Symposium on the History of Technology: Past, Present, and Future
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Continuity and Change Across Four Eras: The Past, Present, and Future of the History of Technology

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First of all, I want to thank Roe for inviting me and for hosting this symposium and also to thank Judy, who we all know is amazing. It is great to see you again, and like Eden Medina said, I was at the University of Maryland once upon a time, and we both had David Sicilia as a professor.

I also had a naval historian there, named Jon Sumida, and then I had Robert Friedel, and Robert was the one who I took history of technology courses from. He thought I had some talent, I guess, and he said to me one day, "You know, you should go up and study with Roe Smith at MIT. Oh yeah, and there's this other kid who is also pretty good. I think he just graduated. His name is Dave Mindell."

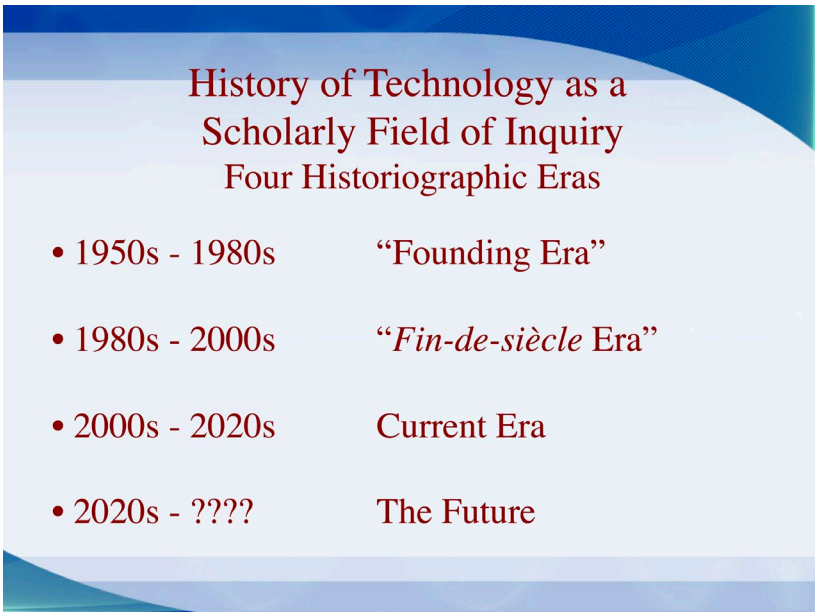
These are some of the people I owe a significant intellectual debt to, both Maryland connections and MIT connections. So thank you, Roe, and like Greg Clancy said yesterday, I would not be where I am today if it weren't for coming to this program and studying with those two amazing scholars sitting here in this auditorium. As Jamie did too, I took Roe's invitation literally. He said, "I'd like you to talk about the past, present, and future of the history of technology." So I don't need an outline because that's what I'm going to do. I'm going to talk about the past, the present, and the future of the history of technology. As I see them, at least.

From Dave Mindell is where I first learned how important origin stories were to any kind of technological story one is going to tell. And the history of technology has its origin story, which we are largely familiar with in this room. Belgian-born chemist and historian George Sarton actually launched the journal *Isis* in 1913, and after the Great War, he worked with others to found the History of Science Society. In the 1920s, 1930s, and 1940s, an occasional article on technology would appear in the pages of *Isis*, but in the 1950s, a group of scholars, concerned especially with engineering education in the United States, established its own professional organization, the Society for the History of Technology, and they started to publish their own quarterly journal, *Technology and Culture*, which, not surprisingly, is what Mel Kranzberg Jr. is holding in his hands in this image. Kranzberg would serve as first editor of the new quarterly, which is now in its seventh decade of publication.

Left - George Sarton (1884-1956) in November 1925;
Right - Melvin Kranzberg, Jr. (1917-1995) ca. 1960s

https://siarchives.si.edu/blog/science-service-close-george-sarton https://commons.wikimedia.org/wiki/File:Melvin_Kranzberg.jpg

I'd like to contend that, if you look at the field from a historiographic perspective, the field has had three distinct phases and is likely entering a fourth right about now. I label these identifiable historiographic eras. Of course, the boundaries between any such putative eras are fluid and overlapping. I am going to mention things in the third era, for example, and you'll be like, "Well, there's evidence of that in the founding era," or whatever. I understand that, but these are very general, broad-brush perspectives.



