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HoST - Journal of History of Science and Technology  
Vol. 14, no. 2, December 2020, pp. 115-119  
10.2478/host-2020-0018

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## BOOK REVIEW

David Pretel and Lino Camprubí, eds.  
*Technology and Globalisation: Networks of  
Experts in World History*. Cham: Palgrave  
Mcmillan, 2018. 394 pp.  
ISBN: 978-3-319-75449-9

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This welcome collection of articles insists on the importance of injecting engineers and their expertise into histories of the global economy using a variety of case studies of “systems, networks and circulation” (p. 6). They remind us repeatedly of the mutual embrace between the state and engineers. Their skills and networks were essential assets to the consolidation, legitimation and projection of national, colonial and global projects, from which experts in turn could build careers, prestige and political influence. To structure this review I have thus read the collection through the lens of what, in my view, would have been a more accurate title of the book: *Technology, the State and Globalization*.

Several papers locate the national at the core of the global. Dagmar Schäfer’s paper describing the practices, representation and ritualization of hydraulic engineers and bridge builders in China stresses the “historical continuity of both an engineer’s technical prowess and his/her political responsibility” over the *longue durée* (p. 28). She shows how deeply these experts were engaged in nation building and identity debates, and how crucial their technical success

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was to legitimizing state power. Sharing engineering know-how was said to have a civilizing influence that began to spread beyond the nation state after the nineteenth century and that legitimated the regime's global expansion, all the more so as engineers became engaged in political, economic and social decision-making in Mao's China.

Darina Martykánová turns the spotlight on France. Her contribution illustrates the role of the *École centrale des arts et manufactures* (Central School of Arts and Manufactures) in training engineers using biographical data of students from Spain, Latin America and the Ottoman Empire. This elite corps spread out across the globe "to expand and strengthen French economic interests . . . during a period of intense economic expansion" (p. 98), i.e., from about the mid-nineteenth century to the early twentieth century.

Ian Inskster's contribution situates the R&D on plastic material and products in Britain and the USA in the late nineteenth century in the context of a "second industrial revolution based on a great surge of technological change, a massive growth in the international trade, investment and migration of the so-called Atlantic Economy, [and] an almost worldwide entrenchment of colonialism and formal imperialism" (pp. 42-43). He shows that expert chemical knowledge embodied in a vast range of plastic-based items, and protected by patents, was successfully commodified because it had access to camphor extracted from trees in eastern Formosa. British and American commercial success was built on camphor secured by Chinese settlers and Japanese colonial authorities who controlled the market until the early twentieth century, and who violently repressed the "savage" Tayal people who lived in the camphor forests.

David Pretel analyses the globalization of patent expertise during the late nineteenth century, when patenting turned out to be increasingly transnational, although patent systems were still national institutions. One important question he raises is whether patent experts facilitated or impeded international technology transfer. While it is difficult to get a clear answer on this, he does stress that the high fees charged for moving patent rights across national boundaries constrained technology flows considerably.

The Sino-Japanese war is the defining context for Carles Brasó Broggi's analysis of the strategies of a transnational engineering company, China Engineers Ltd., to survive the Japanese occupation that was fully-fledged in 1937. The board of directors was determined to remain in the International Concession in Shanghai rather than relocate to the interior along with Chiang Kai-Shek. Brasó Broggi describes how, facing the collapse of textile machinery imports and the destruction of factories, the firm diversified its activities to equity investment, trading services, auditing, and the internationalization of other Chinese firms, so finding a temporary *modus vivendi* with the Japanese authorities. This lack of national engagement had palpable political effects after the war, when the Chinese industrial base moved away from the Yangzi Delta to Hong Kong.

Inter-state relations are also an important, though muted variable in Leida Fernandez-Prieto's description of the establishment of the Harvard Botanic Station for Tropical Research and Sugar Cane Investigation in Cuba in 1899. The author situates the Station in "imperial networks of botanical research through Cuba's sugar industry and, specifically, an enclave founded on slavery" (p. 167) made possible by the United States' intervention in Cuba first in 1898-1902 and again in 1906-1909. She mentions but does not expand on it being a hub in a global network of American, British and Dutch colonial research stations, i.e. of participating in *inter-imperial* botanical, agricultural and entomological collaboration in a period of political rivalry between major western powers (see Jessica Wang, "Plants, Insects, and the Biological Management of American Empire: Tropical Agriculture in Early Twentieth-Century Hawai'i," *History and Technology* 35, no. 3, 2019).

