

Scholarship in the 21st Century: Leaving the Paper Behind

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Notes from The Cellulose-Free Zone: An Introduction

Let me begin, in the generous spirit of after dinner speeches, by telling you about a memo I received in August of 1996. Significantly I think, it arrived electronically as an email message. It was from the Acting Librarian of Carleton University and it announced that due to budget constraints, the new acquisitions budget of the library had been eliminated for this academic year except for commitments already made. To a traditional academic I suspect this bespeaks a classic bungle, a typical cutting off of nose to spite face situation. Not only is there no permanent librarian but the man who is acting in this pivotal function of the library is basically washing his hands of his central mandate, the care and protection of the library. It reminded me that when I was a graduate student at the University of Toronto in the early 1970s through all the turmoil

and conflict, the Robarts library (or Fort Book as it was known to us) was still pursuing a policy of universal acquisition to the best of its ability.

In most respects, I am a traditional academic by training. I attended a fine liberal arts program at Glendon College and really fell by default into the social sciences. Were it not for lousy math marks in high school I might well have found my way into engineering (as was much of my family background), and to this day I suspect some of my colleagues think of me as primarily a computer programmer. But be that as it may, I love books, I have hundreds of them and some of my most prized ones are obscure political tomes from previous centuries. For instance, I have the complete works of Dugald Stewart, a contemporary of Adam Smith occupying a couple of feet of shelving in my sunroom where I do most of my work.

Notwithstanding my liberal arts background, and the small-C Conservatism of small town Ontario which is my heritage as a descendant of the ethnically cleansed survivors of the Battle of Culloden Moor in April of 1746, I did not greet this email message with complete alarm though it did give me pause to think. The reason for this is simple. I don't really need the library for paper products much anymore. Neither apparently does the library because the main foyer is now full of computers and they have now colonized the second floor and pushed their way into the govdocs section as well. The TV tape section in

the basement has expanded as well and many courses for credit are now conducted on videotape in this place. Students and faculty are voting through their actions for the digital collection and for delivery of holdings by remote access. I personally run the advisory committee on electronic data holdings at the library for instance.

As another for instance, I now routinely glance through the electronic editions of several newspapers, the New York Times (2x because of the 1pm update), the Globe, the Star, and the Los Angeles Times (several times a day because they provide the Associate Press wire service and a means of filtering its flow to my individual interests). In special circumstances, I can consult the Washington Post or the Times of London, though sadly not as yet the Guardian or the Independent or the Observer on the weekends. There are also the whole or partial contents of most of the quality news periodicals on offer as well. And all of this is delivered to me at any time day or night to wherever I am and without charge. For instance, I recently saw a CNN interview with an editor at Time Magazine talking about a piece to be published the next day containing an interview with Dick Morris, the political Meyer Lansky of his day I suppose. I was able to obtain a complete text of this article early the next day from the Time Magazine Pathfinder site.

Taking this scenario a step forward, I can use the Uncover service in Colorado to do a literature search on any English language periodical literature from about

1990 onwards and have obscure articles faxed to me for under \$10US in less than 24 hours. The Carleton library even underwrote this service as a trial last spring and the pilot quickly ran out of money because of its popularity. There is also the e-library service in the U.S. which delivers some whole text books to its customers for a modest charge, in addition to contemporary periodical literature.

I feel the availability of these new services, virtually all of which have appeared in the last five years, is an immense boon to all of humanity. Still, a library without cellulose is a difficult transitional notion. And in general, academics in North America have been slow to jump onboard perhaps because the professorate is a demographically seasoned group, suffering from the lack of new hiring over the past 20 years and to some extent isolated from current pressures. A recent article by Stephen Harter, for instance, reports on citation index data for articles which appeared in electronic journals. He concludes that existing e-journals have had a limited impact so far¹. What happens however when the paper editions of major research journals are terminated is anybody's guess.

The transitional difficulty of which I speak extends to the heart of contemporary professional scholarship practices and to the open accessibility to Web publishing and the alternative reputational engine that is being established outside the bounds of peer review.

Fixity, Provenance, and Authority

In traditional publishing terms, a book is fixed on paper once it appears. If there were errors included, and if they were detected early enough, perhaps an expensive errata sheet may have been included. But in many cases, the errors are known only to a few select readers. There are however exceptions.

Consider the bible of cryptography, **Applied Cryptography** by Bruce Schneier. When the first edition was published, there were many errors caused by typesetters who hadn't a clue about what was intended by the manuscript and a lack of any qualified proofreaders. Mr. Schneier took to posting updates of the errata sheets, which grew in number to dozens of pages, to Internet Newsgroups. Without these sheets, frankly you could not trust the first edition of this fine book though I am sure it sits on the shelves of some of your institutions' libraries.

Changing publishers, Mr. Schneier resolved to do better in the second edition. Nevertheless, there is an errata file for the second edition which runs to dozens of pages as well. And without the files, the books themselves are clearly inadequate and misleading. So, on book shelves all over the world, there is or should be a large set of sheets of printed paper stuffed into the back of **Applied Cryptography**. And to some extent this was inevitable since some of the subject matter has until recently or still is covered by official secrets acts of one sort or

another. Indeed, the published source code in the book for some encryption algorithms comes from anonymous Internet-posted messages. Mr. Schnier was denied permission when he asked to include a diskette of source codes with the book on the grounds that the diskette would be a munition export from the U.S. (which is prohibited), even though the printed listings were in the book and thus covered by 1st amendment rights. This ridiculous situation betrays a deep misunderstanding of the role of cellulose in human affairs; ideas have no natural affinity for cellulose.

