

Peter L. Galison and Jens Kugele

Future Trading Zones for the Study of Culture: An Interview with Peter L. Galison

5 September 2019

Jens Kugele: Thank you very much, Peter, for agreeing to this interview. I truly appreciate this opportunity to continue our conversations on possible futures of the study of culture and to include your perspective as a scholar and filmmaker in this dialogical form. In addition to your academic work as a physicist and historian of science, you have also been involved in the production of several documentary films. In your and Robb Moss's documentary *Containment* (2015), for instance, you raise questions about possible futures when you shed light on governments' practices in their efforts to (safely) contain overwhelming amounts of radioactive sludge for the next ten thousand years. Your film addresses the question of how we can communicate with future generations and, indeed, future cultures about these containment attempts. In your view, how can we in the academic study of culture make sure that we foster communication with future generations and with future cultures? What kind of questions, topics, and concerns are of central importance in this context? What kind of (new) genres, formats, and media might be helpful or even necessary in your view?

Peter Galison: An interesting double question! On the one side, in the United States and in Europe, for some years a mix of physicists, futurists, astronomers, anthropologists, and material scientists have been grappling with the problem of how to warn the far future about the dangers of our buried nuclear waste. It seemed to the American Congress that it would constitute a plain moral hazard to bury and forget such dangerous materials. But then how does one communicate across 10,000 years or more during which the radioactive waste remains dangerous? Should one proceed by burying an image, icon, or image sequences? By a contemporary version of the Rosetta Stone? By entombing samples of the waste itself? By encoding scientific formulae and descriptions of the state of our knowledge of radiological medicine, nuclear physics, and geology? These are hard questions indeed, and they push to the limit – to the breaking point – our capacity to imagine the societies ten millennia from now. But the very act of trying to grapple with this necessary but nearly-impossible task is itself a great good thing. My hope in *Containment* was that to convey the idea that the very act of thinking far ahead – backed by nations – could help dislodge us from the presentism that threatens us everywhere. Most dramatically, we must resist our avaricious

present moment: The future of the planet depends on addressing the unfolding planetary catastrophe of global warming.

Turning to the other side of your good question: How might we, scholars of culture today, address matters of consequence, starting with finding ways to bring our concerns to an engaged public even today? When the futurists had to decide what to do, they felt inexorably drawn to the idea that no single modality could be relied upon – our best chance of communicating with the future would necessarily encompass many forms: images, texts, samples, ceramic plates, monuments, and scientific information. In some sense I think we face something similar in the human sciences today: It behooves us to think not only of a multitude of *sources* for our research, but a multitude of productive forms in which to present it. In my work, I've tacked back and forth between film, material culture, and text. Text is adept at cutting across times and places; it can, more easily than other media, take a topic and follow it through a multitude of countries, times, cultures. Books, physical and digital, travel relatively easily and can be read in any order. Film may more easily register the density of specific circumstance; it generalizes through its particularity and unfolds across time. Focus on an individual or family or kind of work, and the density of affect, the physicality of circumstance, and the volatility of relationships can emerge in ways that are not so easily ignored. Exhibits do yet other things, insofar as they can establish new and unexpected kinds of juxtapositions among objects, images, sounds. Done well, they can make immediate a distant time and place: I think of the power of the National Museum of African American History and Culture in Washington, DC; artefacts compel a confrontation with the physicality of slavery in a way that text alone cannot. My own sense is that the human sciences could do much more with these other (non-textual) forms of address: Culture is material and visual as well as textual. I strongly believe that we will need to be adept at using these and other modalities to present our work.

Over the last years, this kind of concern has driven me, for example – from writing on state secrecy, e.g., “Removing Knowledge” (2004) and “Secrecy in Three Acts” (2010), to making the film, with Robb Moss, *Secrecy* (2008) – all of these addressed the question of how historical (and present) attempts to block understanding help us frame how knowledge works. Grappling with university knowledge meant also confronting the historical inequity of the university – I made a film about a disputation that occurred in 1773 over the moral legitimacy of slavery itself – at a time when there was slavery at many American universities. The short film I made, *No More, America* (2017, with Henry Louis Gates), was accompanied by a textual exploration of the role of the eighteenth-century debate, its antecedent forms, and how academic disputation crossed with slavery on the eve

of revolution: “Disputation, Poetry, Slavery” (2019). A work in the history and philosophy of science, my book *Einstein’s Clocks, Poincaré’s Maps* (2003), led me to a collaboration with South African artist William Kentridge in the multi-screen installation *Refusal of Time* (2012) and that then carried over to its accompanying chamber opera *Refuse the Hour* (2012).

