pen, and paper, not to mention the practices of scholarly knowledge representation, distribution, editing, and citation are naturalized for us and seldom considered to be infrastructure (ACLS). These have certainly changed in significant ways historically, but their use for scholarly purposes has changed relatively slowly: Casaubon's method in *Middlemarch*, as he tries to produce a Victorian key to all mythologies, is not that far from the method of organization through notebooks, annotations, index cards, and other paper-based technologies that those of us of a certain age employed before the personal computer came along. Moreover, many of the digital tools that we now use are really enhanced versions of those earlier tools, which are highly naturalized and deeply imbricated with the ways in which we were trained to develop knowledge.

Canadians use digital infrastructure extensively. Canada has some of the highest rates of Internet usage in the world, with 80 percent of Canadians 16 years of age and over and 98 percent of those from 16 to 24 using the Internet ("Canadian Internet Use Survey"). Yet Canada is punching under its weight digitally with respect to content, garnering as little as 16 percent or less of its own web traffic (LaPierre). Moving forward with new kinds of infrastructure that are geared toward collaboration would assist the humanities to connect more directly with the broader public, most of whom are online, could help to rectify the paucity of compelling homegrown web content, and would advance research.

Computers are integrated into daily administrative, teaching, and research lives within Canadian colleges and universities, where most academics are

deeply dependent upon new tools and new media but reflect little on the networks of signals and cables that move digital data from place to place, or on how the machines that combine silicon chips and hardware to give us ways of accessing and interacting with digital materials actually operate. Infrastructure is necessary but integral to our routine ways of operating in the world. As Geoffrey Rockwell says, it is transparent. So we do not notice how dependent we are on it until our local area network at the university goes down or our home Internet service fails and we are suddenly without the use of email, the Web, or Skype. Our thinking about infrastructure is further muddled by the misleading metaphors that obfuscate its specificity and materiality. The great example of this at the present moment is the use of "cloud computing" to describe remote and usually commercially provided computing infrastructure (processing, storage, software services) to diverse and geographically distributed clients. This metaphor obscures the fact that we are still talking about polluting, power-hungry, cooling-dependent boxes and cables with the impression that moving to "the cloud" shifts us away from such twentieth-century detritus toward a delightfully organic and dematerialized computing that is as natural as the weather. This paradox is nicely pointed up by James Glanz in his article "Cloud Factories," which launched a series of investigative reports for the *New York Times*. Data centers, he claims, typically waste 90 percent or more of the vast quantities of electricity they consume—an estimated 30 billion watts yearly, or the output of about 30 nuclear power plants—in addition to generating diesel exhaust for backup generators. Environmental violations by server farms are becoming increasingly common.

If infrastructure that works is invisible and smoothly supportive of our activities, like a beautifully paved road, until it fails, like a massive pothole, or innovates, like an elevator for cars, I would argue so too is collaboration in the context of cultural research and culture more generally. We have long recognized and indeed studied the more extreme and often formal collaborations between people who work together to produce a body of scholarship or a cultural product, but these mask the extent to which all scholarly work is in fact collaborative in building on the labour of many people. As Richard A. Gale argues, "[V]irtually all scholarship requires some collaborative effort, and most important insights tend to result from the most collective endeavors" (39). Citation, one of our most cherished scholarly practices, embeds a recognition of the extent to which knowledge is collaboratively produced. Now that we stand faced with the transformation of our scholarly infrastructures by digital tools, it is worth considering how far collaboration and sharing are embedded in our practices and how an online scholarly work environment might afford new modes of scholarly collaboration. Changes in certain aspects of our infrastructure, such as the shift from print to bits and ink to pixels in the material delivery of scholarly knowledge, can allow for shifts in the way we practice collaboration.

