

SPECIAL ISSUE: NEW INSIGHTS AND
PERCEPTIONS ON RAILWAY HISTORY

Introduction – New Insights and Perceptions on Railway History

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Throughout the nineteenth century and early decades of the twentieth century, railways played a vital role in the construction of nations, economic growth, technological development and the dominance of Western nations over sundry African, Asian, and Latin American territories. In more or less recent years, different authors have emphasised this agency in several of their classical works, reflecting in some way the representations and the feeling of technological sublime¹ that contemporaries of the first decades of the locomotive had. Hobsbawm called them the most spectacular symbol of the nineteenth century,² while Adas deemed them pioneers of civilisation, conquerors of time and space, unrivalled promoters of migrations, settlement and

¹ That is, the pleasure of observing a moving machine, as a symbol of the triumph of technology and Man's ingenuity. Kasson considered the railway "the most common vehicle of the technological sublime." See John F. Kasson, *Civilizing the machine: technology and republican values in America, 1776-1900* (New York: Grossman Publishers, 1976), 162-168; and also David E. Nye, *American Technological Sublime* (Cambridge, MA: The MIT Press, 1999), 68.

² Eric Hobsbawm, *The age of capital (1848-1875)* (London: Abacus, 2006), 57.

resource extraction.³ Headrick illustrated their decisive contribution to the creation of a new imperialism and for the overwhelming dominance of Europe over the world in the period between 1870 and the eve of World War I.⁴

It is thus unsurprising that over the years railways have been central objects for the research of historians of different areas and backgrounds, including enthusiasts (railway workers, navvies, engineers, conductors, station masters, etc.), economic historians, political historians, labour historians, cultural historians and of course, historians of technology.⁵ Indeed, for many years, the railway was the classical object for those who did research in history of technology – I remember in the 2015 Annual Meeting of SHOT in Albuquerque, NM, a thematic panel I organised with a few colleagues was considered by other colleagues the most conventional of the event, as it dealt with colonial, peripheral and ultra-peripheral railways. Therefore, interested readers may find an abundant aggregate of historical literature about this subject.

Many of those works deal with specific details of the railway itself, of the invention itself, including the locomotives and rolling stock, engineering works, diverse engineering and technological attainments, and the men that for one reason or another left their mark in the history of railways (engineers, inventors, contractors, businessmen, and so on) – or what scholars of the trade call the internal history of technology.⁶ Albeit very useful from a factual or chronological point of view, these works usually tend to see

³ Michael Adas, *Dominance by Design: Technological Imperatives and America's Civilizing Mission* (Cambridge, MA: Harvard University Press, 2006), 79-80.

⁴ Daniel R. Headrick, *Power over peoples. Technology, environments, and western imperialism, 1400 to the present* (Princeton, NJ; Oxford: Princeton University Press, 2010), 1-6. See also the classical edited volume by Clarence B. Davis, Kenneth E. Wilburn Jr and Ronald E. Robinson, eds., *Railway Imperialism* (New York; Westport, CT; London: Greenwood Press, 1991) and Colin Divall, "Railway Imperialisms, Railway Nationalisms," in *Die Internationalität der Eisenbahn 1850-1970*, ed. Monika Burri, Killian T. Elsasser and David Gugerli, 195-209 (Zürich: Chronos, 2003).

⁵ A thorough survey of literature would be welcome here, but it does not fit the goals nor the limits of this editorial.

⁶ Benoît Godin, "Innovation Studies': The Invention of a Specialty," *Minerva* 50, no. 4 (2012): 397-421, on 402.

railway evolution as somewhat straightforward and deterministic,⁷ besides providing a rather heroic and nationalist view of trains and those who operated them.

Equally abundant are the studies that draw from the understanding that technology does not exist alone; instead it intertwines in a seamless web with the society, economy, culture, and diplomacy in which it is inserted, embodying “social, political, psychological, economic, and professional commitments, skills, prejudices, possibilities, and constraints”⁸ – or an external history of technology.

The field has been quite fruitful in the past few decades with numerous works that address a vast variety of historical questions – some of them benefitting from the methodological framework provided by history of technology – relating railways with *conventional* topics like diplomacy, culture/representations, economy and business, politics, military, and so on, in different geographical contexts and timeframes. More recently, academia has witnessed the publication of exciting new developments in the relationship between railways and (technological) nationalism and nation building,⁹

⁷ On technological determinism as the belief in technology as a key governing force in society, see the edited volume by Merritt Roe Smith and Leo Marx, eds., *Does Technology Drive History? The Dilemma of Technological Determinism* (Cambridge, MA; London: The MIT Press, 1994).