Jens Kugele: In your research as well as in your editorial work, you have built bridges between the natural sciences and other disciplines, particularly the humanities: Several of your publications in the ‘history of science’ field explore its relation to neighboring fields such as cultural history and art history. Moreover, you have also served, among others, on the editorial board of *Critical Inquiry*, one of the leading journals in the humanities. What kinds of methods and strategies have you found helpful to bridge the gap between these disciplinary formations and the different forms of knowledge construction?

Peter Galison: Many of the societal problems that face us just now can *only* be addressed with a concerted effort by natural sciences working *with* the social and human sciences. Above all, we need to see science and technology as part of culture, not exterior to it. To name three such arenas: global warming; digital privacy; and artificial intelligence. Each of these is all at once a technical problem-cluster *and* a concatenation of ethical, social justice, and political issues. Who lives next to the major sources of carbon production: natural gas, methane production, factory-scale animal plants? In country after country they tend to be the poorer, the less privileged of society: In these questions at the intersection of climate-altering substances and demographics is a zone of culture implicated by environmental justice. On computer science: Even to ask a seemingly most basic question, “What counts as online privacy?” takes us beyond pure technicalities. So too does the query, “Do Algorithms carry weight beyond the data bases on which they draw?” – I’ve written on this in “Algorists Dream of Objectivity” (2019). It is a technical circumstance that a DNA swab of a criminal suspect also delivers information about that suspect’s blood relatives. But it is a social and ethical matter for us to deal with what that means for our society: How do we balance criminal inquiry with genetic privacy? This sort of question may be grounded in the gene-sequencing techniques but no amount of biological reasoning in isolation will confront these broader issues. So it is with the steady stream of digital exhaust captured by governments and multinational corporations: siloed disciplines (computer science, ethics, political science). The pure code technicalities of Python or HTML leave open some of the most pressing issues of our time, issues that bear on our freedom to think and act, our ability to vote, our ability to be treated equally under the law.

Collaborating across boundaries requires a certain kind of attentive listening. When I first started to work in film, I tried to import the structure of a text – a periodization that had done good work in understanding the moral-political history of the hydrogen bomb. It was a total disaster – in a text you can scan in a moment a five-part structure. In a film such a thematization comes across as unwatchable pedantry. Working with William Kentridge (I was the dramaturg) taught me something else – we learned to think together through episodic stories, the laying of pipes carrying compressed air to sync clocks, for example. More than that, the logic of the work often proceeded through an associative rather than inferential or deductive arc. Entering the trading zones between fields demands a certain suspension of our confident, go-to forms of reasoning in order to hear our collaborators.

Jens Kugele: How do you envision the future academic work on the intersections between the humanities, the social sciences, and the (natural) sciences?

Peter Galison: I envision future work where shared topics, concepts, and methods will offer deep and deeply consequential sites for inquiry. Some of the great questions about politics and culture in this century, it seems to me, will emerge not from classical party politics but from the driving force of seemingly technical issues, like the multi-national exchange of data and its impact on privacy. The history of our present culture – how we got here – may offer us a platform of resistance to the passivity of technological determinism. Things need not be the way they happen to be.

Jens Kugele: With regard to the possible futures of the interdisciplinary study of culture, what forms of individual and collaborative research do you see as central? Where do you see (new) responsibilities of this academic field?