And I think this is important because to take stock of the field in the mid-2020s and to ponder where it might go in the future, we should consider how the discipline has evolved since its institutional inception. The first era, I would argue, is what I would call the "founding era." This era was dominated by American scholars, with few women or minority participants.

I found this image recently when I was going through some things for class preparation. In the history of science and technology, for those of us who live in the heartland, there is something called the Midwest Junto. It meets every year, and it involves scholars from the University of Minnesota, Wisconsin, Iowa State, etc.. Here is a photo from one of the first meetings. This is actually their inaugural meeting in 1958, and I think it kind of illustrates the point because there is not a lot of diversity visible in this picture. That is a notable element of the founding era.

Figure 1. Group portrait of the attendees at the first Midwest Junto in Kansas City in April 1958. (Courtesy of the University of Oklahoma Library.)

Robert E. Schofield, "'Too Far to Go': Early Years of the Midwest Junto," I*sis*, vol. 90 supplement (1999)

Now, many of the individuals in the founding era of SHOT [Society for the History of Technology] were either former engineers or historians of science interested in elements of the material world. Also, the Cold War exerted a dominating influence on first generation historians of technology. I have heard rumors, although I've never seen anything published on this, but have heard rumbles from some old hands that Mel Kranzberg actually had some connections with the CIA in terms of some of its anti-communist activities.

I think one thing that's also significant, and Roe mentioned this earlier this morning, the society in that founding era had really strong connections with the Smithsonian Institution, and, in fact, the National Museum of American History, until 1976, was called the National Museum of History and Technology. Also, the National Air and Space Museum is another key museum that SHOT has close connections to, both then and now, but it is especially prevalent early in the founding era.

As the first generation of stars began to pass the baton, the field entered what I would argue is a second historiographic era. I call this the "*fin de siècle* era." This period ran from the 1980s until the first decade of the twenty-first century, and historians in this *fin de siècle* era were influenced heavily by a number of things. One was social scientific models, those of European social scientists especially: individuals like Latour, Pinch, Bijker, and MacKenzie. For those of you who are younger in the audience, Ruth yesterday mentioned the "School Bus Book," in which she published her famous article on the consumption-production junction. You may have

read it online. If so, you would not know this, but when you actually look at the book cover you can see why it was called the "School Bus Book."

Also in this period, you had an explosion of interest in both gender and the environment. This was a broader trend in the historical profession, both in the United States and abroad. You had, of course, William Cronon's famous work, *Changes in the Land*, followed by *Nature's Metropolis*, and also Ruth Schwartz Cowan's work, which we talked about yesterday. Here is an image of the journal *Environmental History*, the very first issue of which was published in January 1996, and here is an image of a 1997 special issue of *Technology and Culture* devoted to gender and technology. I have assigned some of the articles in that issue in my own classes. The one on laundry, in particular, has been well received by students.

Influences on that second generation included the advent of the personal computer and the Internet. If you'll recall, the first successful commercial browser, Netscape, came out in 1994, and the end of the Cold War was also highly influential to that generation. The current historiographic era, however, arose during a decade of turmoil and change.

In this third era, which I will simply call the "current era," I would argue that the field has expanded in some very new and exciting ways, with historians of technology more often examining areas of study identified by John Staudenmaier when he published *Technology's Storytellers* in 1985. He said there were areas where historians of technology could do a better job. Again, the boundaries from the eras are fluid and overlapping. John's book was published in the 1980s, and much of this new scholarship began appearing in the 1990s, with non-western technology being one of those areas. Technological failure, racial identities, technical milieus, and technology transfer between the industrial and industrializing worlds were all areas also identified by Staudenmaier. These are some of the subjects that arose to the forefront in the current era of the history of technology.