Any conversation about digital infrastructure for the study of writing in Canada takes place in the context of a national failure to deal adequately with the digital turn. A national digitization initiative ought by rights to have come from Library and Archives Canada/Bibliothèque et Archives Canada (LAC/BAC) or from the department of Canadian Heritage. After all, consider the mandate of the former as articulated in the Library and Archives of Canada Act of 2004:

- To preserve the documentary heritage of Canada for the benefit of present and future generations;
- To be a source of enduring knowledge accessible to all, contributing to the cultural, social and economic advancement of Canada;
- To facilitate in Canada cooperation among communities involved in the acquisition, preservation and diffusion of knowledge; and
- To serve as the continuing memory of the government of Canada and its institutions. ("Act")

And then, too, "Canadian Heritage is responsible for national policies and programs that promote Canadian content, foster cultural participation, active citizenship and participation in Canada's civic life, and strengthen connections among Canadians" ("Welcome"). These mandates were written well into the digital era. Between them, these two national institutions might reasonably have been expected to produce a sustained and extensive effort to digitize our earlier cultural heritage in order that knowledge should endure and be accessible, and that cultural memory should be fostered along with Canadian content, cultural and civic participation, and interconnections among Canadians. What we have instead is a pretty complete void.

Into this vacuum of leadership from government have stepped a number of stalwart initiatives which have attempted to kick-start a national digitization program in Canada. Take the Project Alouette, for instance. Thirty institutions across Canada, including a number of university libraries, contributed $4,000 each in 2006 toward establishing "a portal site for boutique digitization projects at various colleges and museums. As a searchable, open-access database, Alouette will focus on digitized materials about or of interest to Canadians" (Carlson). The project tried to provide some basic standards and infrastructure toward a coordinated digitization initiative for Canada, but it did not fly. I quote here from an article about the project found in the online archives of the US *Chronicle of Higher Education*, because the Alouette project site itself has disappeared into the ether.

Other similar but less publicized initiatives since have made similar valiant attempts to jump-start a coordinated digitization initiative in Canada. The major university research libraries as represented by the Canadian Association of

Research Libraries/Association des bibliothèques de recherché du Canada (CARL–ABRC) and the non-profit Canadiana (the result of merging the Canadian Institute for Historic Microreproduction with Alouette and the Canadian Initiative on Digital Libraries) are persistent players in this recurrent drama of trying to mount, in the face of apparently complete government indifference, a concerted effort to take Canadian culture online, let alone preserve Canadian online culture (Bell). Canadiana was mandated to work with Library and Archives Canada to facilitate the Canadian Digital Information Strategy, produced by LAC/BAC in consultation with stakeholders from 2005 to 2008 (*Canadiana*; Bell), but no funds have been forthcoming to support mass digitization, nor has there been any uptake of Michael Geist's suggestions for furthering digitization through repurposing tri-council research funds, implementing open access, and extending legal deposit to digital materials. On the contrary, LAC/BAC's budget has been cut substantially, Canadiana is struggling to develop a business model to sustain its own activities by offering contract digitization and hosting services ("Digital Collection"), and Heritage, which funds some digitization programs, has also been cut. Digitization is happening, through the commitment of these bodies and of the members of CARL, but haltingly and certainly not with the speed with which it is progressing elsewhere.

This is not to suggest that every other industrialized country has digitization firmly in hand. There are huge complexities to such digitization initiatives and they are expensive. Nevertheless, there are significant endeavours happening across the European Union, for instance, which is coordinating diverse efforts through a series of actions coordinated according to the Lund Principles of 2001, which were designed to "stimulate European content in global networks" ("Lund Principles"). Sweden has a vigorous digitization program related to its aims to be "among the best nations in the World" with respect to ICT generally ("ICT for Everyone"). The Netherlands National Library plans to digitize all of its printed books, newspapers, and periodicals from 1471 onward (Janssen 473). The French government committed $1.1 billion in 2009 in order to "maintain control over France's cultural heritage in an era of digitization" (Sayare). Several organizations, including the Joint Information Systems Committee, are leading digitization initiatives in the United Kingdom ("Digitisation and Content"). There the law for legal deposit which has existed since 1662 now extends, as of 2013, to "e-books, e-journals and other types of electronic publication, plus other material that is made available to the public in the UK on handheld media such as CD-ROMs and microfilm, on the web (including websites) and by download from a website" ("Legal Deposit for Websites"). Such legal deposit aims, as the British Library's website puts it, to "ensure that the nation's published output (and thereby its intellectual record and future published heritage) is collected systematically, to preserve the material for the use of future generations and to make it available for readers within the designated legal deposit libraries" ("Legal Deposit").

