

Library Research and Its Infrastructure in the Twentieth Century
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I would like to thank the School for inviting me to speak. It is a particular honor because of the distinguished history both of the School and of the great library of this University.

My subject is the scholarly research library and the researchers for whom such libraries are the core repositories of their research materials. I shall call these people library researchers, and you should bear in mind that throughout this talk the phrase library researcher refers specifically to them: expert scholarly users in fields like English literature, historical sociology, and musicology. Natural scientists use libraries. But libraries are not their laboratories. For humanists and humanistic social scientists, the research library is the only laboratory.

Given that I speak about research libraries and library researchers, my talk is self-exemplifying, for I am myself a research scholar in one of these fields and you my audience are insiders to the library world. At the same time, just as many of you are also researchers, so I have also had administrative responsibility for libraries. I have chaired my university's Library Board, and in addition, as some of you may know, also chaired my university's recent Task Force on the Future of the Library.

One usually responds to administrative obligations by turning them into research opportunities, and the Task Force presented several such opportunities. For one thing, it led me to a sociological analysis of the existing library and its various uses by various clienteles. Central to that investigation was a study of digital versus physical use of library materials, an analysis which showed clearly what we should have guessed ahead of time -

that students who are heavy physical users of the library are also heavy electronic users and vice versa. The idea that electronic research was actually replacing physical research - at least at the expert end of the scale - proved wrong.

My second research opportunity was less empirical than theoretical. To keep the Task Force honest our Provost appointed my colleague Martin Feder from organismal biology, who bluntly asked all the important questions: why cannot historians and literary professors do their work on screen like natural scientists, what is the point of a huge book-stack full of little-used materials, and so on. To refute Martin's implicit counterfactual claim that the library is worthless I decided to write a formal theory of library-based research as a computational process, using the computational framing in order to upend the usual opposition between the dust-sucking, low-tech stack beetles on the one hand and the up-to-date, tech-savvy whiz kids on the other.

Now my third opportunity for research was more general and more vague than the first two. But it can be symbolized by my experience in writing this second, theoretical piece. I based it on theoretical reflection and self-ethnography. I didn't look at the literature. But of course there *is* a little literature on library use among expert scholars. And when I really needed that literature, about three weeks ago when I was working on the long version of the paper I am summarizing today, I located its crucial review papers quickly and easily. But I did not find them the way the handbooks say you're supposed to. I was supposed to cruise subject indexes looking for the right heading to locate what I was looking for. But there isn't any such heading about library research practices, a fact I well knew by that time because I had found relevant material scattered from AZ 105 to the CT 100s to Z675.u5. So by the handbook method I was supposed to build my bibliography by pruning and combining separate lists produced by partially-related subjects.

Well I wasn't about to do that. I knew perfectly well that SOMEBODY must have pulled together this literature at some point for some reason. The trick was to find that summary and find it fast, not to redo its bibliography myself. Well, if somebody wrote the piece, then somebody else must have cited it. The hard part - as always - was to find that citing article. But I had a lucky outing with *Web of Science*. The subject words "research habits humanists" - a longshot that I did not at all expect to pay off - produced three articles, one of which described a PMLA study of electronic versus physical access to journals in the 1990s. Ignoring the study's content, I went straight to its reference list, a gratifyingly substantial but at the same time not annoyingly excessive twenty-two items. Even better, only ten of them had titles in the electronic ISI listing, and only four of those looked worth chasing. So I went to the shelves and looked physically at all four - these journals aren't in JSTOR yet - and sure enough two of them were definitive reviews of use studies of humanists, one from 1982 and one from 1994. Bingo. Total time, ten minutes. Total time saved over the handbook method - probably half a day.

Now the main story I have to tell you today is how and when this mixture of reverse engineering, trawling, and browsing became standard practice for disciplinary researchers working in libraries. We do use librarians' bibliographies and indexes as temporary starting points when we're desperate, as I did in this case. But almost none of us ever does exhaustive bibliography and certainly none of us starts a project with a broad pass through the general bibliographical tools produced by librarians and their house publishers. The question - my third research opportunity - is why and how this happened.

Now like everything else about real library research, this question is not what it seems. It *seems* like a great starting question for a library research project. But of course it wasn't my starting question. That this was

the right focal question for a paper loosely aimed at understanding American library research practice in the twentieth century became clear only after I had done much of the research. More broadly, that library researchers have projects with clear designs is a myth. A few library researchers may actually *have* such clear designs. And the rest of us *pretend* to have had them after the fact. And we all force dissertation students to pretend to have them *before* the fact. But it's all a myth. We don't have clear questions ahead of time. The logical sequence of our articles is unrelated to the chronological sequence of our investigations. Our graduate students' pretended questions in their proposals are not the ones their dissertations will end up answering. Not only is known item searching a relatively minor part of expert library research, precisely structured research questions are also a relatively minor part of expert library research. They are its result, not its beginning.