Explorations of maintenance, repair, and use of technology joined those that centered on the more traditional themes of invention and innovation, and twenty-first-century historians have also defined their subject matter more expansively than in either the founding or *fin de siècle* generations. In the 2010s, SHOT gave distinguished awards to books and articles on color, cancer, cartography, and the ballet pointe shoe. Some of this work was actually mentioned in yesterday's talks. A couple of those, the ballet pointe shoe, in particular, were mentioned, as well

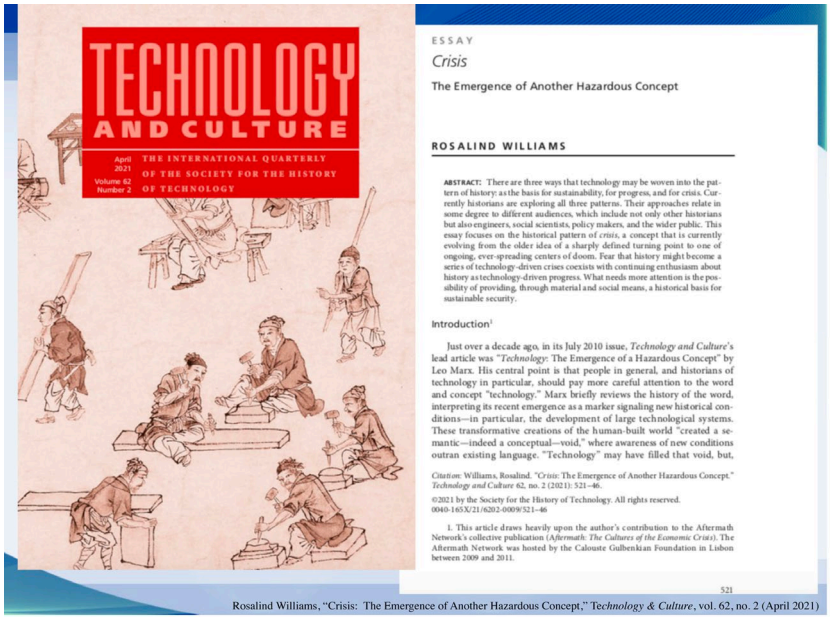
as William Rankin's book on cartography. These are subjects not traditionally associated with the history of technology.

Without question, though, the most pervasive interest to today's historians of technology is modern IT [Information Technology]. Indeed, computer history has been the subject of five of the last six books to win the Hacker Prize. A few years ago, at one of the SHOT Conferences, I heard somebody say, "Hey, you know, the Society for the History of Technology has effectively turned into the society for historians of information technology." Then they said, "Of course, we can't change our name because it would no longer be appropriate in polite society." You've got to think about that one a bit. Okay, so this is why I'm a historian and not a comedian.

I think you can see these trends in the books shown here. *The Shock of the Old*, very influential in the field, was published by David Edgerton, and was where maintenance, use, and repair really came to the forefront. There was actually a recent *Technology and Culture* article that explored these matters in some detail. You also have Eden Medina's book, *Cybernetic Revolutionaries*, and William Storey's *Guns, Race, and Power in Colonial South Africa*. S. Lochlann Jain's book won the Edelstein prize. That was on cancer. Also we have Edward Jones-Imhotep's book on technological failure, and Meredith Broussard's book, *Artificial Unintelligence*.

So, if I go back a few slides to this list addressing the topical and thematic breadth of the current era, how did I come up with such a list? I looked at various awards and also considered what was published in *Technology and Culture* and *History and Technology*.

The current era has also been much influenced by twenty-first-century events, a quarter century that seems to be in a permanent "age of crisis," to borrow Roz Williams's expression, and this was also something mentioned the other day. If you haven't read her essay, "Crisis: The Emergence of Another Hazardous Concept," it is a powerful essay worth reading. It appeared a few years ago in *Technology and Culture*.