Although there are countries where the initiatives are not as well developed as these, there are very few technologized countries in which the void, in terms of official government support and funding for a national digitization strategy, is as pronounced as it is in Canada. As several Parliamentary librarians noted in 2012 in a briefing toward the UNESCO Memory of the World-sponsored conference in Vancouver, "The absence of a comprehensive national digitization strategy in Canada remains a source of criticism" (Trehearne et al.).

I dwell here on what I see as perhaps the most pronounced failure in Canada, from a literary and cultural studies perspective, to deal with the challenges of digital infrastructure, but it is by no means the only one. The archiving of research data is at least as poorly off as cultural materials. The Social Sciences and Humanities Research Council of Canada (SSHRC) and the Canadian University Council of Chief Information Officers (CUCCIO) have worked hard to further a federal Research Data Strategy through national data and infrastructure summits—two were held in less than 12 months in 2011 and 2012—to address the fact that Canada has no national data policy and no uniform mechanisms for archiving or for indexing the location of archived data (Research Data Strategy Working Group; *Digital Infrastructure Summit*). Any preservation of the data collected in the course of nationally funded research is done ad hoc, but usually, and especially in the humanities and social sciences, it is not done at all.

The prospects for sustaining digital scholarship and culture are dim, argued a working group funded by what became the inaugural program of SSHRC's Digital Economy focus, precisely because of the gaps within Canada in research, legislation, policy, and infrastructure. The digital turn is arguably greater than any other development in communications media since the development of print. Yet Canada has had no Royal Commission, nothing similar to the Massey Report or those other sustained inquiries into the implications of major shifts in media in Canada that greeted previous developments (Bretz, Brown, and McGregor). Neither SSHRC nor the universities have figured out how to deal with the fact that scholarship is quickly migrating online. No doubt partly due to ever-shrinking resources, they have been slow to address the challenges posed by the changing nature of scholarly tools, resources, and methods, the sustainability of digital knowledge dissemination, the revolution in publishing, the complexity of archiving digital data, or the need for open access policies. The group's report identified major policy gaps with respect to sustaining digital scholarship and culture, which may be summarized as the need for:

- an intellectual property regime that ensures sufficient circulation to enable knowledge mobilization and cultural engagement while respecting creator rights;

- research funding structures to support non-traditional digital scholarship and dissemination;
- national standards for digital preservation and sustainability to advance the collaborative digitization initiatives already underway;
- a national digital tools repository to sustain digital tool creation and sustainability;
- and policies to foster new forms of scholarship, collaboration and partnership in cross-sector initiatives, knowledge mobilization, and the training of highly versatile technically-trained personnel. (Bretz, Brown, and McGregor, "Lasting" passim)

Given this policy and funding vacuum, frequently within our academic institutions as well as our national and provincial governments, it behooves the scholarly community to step up and try to create the infrastructures we need while lobbying for better long-term solutions. The literary community is positioned advantageously to do so in so far as the infrastructure that we want, need, and are invested in creating and disseminating is also of much broader value. The need for high-quality Canadian web content and the interests of scholars in Canadian writing thus converge in potentially helpful ways.

