

Chapter 14. Afterword. Reflections on Writing the Transnational History of Science and Technology

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As scholars of the past, historians are informed by current events and debates but do not routinely have to confront the sense that they are being outrun by the present. We write now at what feels like a precipitous time for the transnational formations whose histories and implications are the focus of this volume. One of us (JK), has already written a good deal about the history of international and transnational science and technology. Hoping to foster collective reflection on such histories, he began planning this volume and its associated workshop early in 2016, at a time when migrants from war-torn countries to Europe were being met by new waves of racism and xenophobia. The other (MB), a recent Ph.D. in the field, learned of the project through an announcement at the quadrennial joint meeting of the British, American, and Canadian professional organizations for historians of science, in the summer of 2016 in Edmonton. He was dining at a Thai restaurant on the Canadian prairie with a mix of European and North American historians based in Scotland, Canada, and the U.S. as returns from the U.K.'s "Brexit" poll began rolling in and it gradually dawned on the group that we would wake the next morning in a rather less open world. The project workshop convened on the eve of the 2016 U.S. Presidential election in Atlanta, Georgia, many of whose citizens had already cast their votes in what would become, in that state and the nation alike, a narrow but decisive victory for Donald Trump. We revised and assembled our papers during a tumultuous political transition, amidst denunciations, refugee crises, travel bans, detentions, talk of border walls, and other developments that bore directly on the questions treated herein and that demanded formal responses from our professional societies.

With nationality, nationalism, xenophobia, and division regularly in the news, it may seem quaint to make transnational science and technology our focus. Some scholars have,

indeed, suggested that transnational history can never have the popular appeal or vital relevance of national histories that give readers a sense of place, of belonging, of identity.¹ Recent events and the scholarship in this volume alike suggest the opposite view, that states and localities and their concerns, prerogatives, tensions, and conditions come most clearly and potently into view from a transnational perspective, which requires intensifying rather than avoiding attention to local and national scales. The transnational historian must take quite literally the old exhortation to think globally and act locally, constantly embedding situated productions and their archival records in border-crossing patterns of movement and action. Global thinking gives purchase to otherwise unaccountable local phenomena by embedding them in longer and wider genealogies and drawing out the tensions they expose between (often global-seeming) ideals and (inevitably local) practices.

These wider views of narrower practice give us a foothold for grappling with the single most important phenomenon that has us feeling overtaken by the present moment: the United States' political leadership's retreat from superpower hegemony in matters economic, geopolitical, environmental, and moral. The outsized presence of American actors and institutions in some of the histories in this volume derives in large measure, by direct and indirect means, from the predominant role that the U.S. has played in the 20th century as a global power, and its mobilization of knowledge as an instrument of legibility and of rule. The transnational history represented here is a recent and geopolitically specific phenomenon. It was born in the United States in the 1990s in the wake of the Cold War, in deliberate methodological and ideological opposition to American exceptionalism, a sense of American distinctiveness, and the associated tendency to conceptualize the U.S. as "in many ways the clearest embodiment of the idea of the self-sufficient sovereign state", as Akira Iriye puts it.² The papers in this volume do not propound American exceptionalism or self-sufficiency, but neither could they avoid the thoroughgoing presence of the United States as a crucial geopolitical node in the systems by which knowledge moves or fails to move across borders. Indeed, the critique of American exceptionalism can be an uncomfortable one for historians of contemporary science and technology precisely to the extent that the U.S. research system does, as matter of fact, seem to be exceptional, qualitatively and quantitatively, and to differ

from other national systems— not only as regards the extent of federal and corporate investment in Research and Development (\$344b out of the world total R&D expenditure of \$962b in 2007, for instance) but also as regards aspiration.³ The pursuit of American scientific and technological pre-eminence on an international stage has provided an overarching rationale for a U.S. national research system which has, of necessity, been built along transnational dimensions. Technoscientific leadership has dovetailed with political and military might, each reinforcing and reconfiguring each other. As Marilyn Young reminds us

America may not be exceptional, but it is exceptionally powerful, and can only be decentered so far without obscuring that power.⁴

If the nation and state take on particular salience in transnational history, the American nation and state in its changing geopolitical moments across the twentieth century and into the present do so all the more in the transnational histories of science and technology assembled here.

