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TECHNOLOGY AND
ENTREPÔT COLONIALISM
IN SINGAPORE, 1819-1940

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TECHNOLOGY AND ENTREPÔT COLONIALISM IN SINGAPORE, 1819-1940

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Notes on Currency

Unless otherwise stated, the unit of currency used throughout the text is the Straits dollar. Prior to 1906, the Straits dollar fluctuated between 4 shillings and 6 pence in 1874 and 1 shilling and 8½ pence in 1902. A new Straits dollar was introduced in 1903 and the rate of exchange fixed at 2 shillings 4 pence in 1906 and remained at this level up to 1967.

Introduction

When the city-state of Singapore gained its independence in 1965, there was the question of whether the government should bring down the statue of Sir Stamford Raffles, the “founder” of Singapore and standing proudly in front of the iconic Victoria Memorial Hall. The statue was unveiled when the colony celebrated the fiftieth anniversary of the reign of Queen Victoria in 1887.¹ In the words of Lee Kuan Yew:

Investors wanted to see what a new socialist government in Singapore was going to do to the statue of Raffles. Letting it remain would be a symbol of public acceptance of the British heritage and could have a positive effect. I had not looked at it that way, but was quite happy to leave this monument because he was the founder of modern Singapore. If Raffles had not come here in 1819 to establish a trading post, my great-grandfather would not have migrated to Singapore from Dapu county in Guangdong province, southeast China. The British created an emporium that offered him, and many thousands like him, the opportunity to make a better living than in their homeland which was going through turmoil and chaos as the Qing dynasty declined and disintegrated.²

For many former colonies of the British and other European empires, the memory of the colonial period is often a painful one, a national humiliation of conquest, military occupation and subservience. Independence was more often than not greeted as a celebration of liberation. For the island-state of Singapore, British colonialism and its ideology of “civilizing mission” did provide the thousands of Chinese, Indians, Malays and Europeans “the opportunity to make a better living”. Together with the British and other European entrepreneurs, engineers, missionaries, and municipal

administrators, these forefathers laid a strong foundation of a modern city. The story of their effort started one morning in the month of January of the year 1819.

On 29 January 1819, Thomas Raffles landed on the white sandy beach of Singapore, near the mouth of the Singapore River. According to an eyewitness, Raffles was accompanied by two white men and a sepoy who carried a musket.³ Anchored out at sea and ready for action was the British gunboat *Indiana*. In one of his letters to his friends in London, Raffles wrote: “At Singapore I found advantages far superior to what Rhio afforded ... our station completely outflanks the Straits of Malacca, and secures a passage for our China ships at all times, and under all circumstances. It has further been my good fortune to discover one of the most safe and extensive harbours in these seas, with every facility for protecting shipping in time of war ... [Singapore] will soon rise to importance...”⁴ The island was ceded to Britain, represented by the employees of the East India Company, with a stroke of the quill pen — and not the gun.⁵ The “gunboat diplomacy” succeeded without actually using force, though all parties knew it was available in case of need. In all probability, it was not the first time the Malay villagers and their headman saw the firepower-mounted British steamships that would soon force its way up the Irrawaddy River in 1824 and, a decade or so later, the world’s first all-iron steamer, the *Nemesis*, prised open the “Middle Kingdom” of China to European traders and missionaries in 1841. Since the seventeenth century, the Portuguese and the Dutch were marauding with their gunboats in the Indonesian archipelago with the economic objective of controlling the spice trade. But from the middle of the eighteenth century, the Union Jack of Great Britain led the scramble for tropical colonial empires — made easy and swift by a few technical innovations. One new institutional entity for exerting British power and influence, and backed by the Royal Navy, was the establishment of government-run trade entrepôts. They could serve as a naval base, a point of safety for warehousing and distributing the new output of the rapidly industrializing Western world and for bulking raw materials for European industry. As part of Britain’s overseas empire, Singapore’s ascendancy to supremacy over other trading ports in the regional port hierarchies was due to the functions the port offered on imperial sea routes in the region. However, one can argue that Singapore — known as Temasek some five hundred years ago — was already a thriving seaport in the fourteenth century, frequented by Javanese and Chinese traders and used a hideout

by pirates.⁶ But it was also exposed to the internecine squabbles between the rival expanding empires of Majapahit and Thailand. The unique geographical location of the island was not of importance in ancient days and, devoid of natural resources, Singapore remained as a small trading village inhabited mainly by boat-dwellers. What gave a new twist to the traditional pattern, in Singapore's case, was that nineteenth century Singapore was the product of the forces of Britain's Industrial Revolution. Technological change and the rapid industrialization of Western nations contributed to the creation of colonial empires, especially in Asia and Africa, and stimulated the demand for the products of the tropics. Steamships, railways and telegraphs allowed Europeans to rule their newly acquired colonies efficiently. New industries required new materials from the tropics — cotton and indigo, palm oil, copper, gutta-percha, tin and rubber. An increasingly affluent Western consumer society demanded sugar, tea, coffee, cocoa, spices and other tropical goods. There was also massive transfer of technology from the West to Asia and Africa and this, in turn, led to the growth in tropical production of goods destined for the industrial cities in the West. Colonized people were introduced to a whole array of technologies and manufactured goods.