This argument, that literary culture and academic research interests converge in relation to the power of language in Canada, led to the proposal to build an infrastructure that would bring these two things together in a virtual research environment for literary scholars:

> Words move. They move us to understand Canada's tradition and diversity. They move our perceptions and our subjectivities. They move roughly 160,000 majors yearly through humanities programs of Canadian universities. They move $3.3 billion yearly through our publishing industry. They move people halfway around the world to visit Anne of Green Gables' farmhouse on Prince Edward Island. Words move differently now, through semiconductors, across screens, at lightning speed, and in vast quantities. Scholars have studied how words make and move us for centuries, but the digital turn demands new tools and new tool environments. (*Canadian Writing Research Collaboratory*)

The raw materials of literary research are the living materials of culture: this is not true of the sciences. The numeric and scientific data of Greece and Rome are of little interest currently. But their writing, images, artisanal artifacts such as pottery, and sculptures are still highly valued and relevant. While scientific data eventually gets absorbed into the knowledge and practices of a discipline, updated, and subjected to new methods of gathering and analysis, cultural data lives on. It continues to contribute to current thinking and creativity.

Yet it is sobering that efforts to galvanize broader support and public funds for digitization initiatives in this country with the significant exception of Quebec have repeatedly flopped (Barthiaume; *Rapport Annuel*). Things look yet grimmer in the wake of Foreign Affairs and International Trade Canada's cancellation of the Understanding Canada international Canadian Studies program (see Figure 1), which funded conferences, doctoral study, international linkages, library support, and strategic project grants, as outside "the department's core mandate" ("DFAIT"; "Understanding").

Pertinent to the question of digital infrastructure and its relation to cultural memory is the management of the historical record that is taking place through the maintenance of government websites. The Understanding Canada program was cancelled as a result of the federal budget of 2012. As of May 2012 Google indexed a number of Government of Canada pages about Understanding Canada that were no longer available (Google). One snippet from such results, included here as Figure 2, indicates that the deleted page provided details of the Understanding Canada program.

Figure 1 : Announcement of the cancellation of the Understanding Canada program ("Understanding").

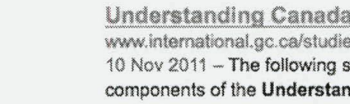

Figure 2 : Google search results snippet from deleted Foreign Affairs and International Trade Canada web page. Google and the Google logo are registered trademarks of Google Inc., used with permission.

One could for some time follow the trail of this information, whose ghost persisted briefly in the machine of Google's indexing empire (it had disappeared by September of the same year), to a page that informed the reader that one had reached an "Archived Document: The document you are trying to access is no longer available online" (Google; "Archived Document"). However, former national archivist Ian Wilson's account of Canada's disarray with regard to archiving, in contrast to his vision of well-managed national archives as the basis of "peace, order, and good government" (*Case for Action*; Wilson), begets skepticism about the prospect of ever retrieving this "archived" content, except, perhaps, from something like the Wayback Machine. Indeed this notice has been superceded by a standard 404 or "file not found" error message.[1] Official "archiving" that paradoxically amounts to removing materials from public access smacks of Orwellian double-think. The paradox is heightened by drastic cuts in the same 2012 budget to Library and Archives Canada (ostensibly in favour of digital archiving and access, for which resources were, however, also reduced, by 50 percent), which the Bibliographical Society of Canada believes compromise the agency's ability to "meet its legislated obligations to Canadians" (Friskey). We are thus in the ironic position that much of our cultural archiving, insofar as it is happening, is being done by institutions, one of them a large commercial venture, south of the border. In addition, Canadian university libraries that are able to devote funds to mass digitization are frequently depositing their holdings with the non-profit Open Content Alliance / Internet Archive initiative in the absence of a domestic repository.

My focus here has been in large part on digitization because I think this speaks most immediately to the interests of scholars of writing and texts, and because therein lies our greatest opportunity for public connections, galvanization, and support. However, digitization is just one component of what is needed for a scholarly infrastructure, and it is indicative of the extent to which we can assume neither transparency nor ease. The way in which something is digitized matters, as anyone who has tried to use Google Books with digital tools, even just to cut and paste a chunk of text, knows. As anyone who has tried to open up a word processing file from a decade ago often discovers to their dismay, the mode of storage of a digital object has massive implications for access down the line. In addition, as anyone who has tried to locate a needle with which to sew up an argument in a massive haystack of search results generated

by a generic search term knows, the tools that are given us by the forces of the Internet commerce and entertainment industries are woefully inadequate—or "KWIC and Dirty," as one analyst puns, since KWIC is the acronym for Keywords in Context, the bread-and-butter of most search engines (Garrett).