This fact should begin to explain what I imagine is for many of you a sense of bait and switch. The School asked me for an abstract and so I dutifully sent one. I said I was going to talk about how overload had brought down the library research system around 1970. That's the talk you came to hear and that is indeed the talk that I thought I was going to give. But it isn't the talk I am giving, because the research made it clear to me that the research practices related to overload arose long before the 1970s.

Not only is the talk I'm now giving not the talk envisioned in the abstract, the talk envisioned in the abstract was not the talk envisioned when I started the project. The paper actually began life as a largely descriptive attempt to understand how faculty researchers and libraries had coevolved over the past century. I had a loose notion that the online knowledge world was losing something important, and I wanted to examine the collaboration of librarians and scholars that had produced that something.

By the time of this abstract I had done the first portions of the

project. I had compiled a clear historical demography of humanities and social science academia - the core of the library researchers. And I had built up a good set of descriptive library statistics. Moreover, I had begun to investigate the actual infrastructure enabling the researchers to use the libraries: the indexes, bibliographies, and above all the specialized reference works that enable us to find our way in the trackless wastes. Such tools seemed the heart of my project, and I knew that little had been written about them other than triumphalist hymns to progress or detailed studies of the creation of particular tools. Nowhere had I run into a conception of them as collectively enacting a knowledge environment.

Moreover, I also knew that there was a relatively easy way to discover and characterize the world of reference tools. My mother was a librarian, so I knew that the ALA had published a guide to reference books since the beginning of the twentieth century. Since I already had her copy of Winchell 1951 plus my own copy of Balay 1996, I had only to take out library copies of Kroeger 1902, Mudge 1923, and Sheehy 1976 and I was in business.

Now as I said, behind my descriptive aim I had a polemical agenda. I wanted to show in this paper that there's nothing so novel about the digital library. I wanted to underscore that we've had extremely powerful library tools - perhaps indeed more powerful than we needed - for a long time. And moreover that we have had a whole family of tools - specialized reference works - that are largely absent in the internet world of metacrawlers and keyword-in-context indexing.

But this whole polemic was based on a hidden assumption. As I was working through the history of reference tools and bibliographical systems, my search was to find what was available. That is, I was thinking of the system in terms of the research it could enable at maximum use. I was tacitly assuming that if tools existed, they were probably used.

But I began to think that maybe they weren't used. Maybe they were too

powerful for their own good. Maybe the academic knowledge system had broken down before the internet. If the crucial problem of the internet is welter - the sheer availability of too much stuff - surely we had gotten to that stage long ago. The 1970s looked like the disaster point to me - the time when the demographically-driven rise in hiring standards pushed publishing to epidemic proportions, when the social sciences and humanities citation indexes brought the most ephemeral and third-rate publications onto the same page as the elite core, when it became impossible to do a comprehensive bibliography of anything. After all, under one of my other hats, I'm the both the editor of and the historian of world's most famous sociology journal, and I knew that there were clear signs of breakdown in the sociology journals in the 1970s, most of them deriving from the fact that the demographic environment in academia at the time meant that journals were suddenly more about personnel evaluation than about knowledge growth: reference lists and article sizes ballooned, research assistants moved from footnotes to co-authorships, senior scholars stopped submitting altogether, referee reports lengthened into professional education seminars, referees demanded citation of their own work, and so on.

So when my hosts asked for an abstract, I said I would talk about coevolution of researchers and libraries over the twentieth century, with the punchline being a blowup in the 1970s: too much publication, of too low quality, by too many people, all assembled by indexes without quality selection into a flattened and desolate intellectual landscape. It sounded like a great story and might even be true.

But as I worked in the sources, it began to dawn on me that such overload might actually have hit long before even 1970. How I came to think this is another long story, and since much of my aim today is to render the actual practices of expert library research more visible, I will tell it. Again the

story begins quite a while ago.

One of my first research strategies in this project had been another research handbook no-no: a brute force title scan of every MLS or PhD thesis ever done at the University of Chicago Library School. I knew there had to be something in those theses. I didn't know it would be, but I knew it had to be wonderful, that those theses couldn't all be about reference questions in public libraries and how to teach high school kids to use card catalogs. So I went on a fishing expedition looking for anything even vaguely related to expert use of research libraries. Now the handbooks don't tell you to do this - indeed they tell you not to do this - because such a fishing expedition works only on one condition, which neophytes never meet. You can do this ONLY if you come into the project with a lot of knowledge about your topic - usually pretty random, but knowledge nonetheless. So for me, all my random knowledge about libraries and my hunches about how it might be that humanists use them acted as lines in the net that I went trawling with. And unlike the neophyte fishing in subject indexes, I didn't know or particularly care whether my net was going to catch haddock or tilefish or grouper. The knowledge I brought to the search meant I would be able to sell them all when I got back to port.