The significant presence of the U.S. as actor in many of the papers in this project was also one of its strengths. Intellectually and pragmatically, it furnished common conceptual and historical backdrops and points of reference for scholars with substantially varied methodological approaches and subject expertise. These points of coherence show the geographical and historical specificity of the volume's accounts while opening it up as a comparative benchmark and methodological guide. As Josep Simon observes, this collection can "provide models or exemplars that other scholars could apply to other cases built from a geopolitical centre different to the US or even to case studies displaying a more clear multipolarity with regard to knowledge exchange."⁵ Such work does exist, particularly in transnational studies of European integration, though that region has its own 'center' and 'periphery' too, as Kostas Gavroglu and his colleagues in the outer ring of European countries remind us.⁶ The time has come to put these various local worlds into conversation with each other.

This volume's papers emphasize how quickly the state apparatus springs into view when we take knowledge as the transnational object, even if our focus is not the regulatory state. The

longstanding importance of scientific and technological knowledge to the exercise of state power and to the construction of national prestige requires that we reckon with the state—its actions, effects, and limits—whenever we study the production and movement of knowledge across borders. This does not subvert the goal of transnational history to break the bounds of the national container, and to situate the state in a web of interconnections and interdependencies that are less visible from a national approach. On the contrary, in many of the papers presented in this volume the state emerges as an actor *precisely because* its borders are being crossed. Seeing like a state involves being aware of where borders lie and how they operate, and policing those borders in the name of national sovereignty and other prerogatives.

It bears emphasizing here that states controlled the movement of knowledge and knowledgeable bodies centuries or more before the transnational moment pursued here. Wherever policing knowledge's borders gave state actors a competitive edge, they have attempted to do so. Consider, for example, Spanish control of maritime knowledge in the 16thC. Alison Sandman has characterized the complex body of laws governing pilots, charts, and nautical instruments that officials of the Spanish Casa de la Contratación developed in 1510.⁷ Protecting knowledge of Spanish sea routes from rival powers who might attack their ships and infringe their colonial monopolies required policing people, records, and instruments. Chart makers were forbidden to sell their charts to foreigners, and naturalized experts saw their loyalty questioned. Pilots, who could easily flee the country with their precious knowledge of sea routes, could only be licensed if they were native or naturalized Castilians, and had to guarantee loyalty through significant family or property ties to the kingdom. Cosmographers, who taught pilots the use of instruments to establish latitude and longitude, were obliged to swear oaths not to share their knowledge with foreigners.

The strong parallels between such early modern forms of transnational knowledge control and the modern ones studied here train our attention on what, precisely, is modern about the latter. Modern nation-states constructed rational, systematic, bureaucratic apparatuses that jointly regulated political, economic, and military potentialities as part of the process of nation-building. As Daniels and Krige show in the first two chapters, the striking feature of America after 1945 was the institutionalization and expansion of regimes of control

developed for war-time contingencies, or invoked temporarily in response to a specific situation. Unstable moments of contingency, in the late 1940s, in the 1990s and early 2000s, or in 2017, leave lasting imprints in the rational structures of transnational modernity as the state seeks to maintain control over the changing geopolitical economy of knowledge production and circulation. Borders that began in artificial and in many ways arbitrary operations of geopolitics become aggressively affirmed, as refugees crossing into or out of Austria, Hungary, Mexico, and the United States know well. Xenophobia's modern transnational figuration resounds in policing regimes justified in the name of protecting the 'nation' from being undermined by 'foreigners' within and without.

The portability of transnational knowledge/power subverts efforts to draw stark national divisions. Those the state sees as knowledgeable individuals are not treated in the same way as refugees or members of diasporic communities. What people know make them both desirable *and* dangerous from the state's point of view, and state controls to regulate both aspects open some avenues of identity and assertion while foreclosing others. Knowledgeable individuals navigate 'hybrid' identities that combine a sense of self as a knowledge producer with a sense of national and political allegiance, with different contexts calling for the performance of different selves — a phenomenon most explicitly developed in Adriana Minor's study of physicist Sandoval Vallarta. When knowledgeable bodies move across borders the potential contradictions between these selves can be the source of considerable anxiety to them and their colleagues, and of suspicion to immigration officials.