So our infrastructure gap poses a broad set of problems, and the example of the national digitization initiative indicates that success will be achieved through partnership and collaboration, because the task is so vast and complex. Scholars have a significant part to play in this process in a range of ways. I want to outline these in relation to the Canadian Writing Research Collaboratory infrastructure project, not because it offers a solution in and of itself, but because a number of such initiatives, working in concert with complementary forces and emphases, would help move us in the right direction.

The Canadian Writing Research Collaboratory, or CWRC (pronounced "quirk"), is funded by our national infrastructure funding body, the Canada Foundation for Innovation (CFI). The CFI funds little humanities infrastructure. In fact, when it was founded, its mandate was limited to applications related to health, science, engineering, or the environment. The infrastructure funded by the program has most often been material, visible infrastructure that looks like traditional knowledge infrastructure: equipment and labs.

The term collaboratory has its origins in the shift to online infrastructure in the sciences. As William Wulf argued in 1993 in the wake of a US National Research Council report, "Although computers have already had a significant impact on the conduct of science, there is now a special opportunity to use them to further leverage the entire scientific enterprise," as (according to his 1989 definition) a "center without walls, in which the nation's researchers can perform their research without regard to physical location, interacting with colleagues, accessing instrumentation, sharing data and computational resources, [and] accessing information in digital libraries" (Wulf). A collaboratory thus refers to a set of tools shared by particular research domain, distributed via a network, a sharing of infrastructure across space. Wulf discerned that the real potential of a collaboratory was not so much its cost savings or the equipment it provided, but the kinds of interactions it enabled, the extent to which it could foster communities of a different kind: "The essence of the collaboratory, however, is not this physical infrastructure. Rather, it is the software that enables scholars to use remote libraries, collaborate with remote colleagues, interact with remote instruments, analyze data and test models—all with nearly the facility they now enjoy locally" (Wulf). A successful collaboratory, then, achieves something of the naturalness and transparency we experience with infrastructure that really works.

CWRC aims for infrastructure in this sense: an online environment that can become part of the scholarly work life in a way that feels like less of a strain than

our current conditions, in which we move ceaselessly between tools and interfaces to work online. It is fundamentally a software development project devoted to creating an environment to support scholarly collaboration, recognizing that all scholarship has been thus, but that digital scholarship needs purposeful experimentation with modes of support because the tools for digital collaboration are primitive and the practices for it are not yet established.

CWRC will provide an online repository for digital objects, primarily but not exclusively texts, plus a set of tools to use with them. It is designed for production as well as consumption. It aims to enable individual scholars to pool their research resources with others in mutually beneficial ways, linking to and reusing others' content and making their own materials available to others, while also enabling groups of researchers to work together to create new scholarly materials, and edit or annotate digitized versions of existing texts. It is designed to support and allow people to share research in progress and to "crowd-source" digital resource production and a wide range of annotation, including public annotation, but will also incorporate peer review. The Collaboratory will support the interoperation of related research projects and provide new kinds of access to some existing digital collections. It will provide tools for creating new works of online scholarship and editing existing ones, along with tools for analysis and visualization that provide researchers with new perspectives on their materials as well as place those materials in dialogue with other materials.

CWRC aims to provide a dynamic environment within which scholars will continually contribute and augment not just their own but also others' content. Its repository will embrace larger named projects with distinct identities and defined groups of contributors, a "commons" to which all members of the community will be invited to contribute, and annotations contributed by the public. In aiming to serve a broad and diverse community ranging from professional literary researchers to interested readers of literature, along with a wide range of pilot projects with many and divergent use cases, it seeks to provide a new kind of online resource. In so doing, it hopes to bridge the gap between mainstream literary scholars and those making use of metadata standards, text encoding, and second-generation digital tools such as database creation, text analysis, visualization, or "algorithmic criticism" (Ramsay).