So I went through the entire list of Chicago theses, which I ginned up electronically, because even though they are all filed together alphabetically, the spine lettering has often faded and so doing it physically - normally my preferred strategy because you can pull things out and quickly look them over right on the spot - was not an option. I charged out about a hundred out of the six hundred theses total, and carted them up to my library office where they sat while I worked on other parts of the project: the demography and the library statistics first because they drew on well-defined, limited sources and would produce clear, defined results, and then the bibliographical and reference tools side of my project. There I finally began

to use the theses, but only those bearing on reference tools: things like a history of the first edition of the *Union List of Serials* or a study of the 1946 publication of the *Catalog of Books Represented by Cards in the Library of Congress*.

But now that I was midway through the project and had indeed produced a formal first draft of half of the paper, I gradually realized that the reason for the detailed analyses of reference tools was not just to list the damn things. Anyone could see that the list would just get longer as the century passed. Whoop-te-doo. More does not necessarily mean better.

No, I needed to understand whether I was right in assuming that whatever was available would be used. More broadly I needed to understand the habitus of scholarship; what was it actually like to be a library researcher in 1915? Not just what tools were there for you to use, but did you use them? How often were you in the library? In other libraries? Could you duplicate things or have things duplicated for you? In short, I wanted to understand the same kinds of things that I had wanted to understand about current research practices in my empirical work for the Task Force.

So I shrank the freestanding demography and library statistics sections: these things mattered not for themselves but for how they set the stage for the actual experience of scholars. I also now saw - months after starting the project and long after my first draft - that the reference tools analysis for each of my four periods should be organized around four things: serial bibliography, book bibliography, archive and document tools, and reference tools proper. But the crowning section for each period would be about habitus: how had the demography, library resources, and tools combined to enact a world for scholarly practice?

Only after this complete refocusing and redesigning of a paper already half complete did I finally start to read my way through the Chicago theses.

But when I started to read through those theses with my tighter trawling net, I found some pretty ugly fish. Everything I could find out about stack behavior in the 1950s indicated that faculty and graduate students weren't using catalogs, even for known-item searches. Nor were they using most of the wonderful apparatus I had written about, built for them by Wilson and ALA and the library profession. They were just wandering into the stacks and trolling. They were indeed standing in the stacks and reading whole chapters, then pulling something else off the shelf and reading that.

Now it goes without saying that I ransacked the footnotes of these theses for citations. All these masters and doctoral students had already done the bibliographical work for me, under the watchful eye of Jesse Shera, so there was no point in my carefully working through the various volumes of the relevant index, *Library Literature*. However I could and did take the items they DID cite to *Library Literature* and use them to figure out how the indexers had categorized the things that interested me, something that would have been much harder if I hadn't had the sample references to start with.

It's useful to have a name for this last kind of move. I will call it brachiation, which as you probably know is the name for the motion we normally call "apes swinging through the trees." Library brachiation is like that - you just swing from a primary source to its reference list to an index then out again via another reference to another primary source and then perhaps on to a specialized reference work and so on. I'm sorry to mix metaphors from fishing and primatology, but there we are - brachiation is definitely what it feels like. It has two crucial qualities. The first is back and forthness: some of it goes forward, from subjects to references, the way the handbooks say we are supposed to go, but some of it goes backward from references to subjects, the way we aren't supposed to go. Its second crucial quality is that it generally STARTS in a source that is both close to our area of interest and written by somebody who can be counted upon to have done a lot of high quality

bibliographical work.

Brachiation from the theses took me out to a whole bunch of primary sources: the 1956 ALA Catalog Use study, the Johns Hopkins 1962 use survey, an MLS thesis I had somehow missed on the bibliographical sources of John Crerar Library clients, and various other formal analyses of library behavior. Faculty were pretty rare in these studies, because the surveyors usually looked at libraries in midweek in mid-semester when - as they should have known - the only people in university libraries (and even then only after noon) are undergraduates. But the message was everywhere the same. Faculty and graduate students got their references either from hearsay or from other people's footnotes or reference lists, just as - in fact - I was doing myself. I even began to run across remarks in the broader library literature, which by this time I was reading as well, that made it clear that faculty's unwillingness to use librarians' subject indexes was by this time proverbial; indeed it was a standing joke among librarians.

Now if faculty and graduate students were getting their research bibliography via hearsay or other professionals' published work, why were they doing this? The answer, at least theoretically, seemed obvious. What these sources had that the general bibliographical tools lacked was selectivity. This then was probably a sign that the literature - in the sense of all the material locatable and accessible via the general bibliographical system - was already overwhelming by the early 1950s. One had to rely on colleagues to have sifted it.

But now that I had pushed the date of faculty desertion of the general bibliographical apparatus back to the 1950s, could it go further back? Surely at some point the librarians and the professors had to be on the same page. After all, professors have been around longer than university librarians have, and I had a vague sense that in the early days of research universities - the

late 19th century - professors had loomed large in library matters. (Oddly enough, I forgot until much later that a sociologist about whom I had just finished an enormous historical article had held a high post in the U of C library system at one point. Sometimes the shoe *doesn't* drop.)