⁸ Wiebe E. Biker, “The Social Construction of Fluorescent Lighting, Or How an Artifact Was Invented in Its Diffusion Stage,” in *Shaping Technology / Building Society: studies in sociotechnical change*, eds. Wiebe E. Biker and John Law, 75-101 (Cambridge, MA; London: The MIT Press), 97. Wiebe E. Biker and John Law, “General Introduction,” in *Shaping Technology / Building Society: studies in sociotechnical change*, eds. Wiebe E. Biker and John Law, 1-14 (Cambridge, MA; London: The MIT Press), 4-7.

⁹ See for instance, Marta Macedo, *Projectar e Construir a Nação. Engenheiros, ciência e território em Portugal no século XIX* (Lisboa: Imprensa de Ciências Sociais, 2012), especially chapter 12; or Greet de Block, “Designing the Nation: The Belgian Railway Project,” *Technology and Culture* 52, no. 4 (2011), 703-732.

globalization,¹⁰ and technology transfer/knowledge spillovers.¹¹

As is common in other sub-fields of history and history of technology, most of this scholarship focuses on the English mainland and colonial and North American contexts. Nevertheless, the literature about non-British and non-American railways is also profuse, with different perspectives from both the central and the peripheral and ultra-peripheral nations. This richness and variety of research has even allowed and contributed to break the limits imposed by national borders and theorized a transnational history of railways as a spin-off of the larger methodological umbrella of transnational large technological systems.¹² In sum, this immense set of bibliography provides comprehensive and useful frameworks for new analysis and studies, and even for new concepts, and methodologies.

¹⁰ Especially in connection with the concept of “portals of globalization.” Much has been written in the wake of the seminal work of Matthias Middell and Katja Naumann, “Global history and the spatial turn: from the impact of area studies to the study of critical junctures of globalization,” *Journal of Global History* 5 (2010), 149-170. As far as railways are concerned, I highlight the 2015 special issue of *Comparativ – Zeitschrift für Globalgeschichte und Vergleichende Gesellschaftsforschung*, edited by Geert Castryck, about the globalizing trends that occurred in African and South Asian railways, cities and ports. See the editorial: Geert Castryck, “From Railway Juncture to Portal of Globalization: Making Globalization Work in African and South Asian Railway Towns,” *Comparativ – Zeitschrift für Globalgeschichte und Vergleichende Gesellschaftsforschung* 25, no. 4 (2015), 7-16.

¹¹ There are many examples about technology transfer in the railway industry to choose from. Arguably one of the classics is the edited volume by Roy MacLeod and Deepak Kumar, eds., *Technology and the Raj: western technology and technical transfers to India* (Thousand Oaks, CA: Sage Publications, 1995). The study of engineers and their agency is also associated with the transfer of knowledge and technology. See, for the Portuguese case, for instance, Ana Cardoso de Matos and Maria Paula Diogo, “From the École des Ponts et Chaussées to Portuguese railways: the transfer of Technological Knowledge and Practices,” in *Railway Modernization: An Historical Perspective (19th-20th centuries)*, ed. Magda Pinheiro, 77-90 (Lisbon: ISCTE, 2009). The problematic of engineers and technological transfer may also be found in the recent paper about railway gauges: Hugo Silveira Pereira and Bruno J. Navarro, “The implementation and development of narrow gauge railways in Portugal as a case of knowledge transfer (c. 1850-c. 1910),” *The Journal of Transport History*, forthcoming, DOI: 10.1177/0022526618791726. Another very recent paper develops the concept of knowledge spillovers in the railway sector: Teresa da Silva Lopes and Vitor Corado Simões, “Foreign investment in Portugal and knowledge spillovers: From the Methuen Treaty to the 21st century,” *Business History*, forthcoming, DOI: 10.1080/00076791.2017.1386177.

¹² On this issue, see the edited volume by Erik van der Vleuten and Arne Kaijser, eds., *Networking Europe. Transnational Infrastructures and the Shaping of Europe, 1850-2000* (Sagamore Beach, MA: Science History Publications, 2006). For a study of railways as transnational infrastructures, see Irene Anastasiadou, “In Search of a Railway Europe. Transnational Railway Developments in Interwar Europe” (PhD diss., Technische Universiteit Eindhoven, 2009).