Rosalind Williams, "Crisis: The Emergence of Another Hazardous Concept," Technology & Culture, vol. 62, no. 2 (April 2021)

So where is the scholarly study of the history of technology headed next? This is the part of the talk and where I am hoping to be a little bit provocative. Like all history, there will be continuity and change. Topically, analyses of environmental and information technologies will almost certainly continue to thrive given their considerable contemporary relevance. Climate change is often in the news, and Colleen talked yesterday about generative AI. So I do not think that SIGCIS and Envirotech, to borrow the names of two of SHOT's special interest groups, are going away. I think that they are going to remain mainstays of the field, especially given their contemporary relevance.

So too does the field seem to have accepted that technology should be broadly defined, but I have a cautionary note here. I think there's a bit of a problem with this approach because, if everything is considered a legitimate subject of inquiry, then the history of technology risks

becoming an amorphous assemblage of case studies rather than a coherent field of scholarly inquiry. Thematically, studies that examine the history of technology through the lenses of race, class, and gender will continue to be prevalent, but so too will analyses of real and purported elites -- inventors, engineers, and entrepreneurs -- remain a key element in the field's discourse.

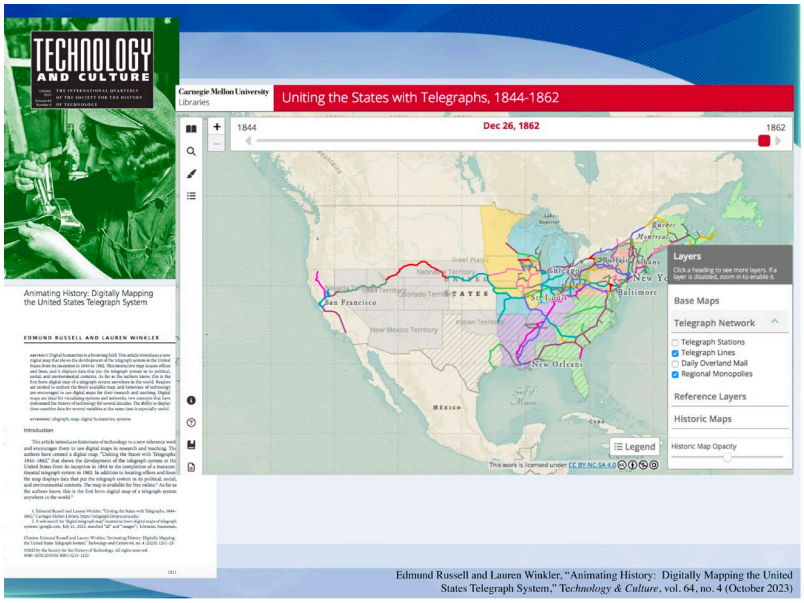
Methodologically, historians of technology undoubtedly will continue to embrace traditional archival research and approaches in disciplines ranging from -- I was going to say anthropology to zoology, although I learned yesterday that zoology doesn't really exist as a field anymore, but it's a good rhetorical phrase -- anthropology to zoology. And given Greg Clancy's talk, actually, maybe I can get away with still keeping it. Indeed, the field's interdisciplinary heritage is visible in the very first issue of *Technology and Culture*, which had nine articles, five of which were written by historians and four of which were written by individuals whose chief areas of expertise were in journalism, management consulting, that was Peter Drucker, sociology, and metallurgy.

Given all this continuity, where lie the emerging and prospective changes to the field? I think this question is best considered from two perspectives: (1) trends underway that are likely to persist, and (2) changes that are important if the history of technology is to remain a vibrant field of scholarly inquiry.