So suddenly I found myself back in the interwar period, where I had already written the section on the library research habitus. I had written a success story about the new tools of the 20s - the *Union List*, the *Carnegie Guides* to archives, and so on. It must have been great being a young researcher with these new tools, I thought. But in reality I didn't know much about actual faculty experience.

So now I will tell you yet another long story - the story of how I figured out how the honeymoon ended. You will find it crashingly obvious when we get there. Indeed, once I knew what I should have been looking for, the answer was staring me in the face: in the indexes - where I just had to know what the correct headings were; in the books of essays by interwar librarians - where I just had to know what the important chapters were; even in the academic library surveys - where I just had to know what the important tables were. Many of these things were already sitting on the shelves of my library study by this time - I had about seven hundred books charged out. But even that, you see, is overload if you don't know what you are looking for.

This is indeed the heart of the matter. The answer to a library research question is ALWAYS staring us in the face. Library research is the art of figuring out WHICH of the many things that are staring you in the face is the one you ought to have wanted to look for. It has almost nothing to do with searching for known items. Finding something is easy. It's knowing you ought to be looking for it that is hard. You search for known items only once you have done all the real work. (I'm even tempted to say that you search for known items only once you know what they are going to say.)

Moreover, what you ought to look for is not something that comes out of

your research design. Only high school students and other such neophytes have clear library research designs, and their clear research designs are in fact precisely why they never discover anything important. As Jesus said, "if the householder had known at what hour the thief would come, he would have watched and not have suffered his house to be broken into." If we knew ahead of time what the questions were and what books probably answered them, there would be no purpose to library research. Or put another way, the research that is doable in that manner is not worth doing.

So this is the story about which of the things staring me in the face told me how the honeymoon ended. It starts about three years ago, when I had taken on the Task Force job and knew I would be writing about libraries. Because the library needed a new ventilation system, the Z stacks would be inaccessible for six months. So I went down there with a cart and spent a couple of afternoons pulling down everything that looked interesting. I scanned about four thousand feet of shelves, from Z1 to about Z1200. I left the serials to my RA, who had simple orders to take out the last ten years of every substantial library periodical. This huge trawling expedition put about five hundred library-related items in my library study - I had to have new shelves installed, in fact.

As it happened those books sat unnoticed for a year or so while I wrote several other major papers on non-library topics. And once the Z stacks reopened I began gradually returning things that didn't seem as if they would ever be useful: esoteric serials, histories of french publishing firms, studies of information literacy among teenagers, and such like - things that had looked interesting at the time. I returned a couple of hundred items.

A few weeks ago, while I was pondering this puzzle of the end of the honeymoon, I decided to return a few more books. Actually, this was a vain attempt to get my total charges under 600 books, an important mark for U of C

library researchers. We can charge as many books as we like, but you can't get an online list if you have more than 600 charges, with the rather embarrassing result that you occasionally end up recalling things from yourself, much to the amusement of the circulation department.

Now one item I picked up for return was called a *Bibliography of Library Economy*. I had once been thinking of writing a theoretical paper about knowledge as capital, identifying the digital knowledge world as an enclosure swindle just like the enclosure swindle in 17th century England. So the idea of "economy" had appealed. Before returning it, I idly opened this book, and, as some of you may know, it isn't about economics at all. It's a general bibliography of library matters - the only one, in fact, covering the period before 1923. So we begin with my having the right tool in my hands for the wrong reasons.

Well, I thought, I can start looking for my early scholars on their library honeymoon. What will this book call them? Luckily the book had a complete listing of all its subject headings, and there it was - "Libraries and the Investigator", how quaint. So I start to look through the list of ten or so articles, for things that would be easy to get. One in particular appeals to me, and luckily it is in JSTOR. It turns out to be a review of a US Bureau of Education pamphlet on special libraries in the US. Well, that's interesting, I think. But the pamphlet itself is not named. I wonder if we have it, so I search the online catalog with "Bureau of Education" and "1913," the year of the review. No luck. But I remember that 1913 is within the range of years that have decent indexes for gov docs, so I grab Mom's Winchell to remind me of the right title for that index - oh yes, it's the *Document Catalog*. Then I have to look that up in the online catalog to find the call number, because the current reference librarians cannot answer questions like "Where is the *Document Catalog*" without looking up the call number. I might as well do it myself. So I find it, and after some floundering with the headings,

I find my pamphlet. I now have the proper title, authors, and year - it turns out to be 1912, not 1913, and it also turns out our catalog had the imprint wrong - "Office of Education" instead of "Bureau of Education." So I send the catalogers an email request to correct the cataloging and I go to find my pamphlet in the stacks.

It's in z731, which looks interesting, so I scan it again with my more focused interests. I turn up two other early surveys of special collections to add to my lists of general reference tools and I also find, of all things, a history of OCLC. Thus far I have four things from this little adventure: none of them dead center in my interest of the moment - early scholarly practice - but each useful in its own way.