From the 1850s, Britain led the West in the creation of an international trading infrastructure. In the words of Peter Stearns, “[f]orming part of this structure were international trading companies and shipping lines, which were expanded by the technology of the steamship ... the globe was shrinking because of industrial technology and new levels of world trade...”⁷ Singapore was like a fresh frontier of the British economic interest in the East, eagerly waiting to receive the benefits of Western scientific and technological advancement and the economics of free trade. While the study of the relationship between technology transfer, modernization, economic development and colonial politics in India has been widely researched — and rightly so since the continent was the strategic centre of the British Empire and the envy of all other Western colonial powers — little has been done on this relationship in the context of an important colonial port-city in the “Far East” of the British Empire. This book hopes to fill this void by examining the role of imported technology on the growth and development of the port-city of Singapore from 1819 to 1940 and set as a case study to illustrate Britain's “civilizing mission”. It does not purport to any extensive interpretation of existing or new primary sources relating to science and technology in colonial Singapore. This is

because archival reference to science and technology *per se* is piecemeal and incidental in nature and largely drawn from various official reports and personal accounts of contemporary residents and travellers. There is hardly any secondary works done on the role of technology in the growth of the port-city during the period of British rule. It is acknowledged that this study is heavily biased towards Western samples mainly because there is no attempt made to look into pertinent Chinese sources that could provide a useful angle of interpretation. However, it could be inferred that such sources are also far and few.

The book serves three purposes. First it hopes to add a new dimension to the historiography of Singapore from a “science, technology and society” perspective. As it stands, the scholarship leans largely on the development of the city-state after 1965 (the year of its independence), particularly in the social, economic and political arena of nation-building, popularly encapsulated in the term “The Singapore Story”. How has everyday life changed between 1819 and 1940? How much of this change is due to the introduction of Western innovations in science and technology into the port-city? The important roles of technology and science in transforming the life of the inhabitants in colonial Singapore before 1940 have yet to be sufficiently recognized and documented. This book opens up a new angle in looking at Singapore’s development as a port-city, and adds an important dimension in understanding the impact of colonialism in Singapore. Such studies on the impact of science and technology have already been undertaken in places like India, China and Japan, and this book will add to the growing literature in the field.

By providing an overview of technological change in colonial Singapore during the years 1819 to 1940, this book also introduces a historical perspective to the understanding of Singapore’s current quest for technological and scientific excellence. While it is true that the antecedents of Singapore’s colonial past tend to diminish over time, it is also plausible that explanation for the issues and challenges of Singapore’s science and technology policies in today’s context can be traced to its historical developments. Much has been written on the technological success of Japan, South Korea, and Taiwan — how they transformed from imitators to innovators — and the process of which has been explained with references to their national histories, in particular, to their encounters with Western science and technology and their subsequent enactment of supportive state policies to develop the indigenous technological base.⁸

Indeed, a more matching comparison is Hong Kong, an entrepôt under the British rule until 1997. While the remarks on Hong Kong are made in passing, they are nevertheless useful to highlight certain arguments made in the book.

On a broader canvas, the book provides a view of the British Empire from the periphery — by documenting a more integrative interpretation of Singapore's colonial past with that of the Imperial metropolis. Some observers have lamented that in Britain itself, “by the 1980s, colonial history was largely dropped as a subject in Britain's increasingly multi-ethnic schools” and that “citizens in the old colonies” are generally apathetic towards their historical ties.⁹ While it is true that there is only limited mention of the British Empire and the period of British rule in Singapore (particularly before 1940) in the school history textbooks, there were public exhibitions and talks organized to prick the collective memory of Singaporeans of the city-state's imperial past. This study hopes to generate readership interest and perhaps open up discussions on the broader question of the relationship between technology and the Singapore society in the period of European imperialism and colonialism. However, this study is not preoccupied with the constitutional, political and economic aspects of British rule in the colony. There are notable works done by local nationalist historians under the so-called “old” or “traditional” imperial history approach who tend to see their work as offering lessons in citizenship and moral instruction relating to issues such as racism, chauvinism and colonialism.¹⁰ This book hopes to encourage local scholars to return to the history of British imperialism in a search for the historical roots of globalization, or to write “new imperial history” as a form of global history. It provides an interdisciplinary, thematic platform to study the representations of empire — issues of imperial science and technology, culture, gender, race, education — which played so central a part in the creation of what many “post-colonist” historians regard as the significant experiences of imperial dominance and imperial subservience.¹¹