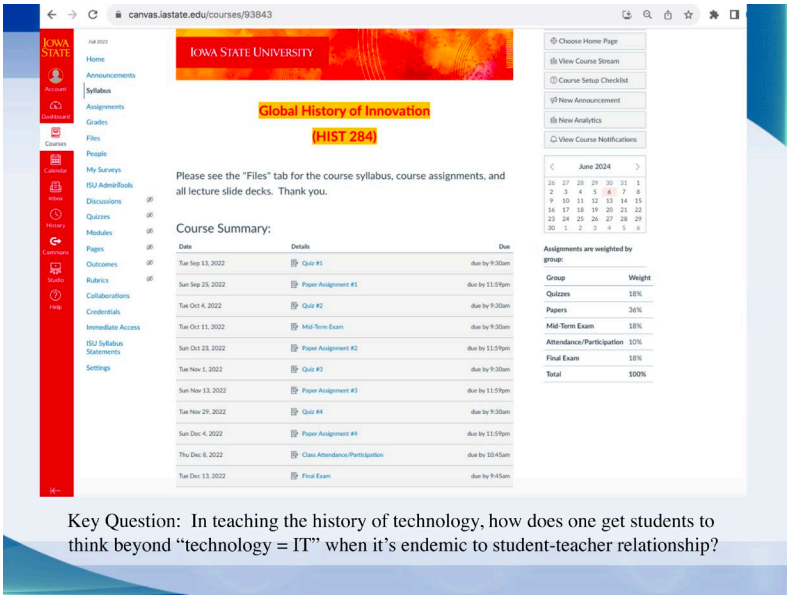
With respect to the former, arguably the most notable recent change in the field has been a methodological one. Unsurprisingly, historians of technology have wholeheartedly embraced digital history, broadly defined as an approach in which computational tools are used to investigate and represent the past. Digital history actually has two main branches. One is the methodology itself, things like topic modeling or word clouds or some of the pedagogic research I am involved with right now. I'm using a program called Readability, which actually analyzes the readability of different texts. The other branch revolves around how best to deliver history to audiences using digital media, and we just had a talk on using digital media to reach audiences in the film industry.

So digital history, I think, is here to stay, and it is something historians of technology are by and large embracing. If you look at *Technology and Culture* in the last five years, there are quite a few articles that have used topic modeling and other digital historical methods. Some examples include Edmund Russell, right here, in the October issue of *Technology and Culture*, and also the Society for the History of Technology, which has tried to reach out to the public with

"Technology's Stories." This effort has had some success, although it has been sporadic. Not much has been published recently, but it is, at least, a notable digital history effort by SHOT.



Another big change, accelerated by the pandemic but also tied to the proliferation of digital computers and the Internet, is a shift in the way the history of technology is taught to undergraduate students. Online classes are much more common than they were a few years ago, and even in-person courses tend to rely in part on learning management systems like Canvas and Blackboard. I went ahead and pulled up the Canvas page for my Global History of Technology Survey class, which at Iowa State we call Global History of Innovation. Here is a screen capture from the last time I taught the course, and the question located at the bottom of the page is one I frequently think about.



In teaching the history of technology, how does one get students to think beyond "technology = IT" when IT is so endemic to the student-teacher relationship? I just read an article last week in the *Wall Street Journal* that said nearly 40 percent of graduating students of from Stanford were computer science majors or directly related fields. For our students, information technology and technology are almost synonymous, and I often ponder about how I get students to realize, "Hey, technology is not just IT." Not that IT is unimportant, but there is a lot more to technology than information technology.

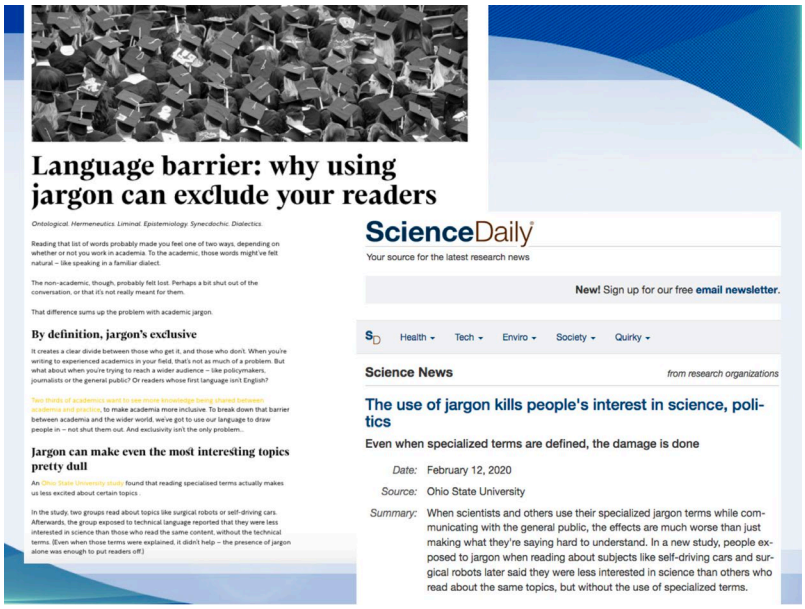
For reasons of convenience, instructors increasingly are assigning fewer books and more articles to undergraduates. This is based on anecdotal evidence I have gleaned from talking to my colleagues. I am the curriculum committee chair for the Iowa State History Department, and I've seen this trend where we are putting less books in the bookstore and more often assigning articles. I do not know if Iowa State is unique in this sense, but based on talking to colleagues at other schools I suspect it is not. This trend, which seems likely to persist, has the potential to elevate further the importance of the field's two leading journals, *Technology and Culture* and *History and Technology*.