Next I wander about a bit in JSTOR. I try the language and literature section constrained to pre-1920 with "library" or "libraries" in the title. I get mostly stuff about school libraries, although there are some articles on "opportunities for research," organized around particular Italian collections in particular research libraries. It's interesting that specialists were in effect advertising their libraries' special collections.

Next I try Wilson, good old Wilson; *Readers Guide Retrospective*. And the *Essay and General Literature Index*. But it turns out the online version of the latter is not retropective, and the online *Readers Guide* itself is taking long pauses for screen refreshes. So I go to the physical volumes downstairs, which are much faster. It's noisy - I have to shut up two blabbing undergraduates whose conversation the reference librarians are pointedly ignoring - but in half an hour I've done the *Guide*, the *EGL*, and the *International Index*. I've got about twenty interesting possibilities on college libraries, although few of them look to be about research per se. While I'm there, I also take a moment to scan the five red books of the LC classification to ascertain exactly the relevant LC subject headings. For the most part I discover stuff I

already know and areas I have stack scanned long since, but I do discover that there are LC headings for "libraries and intellectuals" and "libraries and scholars." My hopes are raised, but in the stacks it becomes clear that these are recent headings. Anything I want will be somewhere else, in an older, more general heading.

Now one of the things the *Reader's Guide* turned up was a 1952 piece by Richard Altick on "The Scholar's Paradise," which turned out to be an interesting riff on his own experiences in libraries. It happens that I own two of Altick's books and that one of them is organized around biographical accounts of famous scholarly discoveries. So I suddenly decide that maybe autobiographies are where I should go. I will spare you the details of how impenetrable the online catalog is on the subject of autobiographies - it turns out that the heading "autobiography" is about the writing of autobiography and the heading "autobiographies" is where you look for the things themselves - but I eventually fall back on Sheehy and Balay who immediately produce Kaplan's and Briscoe's wonderful subject indexes to American autobiographies, which in turn led me to about 90 autobiographies of scholars in my period, all of which I charge out. While I am at it, I get a list of librarians' autobiographies - not many librarians write autobiographies, by the way. I also accidentally find some librarian *biographies* that look interesting, which turn out to be in the same LC heading as the autobiographies, Z720.

Two of these librarian biographies provide crucial steps in my argument. One is a hagiographical account of William Warner Bishop, czar of the University of Michigan Library from 1915 to 1941, and a crucial player in reshaping American university libraries in those decades. The other is a biography of Pierce Butler, professor of bibliography at Chicago, and portrays Butler as the man who defended a scholarly ideal of librarianship against his colleague Douglas Waples, an ardent apostle of rationalization and

scientization. Bear in mind that I have found these two wonderfully useful biographies not because I was looking for them but because I had decided "why not look at the librarian autobiographies?" and then it had turned out that librarian biographies and autobiographies were in the same LC heading when I went through the shelves.

I'm underscoring this detail because I want to emphasize that browsing - broadly understood as the productive confrontation between an ordered, informed mind and a differently ordered set of materials - is going on at all levels of investigation at all times. It is not something unusual or occasional. It's like peripheral vision or the virus checker on your computer; it's always running in the background, always ready to pick things up. It doesn't work, however, for minds that don't have anything in them for that peripherally relevant stuff to stick to, which is why the handbooks don't tell you much about it. But it is the heart of expert work in the library.

I was telling you about the debate between Butler the humanistic librarian and Waples the library scientizer. As I know from my own historical work on sociology, this opposition was identical to the methodological debate between ethnographic and survey methods in sociology at that time, which is hardly surprising since - as Butler's biographer tells me - his office (and in fact the the Graduate Library School itself) were both in the social science research building. This reminds me that my own current methodological writings might be relevant - it's easy to forget that other pieces of one's own work might be relevant, as I noted earlier - and so I see at once that the inability of the library survey researchers of the 1950s and 1960s to actually find out how humanities faculty were conducting their research flowed directly from their having used survey and other scientific methodologies that not very subtly encoded into their inquiries a quite particular view of what library research ought to be. They couldn't see what they had not imagined.

In any case, I began reading the scholar autobiographies, taking a couple home every night and scanning them. There was lots of gold in them, not necessarily dead center on the immediate question of library research practices but providing great detail around that center: interesting things like the fact that scholars at places like Wisconsin took summer jobs teaching at Harvard or George Washington simply in order to support summer trips to major libraries or the fact that library-based dissertations in various East Coast library cities usually involved sojourns in other major East Coast library cities or the fact that Chicago's President Harper thought it fine to promise a brand new graduate student a private book fund in the student's particular area of interest. These kinds of things cannot really be suspected ahead of time. There is no way to look for them systematically. One can only trawl attentively and hope.