Peter Galison: Over much of the twentieth century, anthropology, from the work of Franz Boas to that of Clifford Geertz, has held the study of culture to be urgent. Up until the 1970s and 1980s, it was held (obviously, I'm oversimplifying) that cultures had a certain structural integrity to them; they were not to be ranked hierarchically. Each particular culture was supposed to carry its own validity through the interrelated and co-dependent use of meanings, symbols, and values; each had its own account of origins, reproduction, and relation to the outside. There was good reason for anthropologists to have treated cultures as self-sustaining, quasi-autonomous entities: These ideas had a powerful anticolonial force; it offered, in its relativism, a bulwark against racism, subordination, and genocide. Cultural holism and relativism seemed necessary: If every culture was the equal

of every other one, the imperial subordination of groups outside of white, European Christian ones in Western Europe (or North America) could not be justified.

Since the 1980s, in the highly interpenetrated world in which we live, we have come, more and more, to find it impossible to see cultures as isolated, crystalline structures; more and more, we see them as overlapping, tied together through the movements of people, ideas, objects, and struggles. We no longer see a homogeneous culture (singular), not in the nation, not in ‘pre-contact’ third world countries, not in former imperial capital cities.

In our cacophonous and interrelated world, we need to form new modes of understanding these shifting and ever-crossing boundaries of cultures. In my sector of inquiry – the study of the physical sciences in its broader cultural frame – it is clear that people and ideas are always on the move, there are no strict borders between previously separate disciplines and subdisciplines: String theory shares techniques with what used to be called condensed matter physics. Biology and physics share major spheres of interest as they address the nature of DNA and other biological materials. No longer are the sectors of civilian, military, and commercial science so distinct. A GPS chip is in your running watch, in a smart bomb, in drones, and in more apps on your smartphone than you can remember. Buying a GPS chip is cheap and they are ubiquitous. But the impact of these little objects – some just a few millimeters long, wide, and high – is vast: as they can report back on our positions; as data combines to report who we are with, where we idle, our objects of attention. Indeed, understanding our emerging technical world will take the collaboration of many disciplines, from economics and anthropology to physics, engineering, and surveillance studies. Even this little example of the GPS chip suggests that we will need a myriad of approaches to characterize, understand, and intervene in the great issues we face now.

The study of culture going forward necessarily must address the technological and scientific domains, it cannot retreat to a belle-lettrist self-definition. But the study of culture can and should be more than the study of the “impact” of the scientific-technical, the study of culture is needed to understand how we, as society ought to handle these intersections.

Jens Kugele: Where do you see key challenges for interdisciplinary work in light of the academic publishing market, tenure reviews, and the high value attributed in most Humanities disciplines to single-authored publications, a concept rooted in eighteenth-century discourses of individual geniality.

Peter Galison: I am very worried about the institutional frame that faces a new generation of scholars. Right now, I see early-career researchers whose interdisciplinary, collaborative work is highly valued, even celebrated, as they are chosen for postdoctoral fellowships across North America, Europe, and elsewhere. But then, when these same scholars go on the job market, they suddenly face obstacles. They confront resistance to cross-disciplinary work alongside discord about the validity of multi-authored books and articles. I see ambivalence about promoting to tenure someone who works in teams or steps over the disciplinary border. This switcheroo of values – telling a generation of scholars interdisciplinarity is good, until they are told it is bad – is, in my view, misguided academically. It ignores some of the best work produced today. But I would say more and with a certain degree of anger and frustration: By alternately encouraging and then devaluing collaboration and interdisciplinarity, our institutions are behaving unethically, betraying an emerging generation of scholars.

The natural sciences have not solved the manifold problems of collaboration and interdisciplinarity, but they are ahead of the human sciences: Teams of hundreds, now (at CERN) thousands of physicists work together toward goals of the first importance, including the discovery of the Higgs. Over the last four years, I have been a member of one such team, with some 207 scientists and engineers, distributed over 18 countries and 59 institutions. Some of the collaborators come from computer science, some from theoretical astrophysics, yet others are experts in electrical engineering, or radio-telescope observation. I come from a mix of history and philosophy of science – focused to a certain degree on image-making, and theoretical particle physics. Together the many of us constitute the Event Horizon Telescope Collaboration, formed to assemble a world-spanning network of radio-telescopes capable of imaging a black hole 53 million light years away. We are constantly grappling with questions of credit and the advancement of early career scientists – and by no means has this or any other big collaboration solved the problem. But there are substantive things one can do to promote the visibility recognition of rising PhDs, postdocs, and assistant professors: They can be promoted to give academic and public talks; they can take on recognized roles in working groups; they can report at collaboration meetings; they can be leads on white papers. We ought to be thinking now about ways to do such things in the growing number of interdisciplinary collaborations in the human sciences.