I would argue, though, that at a time when it is easier than ever before to introduce students to the history of technology through articles researched and written by subject matter experts, there has been a disconcerting trend away from engaging narrative and jargon-free prose. Not every article needs to be accessible to the average undergraduate, but more of them should

be. In selecting course readings, I have something I call my undergraduate STEM test: would a typical STEM major find a particular article interesting and engaging?

A few years back, what I started doing every time I assigned a book or an article, when we finished it, I would pass out little slips of paper and ask students to rate the reading on a scale from 1 to 10. I then added them up, and that gave me an average for each assignment. I created a little spreadsheet -- using digital history there, I guess -- and I can see, 7.8, 8.4, okay; 2.6, not okay. This is an article students do not like, so I don't assign it again. Anecdotal evidence, to be sure, but one of the things I've noticed is that students, when I assign *Technology and Culture* or *History and Technology* articles (although I'm more likely to assign the former), routinely give founding and *fin de siècle* era articles higher marks than articles from the current era. I think that is because there's a lot more jargon in them, although I don't mean to pick on any specific article.

When we read the blurbs shown here, all excerpts from articles published in the last six months in either *Technology and Culture* or *History and Technology*, in this room we're all like, "Yeah, I totally understand that," right? Believe me, the undergraduates of Iowa State -- smart kids -- they're, just not interested in highly pedantic language. There's a lot of research showing that college students and others really dislike jargon and learn less when exposed to it, and that is the key point. People learn less from jargon-filled pieces, and this slide shows two examples of some of the research on that.



Language barrier: why using jargon can exclude your readers

Ontological. Hermeneutics. Liminal. Epistemiology. Synecdochic. Dialectics.

Reading that list of words probably made you feel one of two ways, depending on whether or not you work in academia. To the academic, those words might've felt natural – like speaking in a familiar dialect.

The non-academic, though, probably felt lost. Perhaps a bit shut out of the conversation, or that it's not really meant for them.

That difference sums up the problem with academic jargon.

By definition, jargon's exclusive

It creates a clear divide between those who get it, and those who don't. When you're writing to experienced academics in your field, that's not as much of a problem. But what about when you're trying to reach a wider audience – like policymakers, journalists or the general public? Or readers whose first language isn't English?

Two thirds of academics want to see more knowledge being shared between academia and practice, to make academia more inclusive. To break down that barrier between academia and the wider world, we've got to use our language to draw people in – not shut them out. And exclusivity isn't the only problem...

Jargon can make even the most interesting topics pretty dull

An Ohio State University study found that reading specialised terms actually makes us less excited about certain topics.

In the study, two groups read about topics like surgical robots or self-driving cars. Afterwards, the group exposed to technical language reported that they were less interested in science than those who read the same content, without the technical terms. (Even when those terms were explained, it didn't help – the presence of jargon alone was enough to put readers off.)