But eventually I decided that there must be more stuff like Altick's wonderful "Scholar's Paradise" article. It was time, at last, to do some systematic bibliography. I pulled out the copy of Cannons's *Bibliography of Library Economy* to 1923, grabbed early volumes of *Library Literature*, and retrieved from the stacks the single volume continuation of Cannons for the decade 1923 to 1933. Now was the time to follow the handbook method.

But as I begin to ask myself which headings I am going to search in these volumes the phrase "departmental libraries" pops into my head. I don't know why. It's just there quietly clamoring for attention. Now "departmental libraries" is a familiar phrase. Every academic institution I have been affiliated with - from Andover to Harvard to Chicago to Rutgers - has had departmental libraries. I even know some details about departmental libraries: I know about the great centralization of departmental libraries at Chicago in the late 1960s; I know about the enduring importance of departmental libraries in the sciences; I even know that departmental libraries had their roots in the seminar libraries of late nineteenth century Germany. But it is as if I

have never before really seen what departmental libraries mean. My diary notes are clear on this:

A huge shoe drops as I am looking around here. The topic that I am struggling with is related to departmental libraries. I figure this out as a problem in bibliography. That is, I have figured out that the topic I need to be searching in each volume of *Library Literature* is "departmental libraries." But far more important, I see that departmental libraries are a metonym of the argument I should be making. Departmental libraries were where the scholars wanted to do most of their work - because of the relative density of tools. Everything was at hand, just as it is in the wonder world of the internet, only departmental libraries were better because all the tools and only the tools were immediately in your hands.

Moreover, it is analogous to the importance of specialist reference works - limited, but highly ordered and highly particular sub-indexes of parts of the whole library. Departmental libraries are limited but highly ordered and highly particular subsets of the library. It was the librarians' contention that there ought to be one master index, but the research scholars always want partial indexes, indexes slanted their way, organized by their way of seeing the world, not by a generic view from nowhere.

Armed with this new insight I pursued departmental libraries through the formal bibliographical sources and what I found was a long and fierce debate, a gradual divergence of views of research between librarians and scholars, and then a gradual withering of the debate after the 1920s. Why had it fallen off?

Here I made a lucky guess. I was thinking about the first real departmental libraries I had known - the English and History seminar libraries on the top floor of Widener. It was obvious after a few seconds of recollection that the entire top floor of Widener had been designed for seminar libraries. And of course I knew the date of the building because it was a memorial to a young man who went down on the *Titanic*. Suddenly it flashed into my mind that every major university library I've ever entered was built between the wars. Luckily there turned out to be in the stacks a history of American university library architecture, from which it was easy to construct the list: Berkeley 1911, Chicago 1912, Harvard 1915, Johns Hopkins 1916, Stanford 1919, Michigan 1920, Minnesota 1924, Illinois 1926, Yale 1931, and Columbia 1934.

Two of these libraries - Chicago's Harper and Hopkins's Gilman - were collections of departmental libraries grouped in adjacent quarters. The rest were all completely centralized libraries, usually with some seminar rooms scattered in them and provision for graduate student study space in the stacks. This then was the answer. What happened in the 1920s was that the professors had lost control of the books to the librarians. More important, unlike the scientists whose laboratories were subject to all the same arguments for centralization, the humanists and humanistic social scientists had their research and instructional worlds broken apart. No longer would faculty and graduate students rub shoulders daily in departmental offices and seminar rooms immediately adjacent to a departmental research library with both basic and specialized reference tools as well as a substantial monographic collection. From henceforth, for the faculty, doing research meant going to another building, in which they might or might not have an office or research space; it meant working with general and specialized reference tools now mixed in with all the other reference collections; it meant seeking monographic material interspersed throughout an immense main stack. The days of running down the hall and quickly bringing an important reference tool to one's desk were over.

This then is the crashingly obvious discovery I promised you twenty minutes ago: academics developed new research practices to deal with the centralized, massified libraries forced on them in the 1920s. The answer indeed was staring me in the face: in the indexes - where I just had to know that the heading to pursue was "departmental libraries;" in the books of essays by prominent interwar librarians - where I just had to know that the important chapters were the ones on centralization, physical buildings, and departmental libraries; in the academic library surveys of the time - where I just had to know that the tables that mattered were the ones specifying where the books and reading rooms were physically located. Now all of those things

are in retrospect obvious. One can even think up a chain of reasoning by which I ought to have been able to figure out ahead of time that these were a or *the* important place to look. But the fact of the matter is that only by immersing myself in the investigation, by trawling in the lean places, browsing in the rich ones, applying reverse engineering when needed, and brachiating around in circles from primary to secondary to bibliographical sources, only by all this could I get to the place where I saw which of things staring me in the face were the important ones.

In conclusion, then, let me sketch the century-long history of research practices in libraries as I see it now. In the formative years, before the First World War, the entire PhD cadre of library researchers in all fields probably numbered about a thousand. Most library research was done in a handful of universities, all of them in or near the great library cities of Boston, New York, Washington, and Chicago. Professors and graduate students did research side by side in departments that had their own office space and, most often, departmental libraries immediately at hand. Acquisitions for departmental collections were in faculty hands.