The lessons from this experience are many for scholars:

1. Printed material must often be amended and updated. Economically this is increasingly less feasible on paper. It cannot be done in a timely and effective manner even in the best of circumstances. Therefore a fully electronic text that is updated regularly is preferable since errors and omissions can be corrected.

2. But, one can never be sure one has the latest version or even a version which comes from the author. It could have been doctored by somebody else. The requirement here is for a certification mechanism, a digital signature, which both fixes the document from tampering, states the date of revision and alludes to a site where information on variants is available. With this mechanism, a book could be a rolling project. In my terms, when new fertility figures are published on the Statscan Web site, I appropriate them and revise all my Web 'book's'

population projections and put out a new version of my text on my Web site. And hopefully I do it in such a way that the new pages can be printed by the client, say with Acrobat formatted pages for example.

3. The latest version problem. It is difficult to imagine a system by which a recipient of a document could tell if it is in fact the latest available. Consider the following example. I publish an electronic document on my site that includes fabrication plans for a new type of bomb. In the first file, I make a small one digit error, say specifying alloy 1234 instead of 1235. I find my mistake later the same day and put the new file in place of the old one. However, someone in Ceylon has already downloaded the first version with the error. Simply put, how to I let this anonymous person know that the first generation file contains a fatal error? The two files look identical, they have the same number of bytes and the date stamp on them may be the same day or differ by one day at most, something most users would never notice. There needs to be a common means of marking the latest version. The checksum will do this but most users don't even know what a checksum is.

4. Retransmission and Repackaging. My file of instructions will pass through many sets of hands. It will be broken up, expanded upon, commented on, excerpted and so on. The excerpted material, even though from the incorrect source file, will take on a life of its own. The link of provenance is lost through

excerpting. Many years later, people may still be trying to make my initial bomb with alloy 1234. Chained claims take on a life of their own: some real ones come to mind like the claim that one in ten Canadian wives is domestically assaulted in Canada each year, or that John Porter thought that the Vertical Mosaic approach to cultural relations in Canada was a good idea.

The Internet as a Zone of Contestation: Methodology in an Age of Information Superabundance

Without indulging in McLuhanesque hyperbole, it is clear that with the advent of the Internet, and of World Wide Web content on it, that the potential has been created for a new knowledge-creation and dissemination environment in that part of the world which is wired.

The realization of this vision of connectedness is taking place with breathtaking speed. For the social sciences, its realization means that an unprecedented richness of data, literature, current commentary, imagery and sound is being made available at little or no direct cost to all students and academics, and indeed to anyone, schooled or not, in possession of the right of electronic access. To this assemblage is also accorded the unfettered right to publish anything they want in whatever form they want without any form of review or scrutiny whatsoever. In thoroughly unfiltered fashion, the digital information and scholarship resources of the World are spilling into homes, classrooms and offices in the First World. For many, the very

presence of these resources has changed the way in which the learning process itself is conceived of.

But without the ability to locate, evaluate and organize these resources, and the possession of the skills to use these resources as they are found, it is as if they did not exist. New skills are required but they are being generated from outside academia. Some academics have jumped the fold of traditional academic process and crossed the chasm to this electronic world but many have not. This parting of the ways represents age, gender, class of origin, and disciplinary lines of split. If carried to extremes, the methodological demarcation leads to New and Old academies coexisting in a state of permanent antagonism. The valuation of differing print and electronic resources, the manner in which raw data are handled, the means chosen for publication of findings and commentary, and criteria for assessing merit are all likely to bifurcate around this central cleavage.

Some questions to be considered:

1. Is the Internet creating pan-European Anglophonia?

■ the overwhelmingly English-language nature of the Net is obvious. What now happens to other languages and cultures?

■ since the Web exists for proliferating perfect copies of digital files without

logical limit, how can copyright persist in its present form? How could royalties be collected cross-jurisdictionally?

2. Will there continue to be a national labour force in any meaningful sense?

- will it include low wage data entry/coding workers living half a world away?
- could it not also include teachers living half a world away with massive audiences taking courses for credit wherever they happened to be?
- how will national statistical systems reflect this reality accurately?
- will transborder transactions be captured in national accounts? What about import duties?
- What about digital sales from offshore havens? (imagine a digital book on thermonuclear weapons design sold from the Caymen Islands).
- how could income and the transfer of goods and services be taxed in this context?

3. What are the new economics of publication?

- peer review emerged to ration scarce paper and printing resources. It also imposed a conservatism and a time delay in scholarly exchange of views. None of this apparatus has any apparent place now.
- most if not all of the world's major journalism is available free-of-charge now

be properly prepared for the 21st century environment?

7. What will the academic curriculum consist of? If demassification and customization is extended to the production and consumption of serious literature, commentary and analysis, what does conventional academic publishing (and the promotion and tenure system built on it) look like in ten years?

8. What does an academic organization look like in ten years?

- wide span of control? Flat hierarchy? Contract guns for hire?
- is there a headquarters operation? Where will it be? Need there be more than one per jurisdiction, per country, per continent?
- need teachers ever be physically present? Could they not live and work in one place and 'teach' in another?
- can you work for and with someone you have never seen?

Concluding Remarks

These are some of the questions I have about the processes which I find myself embedded. Having grown up as a willing participant in the book culture, I find the present rapidly departing from the norms I absorbed in the past. In large measure, the process is cost-reduction driven. Further, I don't believe the process of conversion now underway can be stopped. There is too much momentum behind it and

too much capital investment as well.

¹ Stephen P. Harter “The Impact of Electronic Journals on Scholarly Communication: A Citation Analysis.” *The Public Access Computer Systems Review*, volume 7, number 5 (1996)—electronic version unpaginated.