Jens Kugele: In your *Image and Logic* (1997), among several others of your publications, you introduce the notion of “trading zones.” Is the concept of “trading zones,” as you understand it, applicable to the study of culture as an

interdisciplinary and international field, i.e., can it help us to shed light on dynamics, potentials, and challenges?

Peter Galison: I introduced the notion of trading zones because I was frustrated with the false choice we were offered: Either there was a universal reduction basis to all of the sciences, as the notion of a physical thing-language would have it (logical positivists). Or cultures depicted as so disjunct that passing between them would be like a Gestalt shift, a radical linguistic translation, or a religious conversion. That did not (so it seemed to me) correspond to the real, partial, ever-developing coordination that is constantly in play between and among cultures. Or put another way, in many fields, certainly in science and technology studies, we are used to focusing on local practices (the focus on the local conditions of knowledge production seems to me the single most important innovation in STS). By the 1990s, it seemed to me far too late in the day to call into play a *global* notion of languages and cultures and join it (as was common in Kuhnian-inflected studies) with *local* conceptions of scientific work. Instead, I wanted to see language itself as an evolving *locally* inflected formation, of which exchange languages (jargons, pidgins, and creoles) were only the most notable manifestation. So too at the boundaries between fields, there is always coordination that can, over time, develop into fields themselves (think of biochemistry, algebraic geometry, physical chemistry, just to name a few).

Jens Kugele: If you think about the possible futures of the study of culture, where do you see institutional “trading zones” for this interdisciplinary field of research? What kind of “trading zones” should be explored further? What kind of competencies should we foster, e.g., in our Ph.D. training, if we are convinced that the ability to make meaning in more than one discipline is based on more than “interactional expertise” (Collins and Evans 2002)?

Peter Galison: Institutions that can best assist the formation of trading zones are not entirely abstract. Instead, they have a focus. Artificial Intelligence offers an example. AI systems are being used to determine who, among those accused of having committed a crime, should be granted pre-trial release. Here is an arena where a technical, computational concern needs to cross with cultural concerns: constitutional and ethical questions – questions of social justice. Similarly, we have a growing number of institutes that study the cross of genetics with politics and ethics – modifications of crops, animals, and ultimately humans raise pressing issues that demand a way of reasoning that is more than just technical drives constrained by cultural constraints. Instead, we need to develop a way of

teaching, researching, and applying genetic knowledge that is reasoning about ethics all the way down, so to speak.

Perhaps our Ph.D. training should include at least some work in an interdisciplinary team. Instead of focusing all our energy on the production of a thesis, we could have at least one project, or a chapter within a thesis built on collaborative research, where, say a literary scholar, a historian, and an economist could address a body of literature not only in its associations of structure, meaning, and allusion, but in the materiality and finances of production and distribution. Book history, media theory, and literary analysis could work together rather than squaring off as antagonistic approaches. With filmmaker/anthropologist Lucien Castaing-Taylor, we set up at Harvard a program called “Critical Media Practice,” where advanced graduate students from across the university could learn, develop, and supplement their thesis work in film, interactive online sites, audio, installation, and other digital work (<http://cmp.gsas.harvard.edu/>). This inter-field, inter-modal mix aims to be an institutional trading zone.

Jens Kugele: To what extent is the concept of “trading zones” helpful to think about future exchange and collaboration between the study of culture, the natural sciences, and the life sciences? Where do you see trading partners who, as you phrased it, “can hammer out a local coordination, despite vast global differences” (Galison 1997, 783)?

Peter Galison: The central concern of trading zones is that it is possible for different domains to work out a local, specific, common form of action and reasoning, even if the larger disciplinary demands remain quite disjunct. Nanotechnology does require that virology, surface chemistry, and atomic physicists learn to work together, create techniques, and develop ways of speaking that are common enough for them to generate new work. But productive nanoscience work does *not* require making physicists into biologists or biologists into chemists, much less all these groups into an undifferentiated morass. Instead, the human, social, and natural sciences come into consequential interaction through a sufficiently developed, *specific* common language and set of actions.