This new thematic issue of *HoST – Journal of History of Science and Technology*, which includes three stimulating papers (four if the reader forgives me the immodesty of including my own), builds from that critical mass to explore in two research papers and two literary reviews new insights and sheds new light on distinct aspects of the history of railways in different geographies, ranging from America to India, passing through Europe and the former Portuguese colonies of Angola and Mozambique, and covering the crucial interval in railway history of the second half of the nineteenth century and the early decades of the twentieth century. The authors encompassed a miscellaneous array of research objects and contexts (from the implementation of railways – since the discussion stage to construction and operation – to railway towns, in colonial and metropolitan settings), using different methodologies and research tools.

In the first paper of this special issue, Ian J. Kerr produces a literary review to take us back to the discussion about the transfer of railway technology within the British Empire, with a particular focus on India – the author’s main area of expertise. In his essay, Kerr takes a thorough look to what was transferred and how was it transferred, highlighting that the process was not straightforward but, on the contrary, quite problematic as it involved “globalization, localization, rejection and hybridization,” besides adaptation to local circumstances. As for the actors of the plot, Kerr emphasizes the British/metropolitan transfer agents – the foreign experts¹³ – and the labour in the colonial context and their position in an uneven relation of power.¹⁴ The former were major supervisors during the construction and the operation of railways. The latter were used as hard labour, but, as Kerr points out – and this is one of the main conclusions of his text – African and Asian workers did not passively receive the knowledge of the alien engineers or contractors: they established a “dialectical relationship” with the Europeans and acted as agents for the relocation of new technologies. Readers may find in this paper a good inspiration for similar studies outside the British Empire; but

¹³ Which takes us back to the previous volume of *HoST – Journal of History of Science and Technology*, a very interesting special issue, edited by Ignacio Suay-Matallana and José Ramón Bertomeu Sánchez, about science, experts and expertise.

¹⁴ His 1995 book about the construction of India’s railways, including an assessment of labour, is still a classic for both labour and railway historians. See Ian J. Kerr, *Building the Railways of the Raj* (Delhi: Oxford University Press, 1995).

I believe they would welcome and certainly find it interesting if future iterations of the paper could reflect on these issues on a longer term and from the perspective of a global history of technology.

In my paper, I look into a field that I believe will be very promising in the academic community in years to come: colonial railways in the former Portuguese Empire.¹⁵ In my research, I combine the tools used in the study of conflict resolution (with a particular focus in track-two diplomacy) with a concept used in diplomacy studies and history of technology: technodiplomacy. With this framework, I argue that, despite the optimistic expectations of cooperation with Britain in the construction of railways to colonize and ‘civilize’ Angola and Mozambique, these territories and the railways therein became stages for conflict. All the cases studied had different inceptions and evolved with distinct characteristics. The underlying causes for the disputes were political/diplomatic, aimed at the appropriation of the African territories to the British and Portuguese administrations; however, I highlight that those conflicts were also resource-based. Therefore, I add to the argument in favour of the inclusion of financial and monetary motivations in the study of history of technology, a variable that is sometimes forgotten in the field. In the future, these results may be polished with the input from New Diplomatic History and with a clearer definition of technodiplomacy

¹⁵ In a 2015 literature review, I wrote that historical research about Portuguese colonial railways was an ample field for historians to tap into, as, besides a number of works of enthusiasts and former colonial engineers and authorities, there were just a couple of academic dissertations and books, and scattered mentions in general history volumes. See Hugo Silveira Pereira, “Portuguese Railway History: Still a Field of Opportunities?,” *Mobility in History – The Yearbook of the International Association for the History of Transport, Traffic and Mobility* 6, no. 1 (2015): 105-112. In 2016, a PhD dissertation constituted a great leap forward in this research field. See Bruno José Navarro Marçal, “Um império projectado pelo ‘silvo da locomotiva’. O papel da engenharia portuguesa na apropriação do espaço colonial africano. Angola e Moçambique (1869-1930)” (PhD diss., Universidade NOVA de Lisboa, 2016). Nonetheless, the field is still pretty much in the open, as there are many perspectives that historians still have overlooked (labour, military, heritage, urbanism, etc.) and the universe of primary sources (correspondence, technical reports and surveys, photographs, maps, statistics, mainly kept in the Arquivo Histórico Ultramarino in Lisbon, but also available in other Portuguese archives and libraries) is gigantic.