The historical pattern of English linguistic hegemony means that anglophone sources permit current transnational historians to reach over large swaths of the technoscientific past. Indeed, specific resources with their own anglophone priorities and biases, such as Google Books and other massively searchable online repositories, make an already preponderantly anglophone corpus appear even more so, threatening to drown out non-anglophone voices. It is all too easy to ignore non-anglophone sources altogether, or to assume (usually erroneously) that the easiest-to-access anglophone materials are representative of the far-flung multilingual body of potentially available documentation as a whole. Transnational historians are limited not just by what is in "the archives" but by which of those archives and which of their respective

contents are geographically, financially, and linguistically accessible. By exploiting economies of representation that have historically concentrated anglophone sources in central nodes of exchange, we risk uncritically reinforcing those nodes as naturalized fixtures in transnational networks.

Contributors to this volume confronted these tensions in a variety of ways, writing and presenting in English while drawing on both anglophone sources and those in local languages from non-U.S. archives at sites of interest in their analyses. Our own border crossings open up both archival sources and experiential sensitivities to the transformations, selective accommodations, and contestations that arise when the transnational meets the local, when new knowledge and the social relations in which it is embedded traverse networks at various scales. Like the subjects we study, we interacted predominantly in English but admitted numerous interstices filled with Spanish, Portuguese, and other languages, especially over coffee or beer as we digested and reframed our findings. The workshop and volume's subsidiary focus on North-South interactions in the Western Hemisphere created countervailing coherences in idioms and reference points that weighed, in some ways, against American anglophone domination. Language operated through the workshop as a means of authentication, projection, consensus, and exchange. We wore our many nations of origin and travel, and the cosmopolitan foundations and aspirations of our research, in our accents, our gestures, and our circumlocutions.

Beyond the importance of working in archives in several countries, and in several languages, historians of science and technology require sources and literatures for transnational arguments that differ from those for studies where borders are less at issue—a metaphorical disciplinary border crossing to match the geopolitical borders just discussed. Relationships between people who circulate across borders often engage very different actors and institutions to those who operate on the national scale, and are studied in academic fields--like international relations, diplomacy, law, and comparative cultural studies---that can be quite different to those that are used for writing a national history. The situation is all the more challenging because there is already a rather weak coupling between historians of science and technology and historians writing social and cultural history, though certain fields like

environmental history or the history of capitalism are creating inroads into these academic divisions. A transnational history of science and technology must draw on insights from other disciplines to analyze the individuals and institutions responsible for promoting and negotiating border-crossing, perforce imposing a heavy intellectual burden on its practitioners.

Beyond its methodological contributions, it must be said that this project derives from and, we believe, advances distinctively cosmopolitan political convictions rooted in the challenges of our moment. While transnational scholarship need not critically confront chauvinism and its associated geopolitical barriers, such an approach does offer powerful resources to understand and subvert nationalistic discourses that other and exclude. The desire to engage with the world, to gain from and nurture fruitful interactions across borders, can be a powerful motivation for the kind of research and collaboration required of transnational history. Such research and collaboration can challenge facile exceptionalisms and underscore hidden dependencies, while situating both with respect to the operation of state power. If history is to be a virtuous resource for present politics, it may ultimately have to be transnational history.

¹ E.g. Michael McGerr, "The Price of the 'New Transnational History,'" *The American Historical Review*, 96:4 (1991), 1056-1067, at 1066; Ann Curthoys and Marilyn Lake, eds., *Connected Worlds. History in Transnational Perspective* (Canberra: Australian National University Press, 2005), 14.

² Iriye, "Internationalizing International History," at 51.

³ <http://www.aaas.org/sites/default/files/migrate/uploads/Chart.-Shares-of-Total-World-RD-2007.pdf>

⁴ Marilyn B. Young, "The Age of Global Power," in Bender, *Rethinking*, 274-294, at 291.

⁵ Private communication with John Krige, March 25, 2017

⁶ Martin Kohlrausch and Helmut Trischler, *Building Europe on Expertise: Innovators, Organizers, Networkers* (New York: Palgrave Macmillan, 2104); Erik van der Vleuten and Arne Kaijser, eds., *Networking Europe: Transnational Infrastructures and the Shaping of Europe, 1850—2000*, (Sagamore Beach, MA: Watson Publishing International, 2006); Kostas Gavroglu and colleagues, "Science and Technology in the European Periphery: Some Historiographical Reflections," *History of Science*, XLVI (2008), 153-175.

⁷ Alison Sandman, "Controlling Knowledge: Navigation, Cartography, and Secrecy in Early Modern Spanish Atlantic," in James Delbourgo and Nicholas Dew, eds., *Science and Empire in the Atlantic World* (New York: Routledge, 2008), 31-51.