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The use of jargon kills people's interest in science, politics

Even when specialized terms are defined, the damage is done

Date: February 12, 2020

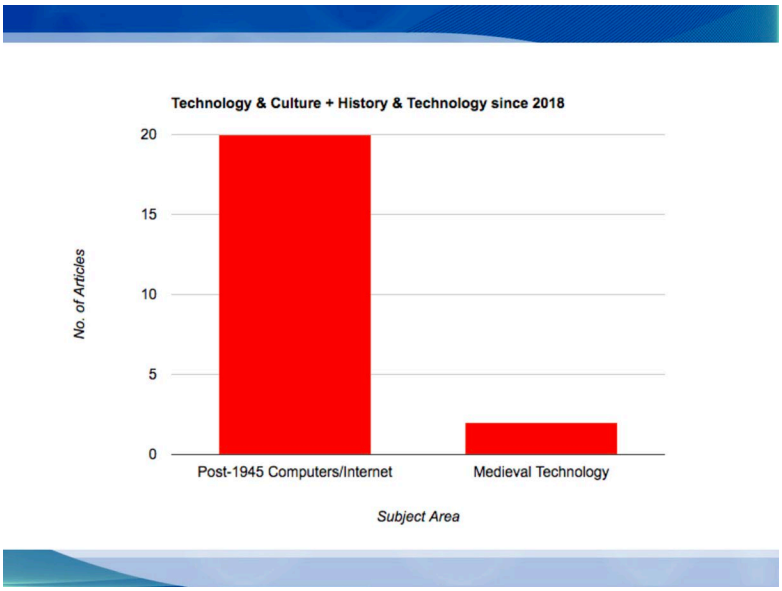
Source: Ohio State University

Summary: When scientists and others use their specialized jargon terms while communicating with the general public, the effects are much worse than just making what they're saying hard to understand. In a new study, people exposed to jargon when reading about subjects like self-driving cars and surgical robots later said they were less interested in science than others who read about the same topics, but without the use of specialized terms.

There are exceptions to the rule, and there are many good articles in *Technology and Culture* and *History and Technology*. So I am not bashing these journals, but I think, if you take things on the whole, there are fewer readable articles for an undergraduate audience today than there were in earlier generations. I submit, therefore, that historians of technology should produce more articles that speak not just to their academic colleagues but also to the future engineers, scientists, and global citizens in university classrooms and beyond. Less theoretical contemplation. More thought-provoking narrative. Or as this slide proposes, "Historians of technology publishing in *T & C*, *History & Technology*, and field-adjacent journals should focus less on theoretical framing, more on narrative flow and clearly articulated historical arguments."

That said, and this is my last thought for today, the most significant change that I think needs to occur, if the history of technology is to remain a vibrant area of intellectual inquiry, is that it must return to its roots as a field with chronological breadth. When Charles Singer, Eric Holmyard, A. Rupert Hall, and Trevor Williams assembled Oxford's seven-volume *History of Technology* between 1954 and 1979, three of those volumes, or roughly 43 percent, covered pre–industrial technology. Along the same vein, during the first decade of *Technology and Culture* there were 159 articles published, and 55 of them, or about 35 percent of the total, covered pre-industrial technology. Contrast this chronological diversity with current trends. I took the five most recently available volumes of *Technology and Culture*, volumes 59 to 63, and *History and Technology*, volumes 34 to 38. I looked at every article's abstract. There were 251 articles total, but of those, a mere 7½ percent covered pre-industrial technology.

No doubt twenty-first century conceptions of technology sway many of those interested in its history and gravitate towards the modern era. But here is another data point for you. In the past five years, there have been 20 articles in these journals that have as their basic subject post-1945 computers and the Internet. Again, I'm not saying that this is an unimportant topic, but we need some balance, too. For the medieval period, out of 251 articles total, less than 1 percent address technology from that era. Undoubtedly, Lynn White Jr. is rolling over in his grave somewhere.



To conclude, then, I would argue that the pull of the modern is wreaking havoc on the intellectual integrity of our field. The multifaceted relationships between humans and technology can never be adequately understood when the community of scholars arguably interested most in such relationships rarely examines anything that predates the steam engine. If the Society for the History of Technology strives to remain the principal institutional home of technology's storytellers, to borrow John Staudenmaier's famous phrase, then the time has come for its members to start considering again the stories of pre-industrial humankind.