The word collaboratory emphasizes a sharing not just of infrastructure but of labour. Labour is important to consider in this context, because as many have recognized, the digital turn is reshaping labour practices, not least in the scholarly environment, and in a host of ways. An estimated 80 percent of online information takes the form of unstructured text, and unstructured text is less amenable to sophisticated digital tools than structured text (Elder, Milner, and Nisbet xxiii). Best practices in digital research typically take the form of

painstakingly reworking such text to make it more amenable to sophisticated digital tools than structured text. The result is a text that is at least potentially of far greater value to many others as well. One of the fundamental facts about doing research digitally is that employing best practices has a long-term payoff for both the individual and the larger community, in that the product of the work is shareable, preservable, and repurposable in ways that are not supported by conventional computing tools such as proprietary word processing programs. Responsible digital research is in this sense always already collaborative, even if pursued entirely solitarily, since best practices are predicated on the future reusability of its materials. But it is undeniably also the case that best practices take more time, and so the short-term labour cost is considerably higher, particularly when substantial training is involved: digital humanities research can as often be slower, more frustrating, and indeed more isolating as it can be faster, more satisfying, and social than research that simply uses computers conventionally. This is one reason digital projects tend to be relatively expensive: the equipment and programming are often a small proportion of costs compared to the labour required to get materials prepared for computational analysis. I expect this is true of the Canadian Century Research Infrastructure project's attempts to get our census data online; I know it is true of the Orlando Project, which involved the labour of over 100 people (albeit not simultaneously) and took more than 10 years to bring to publication. So coming to terms with the high overhead of digital work and the changing distribution of labour becomes key to scaling up digital infrastructure for the humanities and social sciences. It is fundamentally a social rather than a technological problem.

The success or failure of a technology has demonstrably little to do with its value relative to other technologies:

> It is also possible that a tech-centered approach to the challenge of data sharing inclines us toward failure from the beginning, because it leaves untouched underlying questions of incentives, organization, and culture that have in fact always structured the nature and viability of distributed scientific work. Questions of trust loom large here, and run both ways. (Edwards et al. 32)

Take the rather instructive example of a great idea thought up by someone named Jimmy Wales: to build a free encyclopedic resource, called Nupedia, on the web and to do it using a simple technology that would allow many contributors to share their knowledge and produce a massive new information resource, collaboratively producing the largest source of free information available on the planet. It was a flop. Nupedia was founded on the sound scholarly principles of top-down planning on the basis of expertise, control vested in a body of authorities, careful organization to avoid overlap and

duplication, and strict quality control via peer review. It plodded along, got only 24 articles through its processes in three years, and was finally superseded by its side project, Wikipedia (*Creative Economy* 148; "Nupedia"). Wales's Wikipedia has become the largest source of free information on the planet in hundreds of languages, rivals the *Encyclopedia Brittanica* for accuracy, and exceeds it in areas such as science and technology (Giles; "Reliability"). What allowed Wikipedia to succeed was in part the wiki technology, but much more than that was development by the Wikipedia community of incentives, organizational practices, and a culture that enabled a different but phenomenally effective, if not conventionally scholarly, mode of knowledge production (O'Sullivan). It is therefore crucial to consider "incentives, organization, and culture" in relation to infrastructure for our field.

As regards incentives there are a number of interlocking concerns, but the greatest is perhaps related to credit. We need to recognize that scholarly forms of recognition and valorization are historically and culturally contextual. If we overcome our elitism, we can learn a lot from Wikipedia and other successful crowd-sourcing endeavours. These communities can help us understand ways of recognizing collaborative authorship and turning it into an advantage rather than a disincentive, as well as recognizing the role that nonauthors increasingly make to the production of scholarship ("Fair Cite"). As I have argued elsewhere, we need to overcome our urges to hoard up our raw materials until we have mined them for all they are worth and polished them up into glittering and impenetrable argumentative gems (Brown). However, those tendencies emerged from the pressures and competition of the academic world. If collaborative online systems are to thrive, they will require a system of credit that recognizes the mechanisms by which academic researchers are currently rewarded, as well as one that simultaneously tries to open up new forms of acknowledgment (Warwick). Collaboration can be fuelled by self-interest as well as altruism. If online research environments can demonstrate the power of combined, interoperable resources to offer new ways of probing the raw materials of research, this will in turn encourage researchers to share more and share earlier. Such sharing in turn would be furthered by more generous acknowledgment by scholars of digital sources, which they use far more than they cite.