These scholars worked in a surprisingly rich reference environment, some of it in the departmental libraries, some in the central collection. In periodical bibliography, the *Readers Guide* and its scholarly equivalent the *International Index* date from this period. Book bibliography was more chaotic, undermined by the lack of a national classification standard. But on the plus side most American libraries had agreed (unlike their continental counterparts) to follow Dewey's lead in relative shelving, which meant that physical browsing by subject - an immense research advance - was for the first time possible. As for archives and document bibliography, US government documents had better indexing then than they would at times later in the century, and comprehensive lists of special collections were already

available. In specialized reference, however, the future was less evident. The dominant works were typically European: multivolume, foreign-language works combining bibliography with scholarly summary.

In the interwar years, this scholarly world changed radically. It expanded steadily, to about ten thousand or so by the Second World War. Nonetheless, disciplines remained small enough - typically numbering about 1500 to 2000 - for faculty to know virtually everyone in their field. They could know all dissertations going forward across their discipline should they wish to, and, indeed, could in practice read virtually all new work in their discipline should they so desire. Although PhD production remained centralized in the great library cities, library research began to trickle out to the major universities of the midwest and the west, where professional historians upgraded local history as a way of surviving their banishment from the great East Coast libraries.

In the interwar, the research habitus of faculty changed radically as they lost their bid to retain departmental libraries. They were defeated by university librarians armed with the twin rhetorics of on the one hand scientific management and efficiency and on the other hand liberal education and its preference of generalism over "narrow specialism." Departmental libraries survived but only in centralized settings, where they were of much less use to faculty. Faculty lost most of their role in acquisitions, although they retained - as they would for the whole century - the right occasionally to lob sarcastic critiques at librarians' acquisition policies.

The reference infrastructure took several big steps in the interwar. In periodical bibliography, the *Union List* finally appeared, providing enormous assistance to those researchers outside the great library cities. For books, the period saw the halting emergence of the NUC, the creation of the regional depository catalogs, and a serious interlibrary loan system. Again, the boon

for those outside the core was great. For archives and documents, LC began a regular census of manuscript collections, the PRO finally issued a serious guide to its holdings, and the *Document Catalog* continued as a solid index to American gov docs.

But the real story of the interwar is the explosion of specialized bibliographies and tools, generated by scholars - or sometimes scholarly librarians - for research use. The immense *London Bibliography of the Social Sciences*, the AHA *Guides to Historical Literature*, and the MLA annual bibliographies are all examples. The similar PAIS *Bulletin* was to be sure produced by librarians, but they were special librarians in a research library setting and their product was aimed largely at the research market. All these tools in fact bypassed things like the *Reader's Guide* and the *International Index*, which in effect became tools for general readers rather than specialists.

After the Second World War, the system changed again. Academia ballooned. As many humanities and social science dissertations were written between 1945 and 1956 as had been written from 1890 to 1945, and as many were written between 1956 and 1968 as had been written to 1956. Academia lost its face to face quality and also, in most cases, lost touch with its past; a world in which so much research was appearing so fast inevitably forgot older work overnight. Specialization grew rapidly. It might still be possible to know most of the scholars in one's specialty, but not in the discipline. Similarly one could know about dissertations in one's specialty but not discipline-wide. Indeed, even as a nation-wide dissertation location system finally emerged, dissertations were disappearing as scholarly sources.

In this period, the graduate education system finally began to decentralize, in part aided by a leveling of library resources. This leveling came partly through the steadily increasing importance of nationally deposited government documents in major collections but also because massification

brought more and more libraries to behemoth status. Although early collection differences were never erased, current collections and general reference collections were much more uniform as spending ratios equalized. This leveled the playing field, especially in the social sciences.

As far as general reference tools are concerned, it was in the 1950s that abstract journals finally began to appear in the social sciences and even the humanities, although the latter were not very successful. A massively expanded *Union List* in the mid 1940s no doubt helped scholars locate unusual materials, and the book publication, at last, of a version of the NUC meant that one part of the interlibrary loan process became easier. In the late 1950s the *National Union Catalog of Manuscript Collections* finally began to provide systematic guidance on archival holdings, although as with dissertations, the tool was too little too late. Historians had long since turned their graduate students towards local topics and local archives. US Government documents meanwhile limped along under the miserable *Monthly Catalog*.