For example, computer science needs to be taught and practiced with concepts of privacy built in; not added as an afterthought. And here the humanities and interpretive social sciences have much to contribute: What notions of privacy do we want to protect? What does the history of the concept reveal? What is understood by taking onboard the way it is understood in psychology, political science, or critical feminist theory, to name but a few examples?

Jens Kugele: Scholars such as Mieke Bal have suggested the idea of a concept-based approach to the study of culture with a notion of “traveling concepts” at its core. How do you see the potential of concept-based research in the study of culture in the future? Do concepts bear the potential to facilitate such trading zones? Do concepts bear the potential to serve as building blocks of a “contact language,” a “system of discourse” as you phrase it in the context of your notion of “trading zones”?

Peter Galison: I take concepts to be quasi-stable entities, holding practices and meanings in a form that is recognizable over some region of time and place, but not in any sense absolute. We fight over concepts because they organize so much: think of political concepts like liberty, property, rights, nation, citizenship. Understanding their contingency, their remit, their history, is essential to moving forward. Marriage may have had certain meanings (who can marry whom) but in hard-fought battles, that notion is changing – opening up – across many countries. So too is it in science (energy, mass, time, entropy): Einstein’s main contribution was to level a critical re-evaluation of space and time. And much of my work has been organized around an understanding of how certain scientific concepts shifted under the pressure of scientific and philosophical engagement: objectivity, simultaneity, secrecy, containment – to name a few.

I certainly agree with Mieke Bal that concepts move – they *travel* as she has called it in her persuasive studies – as she stresses, the points of intersection and coordination can be generative. My understanding of trading zones – as a local and coordinative venture – sets concepts, material objects, and manipulations in historically-shifting syntactic frames. What we do with concepts (how they relate to each other) is also essential. Rules of combination and exclusion figure vitally in the notion of a trading zone: There is no building structures from bricks alone. We need the mortar binding the bricks; we need guiding principles so to speak: For example, you are better off intercalating bricks from one level to another if you want the house to stand. This is why I come back to the more-than-metaphor of trading languages in which jargons (highly restricted coordinative structures), pidgins (more extensive than jargons but still specific), and creoles (interlanguages sufficiently rich in structure and metalinguistic development that one can grow up in them). There is a semantics, to be sure (the concepts and meanings), but also a syntax.

Of course, not all jargons become pidgins on the way to creoles, some jargons and pidgins persist as such, or vanish altogether. This much we know from the anthropological linguists. Indeed, I reject the idea that there are pure disciplines

as opposed to hybrid fields: Today's "pure" languages are just the more consolidated and elaborated forms of yesterday's hybrids. So it is in disciplinary fields. Take what many mathematicians would consider the purest of pure mathematics: algebraic geometry. The hybrid antecedents of that field (algebra and geometry) are worn on its name-sleeve. Purity in disciplines or languages is a *product*, not an essence. For this reason, we ought to be highly suspicious when interdisciplinarity is derogated. But *which* interdisciplinary forms will persist? That is an open question.

Jens Kugele: In your newspaper article "Self-censorship in the Digital Age" (*Frankfurter Allgemeine Zeitung*, 2014), you point to ways that surveillance and harvesting of communications has and continues to reshape culture and ultimately the self. What are some of the central challenges and potentials that you see for the academic study of culture in this digital age? Do you see a changing role for the scholar in the field of culture studies?

Peter Galison: It is too late in the day to bemoan the new forms of cultural production, circulation, and consumption as if they can be driven back into the keyboards, cameras, and microphones from whence they came. Instead, those of us studying digital cultures have openings. We can study the evolving forms: games, tweets, postings, sites, apps, seriality, blogs. We can use them under critical pressure: What kind of subject and object is constructed by these genres? And we can take an active role in reshaping them, asking how might they be turned to other ends, as in an earlier epoch, film, neon lights, and theatre were bent away from classical structures. My hope for the future of cultural studies is that it will have all of these elements: a critical history *and* a productive taking-up of the forms to other, adventurous, and generative ends.

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