Maria Paula Diogo and Bruno Navarro describe how these inter-imperial rivalries, and the determination of a small country, Portugal, not to be sidelined in the "scramble for Africa" drove the government to engage engineers to construct railways linking port cities in Angola and Mozambique with the interior. Railways would consolidate Portuguese sovereignty over "its" territories, were dazzling symbols of imperial dominance and modernity, vectors for the "civilizing mission," and essential for the commercial exploitation of the hinterland. "Technology and engineers were fundamental pillars of Portuguese colonizing ideology and politics" (p. 113). Their limited success on the ground was due, in part, to the asymmetries of power between Portugal and its global rivals, which impeded its efforts to cement its presence in Africa.

The flow of experts and their statistical methods developed during the New Deal into United Nations agencies is discussed by Tiago Saraiva and Amy Slaton. They pay particular attention to the structure of a practice that gathered data that was gendered, raced, classed, and nationalized not merely for its own sake, but specifically to refashion social spaces first in rural America, and then in "developing" countries. The paper is novel in emphasizing the integral role that gender played in "knowing and making the world" with statistics (p. 244). Following the trajectory of Gertrude Cox from an academic milieu in the 1930s and 1940s to the UN regime after World War II, they see her marginality "both as consolidating the role of duty and service in this statistical practice, and in sorting individuals into meaningful taxonomic categories" (p. 246).

The portability of engineering knowledge, prestige and a career in government service between national, colonial and postwar international contexts is also illustrated in Maurits Ersten's paper on the professional trajectory of Paul de Gruyter, a Dutch irrigation engineer who graduated from Delft Polytechnic in 1920. After spending time in the Netherlands and in Java, he refashioned himself as an international consultant in the 1950s, transferring his experience in colonial contexts to international development aid programs. The paths followed by Gertrude

Cox and Paul de Gruyter emphasize the continuities in the practices and values of experts across the colonial/post-colonial temporal divide and impose a reassessment of narratives that highlight a rupture in world order after 1945.

The paper by María Cecilia Zuleta shows the importance of the geopolitical context in opening spaces for petroleum engineers and technicians engaged in Latin America's oil industry to consolidate transnational networks, to enhance their professional development and identity, and to contribute to technological innovation. The non-profit South American Petroleum Institute (SAPI), established in 1941, brought together experts in state-owned oil companies, private oil corporations, scientific laboratories and academia from a large number of countries in the region, who worked along with US firms and Washington's Petroleum Administration for War. Acting as energy diplomats, engineers in SAPI tried to become "a consulting body in the hemispheric planning of supply and rationing of fuels" (p. 359). The inter-state cohesion enabled by the war effort did not survive the new cold war petroleum order. Ideological disputes and conflicts between private, pro-market and public, state-driven visions of oil development "all within an increasing American influence in the Institute" (p. 361) destroyed the consensus. SAPI declined and was dismantled in 1957.

The paper by Joseba De la Torre, M. d. Mar Rubio-Varas and Gloria Sanz Lafuente on the Spanish nuclear program describes the key role played by industrial engineers in private industry to promote nuclear power in Spain in the 1960s. Working with the Spanish Nuclear Energy Board and the Ministry of Industry they ensured that Spain became a major market for American nuclear power suppliers who provided "Atoms for a dictatorship" (p. 319) with the help of the US Export-Import Bank. There is no hint in this paper of the undoubted internal disputes in the US over supporting a nuclear power program in Franco's Spain, nor of Washington's attitude to West Germany providing nuclear fuel to Spain in the 1970s — all the more interesting since they (successfully) stopped West Germany from collaborating with Brazil in the nuclear sector. Writing inter-state competition out of inter-national relations gives the misleading impression that it is a smooth, well-oiled process.

To conclude, I want to suggest that Hector Vera's paper describing the sustained and ultimately successful effort by American manufacturers and mechanical engineers to reject the metric system as a global standard for a variety of financial, technical and ideological reasons implicitly contains an important methodological lesson. As I have suggested throughout this review, the relationship between globalization and the power of the state and of national forces in general is an ever-present, if sometimes implicit leitmotif in these papers. It is, I believe, one of the core questions in any study of technology and globalization, all the more so since scientific and technological knowledge is a key national asset. There is a tendency in much scholarship to assume that the national and the global are mutually exclusive. As these papers show, in practice they are deeply intertwined with each other; they are co-produced.

One final note. The online advertised price for this book is 168 euros for the hard cover and 121 euros for the soft cover. This doubtless explains why the publishers would only provide me with an electronic copy of the book. They justified this policy differently: that they were implementing a “sustainable and environmentally friendly system” and that “the book is considered an old publicity title, i.e., it was published before 2019.” I urge all contributors to protest this shameful abuse of the free labour of reviewers in the name of profit (Palgrave Mcmillan is part of Springer Nature that originally envisaged a 3.6b Euro launch on the Frankfurt stock exchange in 2018).