and how and why is it different from railway imperialism.¹⁶

The third paper of this special issue, by Robert Schwartz, is a fitting example of how the history of technology can benefit from the methodologies associated with information technologies, namely Geographical Information Systems (GIS) and computer-assisted qualitative data analysis (CAQDA), combined to produce a spatial history. Schwartz is a major contributor in the field, therefore the high quality of the paper comes with no surprise. GIS has been used to significant effect in history, history of technology, archaeology and heritage studies for some time now.¹⁷ Its visual power and evident capability of overlaying large arrays of statistics in maps is always very useful for historical analysis. As the author points out in his paper, CAQDA “greatly facilitates the systematic analysis of large corpora” of documentation. I, for one, was not familiar with this methodology. Its use was for me very refreshing. In his paper, Schwartz argues that the implementation of rail transportation in Great Britain transformed sea fishing and made fresh fish an everyday item for mass consumption, while it contributed to the conversion of British farms from wheat to dairy production. Using GIS, Schwartz enhances the trends and speed of the British market integration and how some regions prospered while others did not. The statistical analysis is completed with documental primary references, illustrating the representations, perceptions and expectations of contemporary Britons. Schwartz also mentions how railways (in tandem with steamers) contributed to “undermine the ecological foundations of sea fishing and fish reproduction.” Even though he backs the claim with a report from an 1893 Fisheries Committee, the affirmation requires further research. However, the hypothesis is very intriguing and interesting.

¹⁶ On New Diplomatic History, please see: Giacomo Giudici, “From New Diplomatic History to New Political History: The Rise of the Holistic Approach,” *European History Quarterly* 48, no. 2 (2018): 314-324 and Diana Carrió-Invernizzi, “A New Diplomatic History and the Networks of Spanish Diplomacy in the Baroque Era,” *The International History Review* 36, no. 4 (2013): 603-618.

¹⁷ A notable example of how the full benefits of this technology have been exploited is the 2011 special issue of *The Journal of Interdisciplinary History* devoted to the study of railway and transportation history with GIS (with examples from Portugal, Spain, France, Great Britain, Finland, Bulgaria and Turkey). See Jordi Martí-Henneberg, “Geographical Information Systems and the Study of History,” *The Journal of Interdisciplinary History* 42, no. 1 (2011): 1-13.

One cannot help but think about the Anthropocene, while reading that part of the paper.¹⁸

Last but certainly not least, the special issue includes a paper by Domingo Cuéllar on railway towns, a literary review on the subject, like Kerr's paper. Cuéllar is a member of the thriving Spanish community of railway historians that for some years now has been publishing many interesting and exciting works about several aspects of the implementation of the railway in Spain. As a matter of fact, Cuéllar's paper is partially the result of a ten-year research project (2002-2012) developed under the umbrella of the Spanish Railway Foundation. But the article is much more than that. The author defines the concept "railway town" as a specific evolution of the "company town," within the model of the garden-city, and then moves to make a large-scale comparison between railway towns across a vast area encompassing the United States of America, Brazil, the United Kingdom, France, Italy, Portugal, Angola and, of course, Spain. The result is a splendid general overview of this historical phenomenon that highlights the inception characteristics of the towns, and their urban forms. A final appraisal of their value as cultural and industrial heritage concludes the text. I would welcome, in future works, a larger selection of towns with a larger presence of cases from the "global South."¹⁹ The construction of a database with clearly-defined attributes that could characterize railway towns systematically would certainly be appreciated.

The four papers that constitute this special issue are quite heterogeneous in form and content, which makes it hard to establish links between them. On the other hand, and even though they point in four different directions, they show that railway history is still a very dynamic sub-field in history of technology. All four papers provide an assorted collection of tools, concepts and methodologies that may be used to study other sorts of technological transfer, conflict resolution, transport trends and company towns in other railway contexts and even whilst writing the history of other technologies.

¹⁸ For those interested in the Anthropocene, this issue of *HoST – Journal of History of Science and Technology* also includes a paper on the subject authored by Jürgen Renn.

¹⁹ Again, the 2015 special issue of *Comparativ* may be useful to this task.