Meanwhile, specialized reference tools continued to explode. A typical example is the UNESCO-sponsored *Current Sociology*, of which each monthly issue comprised a massive review essay and an equally massive bibliography, both by a specialist researcher. Such tools clearly had begun to dominate in research practice. This is the period of which I told you earlier, in which there is much primary evidence that researchers got their bibliographical references from hearsay and other people's bibliographies and reference lists. By this time, then, the researchers had pretty much deserted the GENERAL reference system. They were using things like the *Union List* and the *CBR* when they were needed in detailed brachiation inside research projects, but all of their preliminary bibliographical work and a good deal of their focal library research work was done with specialty tools, many of which they would have owned personally through subscription. It is also in this period that the

paperback book emerged, which enormously increased the ability of scholars to own both current and classic texts, with their rich bibliographies.

In summary, this was a period in which library research became a much larger, more decentralized enterprise, and in which library researchers completed their emancipation from the main core of reference and bibliographical tools, which they henceforth used only when absolutely necessary. The further evolution of those tools was thus in many ways irrelevant to their enterprise.

As a result, when the 1970s brought the social science and arts and humanities citation indexes from ISI, library research scholars were not particularly interested. These were indeed universal indexes, quadrupling the coverage of the Wilson bibliographies and replacing non-specialist human indexing with automated KWIC indexes in a kind of race to the bottom. But most library research scholars - I'm quite unusual in this - have never used these indexes at all. They have long since decamped to specialist tools, many of which they owned themselves. (Every economist had an automatic subscription to the AEA's magnificent bibliography journal, for example.) When they need more bibliography, they go to major recent monographs or to specialist bibliographies.

It is true, however, that the post-1970s world probably brought even those kinds of techniques to their knees. Half of the dissertations ever written in the history of American academia have been written since 1982, and a third of them since 1995. It is not clear whether output per scholar has increased much, but when the typical discipline numbers ten thousand or more persons, even the old output rates mean that sheer quantity overwhelms us.

We do still have a few quality indicators. It is easy enough to simply ignore everything published in third-rate journals and by third-rate presses, and clearly many of us do that. But other people's reference lists - even if in high quality locations - are no longer as good a source as once they were.

The number of references in a typical sociology article has gone up by a factor of five in the last fifty years, and most of those add-ons are not useful as guides to the literature. The Chicago MLS theses show clearly that across most fields, fifty years ago, a third of references were to a single page in the cited source and another third to some page range. Today, I would put the figure for both together at less than ten percent. Most of the new citations, that is, are not substantive. Some are there to preempt the reviewer who might find himself left off the list. Some are there as signs of membership in this or that in-crowd. Some are there simply because word-processing has made it easy to add references like so many Christmas balls. All of this destroys the bibliographical utility of other people's reference lists, which was precisely their selectivity and substance.

I believe then that library research was in fact already in something of a crisis before the arrival of the internet and the digital library. The mechanisms of that crisis are rooted in processes continuous since the 1920s. The librarians have pushed for centralized reference tools and bibliographic structures, counting on indexing to save the day and guide the investigator through the welter that comes with increasing power to locate and access material. Their central metaphors have always been scientific, their poster children for success have been the natural sciences and in particular chemistry, and their model has basically been to make the library a universal identification, location, and access machine. The digital library world is in that sense simply the latest version of a quite familiar program.

By contrast, library researchers started withdrawing from this universalist project in the 1920s and gradually erected a system of specialty tools and a set of research practices that enabled them to bypass the hugely inefficient searches that were the only possibility under the universal bibliographical system. By the 1950s and 1960s this alternate system of

specialty tools and practices was mature. It could therefore survive the race to the bottom that culminated in the ISI databases on the one hand and WorldCat on the other. But I am not sure that it has survived the current mass of work and the degradation of its crucial database of published citations of high quality articles.

I have no idea what is going to come next. Although I have worked with string-search algorithms and data-mining techniques for twenty-five years, I don't believe in the digital utopia for five minutes. I don't think that magical tools are going to enable college seniors suddenly to do library research that will eclipse the work of distinguished scholars of twenty years ago. I don't think faceted metacrawlers are anything more than training wheels for the intellectual under-fives.

Some research will become possible that didn't used to be, and some research will become easier, but most of it won't change much. As is usual in history, the new generation will declare victory and do so successfully; whatever mixture of research tools and practices it uses will be defined ipso facto as quality scholarship. But it will in fact take many decades for real definitions of quality to emerge in the new environment. Perhaps in fifty years scholars will look back at the first generation of post-internet scholarship and cringe, as indeed I cringe when I look forward to it.

But not all of what is happening is silly or puerile. I am watching quite seriously as my colleagues in the Computation Institute at Chicago automate certain kinds of natural science research and even - as they see it - certain kinds of creativity. And I am persuaded by that spectacle that we must think ever more carefully about what it is that we - both as individual researchers and as research traditions - contribute that is uniquely human, that is not in the last analysis translatable into machine production.

I am a pretty firm believer in computational methods. They have been

central to my career and I am thankful for that. It is for that very reason that I think we need to face squarely the concept of library research as computation and the extent to which we would be willing to regard a fully computationalized library research as legitimate. The question here is simple and deep. What is it that is uniquely human about library research? Indeed, what is it that is uniquely human - full stop?