Moving on from incentives, one could consider the requisite organizational practices from a number of angles, but this context raises the spectre of interinstitutional coordination, which is very hard to achieve, and yet undoubtedly necessary if we are to achieve an infrastructure that runs the gamut from mass digitization of our cultural heritage to the provision of high-performance computing equipment for those who engage in processor-intensive methods of inquiry into things literary. It also suggests the massive investment of organizational effort that goes into the production of standards and metadata—the

things that make digital materials interoperable. These things require negotiation, explicitness, and maintenance, and none of them seem like research or traditional scholarly activity, though they require continual investment of time by members of the supporting communities in order to remain current and responsive to new developments. For users of a system, such informational organization results in higher transaction costs, in terms of labour, and also compromise: for interoperability you give up the chance to do things just as you like.

All of this, of course, is caught up in culture and with social relations. Exposing the nuts and bolts, the drafty openness, of research in progress is still quite rare in literary studies. Engaging in writing within a collaborative system to gain the benefits of structuring and metadata standards means compromise, which comes hard to scholars in a field that eschews standard taxonomies for even its most fundamental categories such as genre. Yet standards are crucial to long-term preservation and access, and scholars who create digital resources that cannot be incorporated somehow into a wider community endeavour will find the albatross of perpetual sustainability hanging heavy around their necks. So it will be challenging indeed to devise systems flexible enough to be usable for very diverse ends but standardized enough to support preservation, access, and interoperability.

For such major changes to even begin to take hold, an infrastructural system will need to prove its value up front. In order to prove it, it requires brave "early adopters" of the platform to help define more precisely what kinds of affordances researchers require; as Anouk Lang's article in this special issue demonstrates, such definition is a major intellectual undertaking, requiring careful evaluation of the state of research and tools in a rapidly changing environment, and must be mobilized in relation to particular fields or projects. Such proof also requires a critical mass of openly accessible and interoperable material at the outset to demonstrate the value of sharing. In the end, the promise that collaboratory environments offer is the chance to try digital collaboration, without necessarily embarking on a major digital project or having to work directly with others, within a context that, by harnessing scale, can demonstrate the potential that lies in the pooling of materials, as well the potential to contribute to an important scholarly and institutional legacy.

The creation of a collaboratory is not trivial: it involves, quite apart from substantial technical work, much upfront investment by scholars in the apparently nonscholarly activity of defining what a collaboratory for their work needs to be and in developing the culture that will sustain it. However, that is the only way to achieve a different kind of digital infrastructure than the very inadequate ones with which we work now, which are hostile to both archiving and sharing as well as downright ineffective. The result is that much of the

wealth created by scholarly research effort remains locked in hard drives (Brown), turning to digital dust after the outcomes have been published instead of enriching digital content and stimulating public interest and debate. To the extent that digital research infrastructures can take shape in relation to evolving scholarly practices and respond to existing scholarly needs by promoting collaboration, open access, and sustainability, they stand also to make a historical difference to the cultural infrastructure and cultural memory of Canada.

Note

1. The Internet Archive's Wayback Machine does preserve a related page that, incidentally, notes of the Understanding Canada program: "In a recent study (summer and fall 2009) it was demonstrated that the modest investment made by Canada in this program (approximately $5 million per year) generated 33 times its value in programming in which $55 million were spent directly in Canada" ("Understanding Canada Program"). It is significant that, as noted in the entries for those pages within the list of Works Cited, many of the web pages quoted here in this cursory account of a massive shift in Canadian cultural policy, and hence much of the record of the official representation of the Understanding Canada program, have been revised out of existence and are only accessible, if at all, through the Internet Archive's Wayback Machine.

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