No study of science, technology and society, however, could hope to cover every aspect of a society's modern social and economic development. In writing this book, I have resisted repeated temptations to follow up with all sorts of intriguing anecdotes and reports that relate to how science and technology had affected everyday life in Singapore during the decades before 1940. Such an embracing subject also demands that the text swings between social history of technology and economic history, and between

culture and politics. What I have tried to do is to cover issues in specific areas of technological change which help to illustrate the relationship between society and technology in modern Singapore. Examining areas, such as shipping, port development, telegraphs and wireless, urban water supply and sewage disposal, economic botany, electrification, food production and retailing, science and technical education, and health, this book documents the role of technology and, to a smaller extent, science, in the transformation of colonial Singapore. How did imported technology contribute to the development of the colony? Who were the main agents of change in this process? Was there extensive transfer and diffusion of Western science and technology into the port-city? How did the people respond to change? What is the impact of British colonialism on the development of a technological culture in Singapore? One key argument of the book is that various Western-imported technologies, especially when combined, enhanced the colonial administration's and the local business community's ability to govern the port-city and to expand the *entrepôt* trading system respectively. While the transfer of these imported technologies gave imperial agents more scope for intervention, the indigenous community gained access to them as well and benefited from their transfer.¹² The central theme that runs through the chapters is that the construction and development of British imperial ports like Singapore through the introduction of Western technologies and institutional practices is carried within the framework of British colonialism — to serve the needs of London and the preservation of British imperial greatness in the Empire.

Chapter One provides an overview on the role of technology in the expansion and development of the British empire. While the power of her technological prowess enabled Great Britain to acquire colonies, British colonial administrators, missionaries and businessmen came with their railroads, steamships, telegraphy and industrial machines — as powerful civilizing artefacts. British officials who planned and administered colonial cities like Calcutta and Singapore had to do so within the overall framework of colonialism. The paternalistic mission stressed on the maintenance of law and order, rather than the progressive uplift of the colonized. The preservation of British power and prestige was all-important. Technology and its transfer served ideological as well as physical purposes. Singapore has no natural resources. What made the fishing village into the vibrant city-state today are the people in its history. Rightly then, Chapter Two

examines the agents of change — entrepreneurs, surveyors, architects and engineers — who arrived as part of the diaspora of European skilled immigrants to Singapore and Malaya during the nineteenth century and early twentieth century. They were the harbingers of the “civilizing mission”. However, the entrepreneurial role of the Chinese middlemen or compradors — supported by the thousands of immigrants from South China — also contributed significantly to the successful trading networks of the European agency houses. Collectively, people from all over the world came to tap on the wealth generated by the small island as it grew rapidly into one of Britain’s premier ports in the East. Chapter Three centres on the development of the Singapore port, from its existence at the Singapore River to the “New Harbour” at the southwestern part of the island. It was a continuing process of expansion and adaptation in response to new maritime technology. To accommodate the increasing size and number of ships and the growing volume of world trade, particularly with the opening of the Suez Canal in 1869, Singapore, together with a whole series of new colonial ports — Port Said, Aden, Karachi, Dakar, and Hong Kong — was transformed dramatically. By the 1890s, Singapore served over fifty regular lines and, unlike ports that served as outlets for hinterlands, the port tapped on its strategic position and became a major regional entrepôt. The rapid development of the port also led to the growth of other ancillary and commercial services, in particular, Chinese businesses in coastal shipping. Discussion on port technology in Singapore before 1940 would also not be complete without reference to the construction of the Singapore Naval Base. It was literally the last bastion of British military and technological supremacy to be unveiled by the British Government in the colony’s pre-war history.

By the end of the nineteenth century, Singapore was the pride of the British Empire in Southeast Asia. To reinforce its position as the premier port in the region, Singapore was linked to Britain’s imperial telecommunication network. It was a boon to the traders and merchants. Chapter Four examines the technological systems that were gradually introduced to support the rapid urbanization of Singapore and to enhance its living environment. It discusses the impact of imported technologies — telegraphy, modern transportation, electrification, and civil engineering — in transforming the urban landscape. These were transferred with the primary objective of control and to make the environment liveable for the Europeans. The telegraphy satisfied Britain’s demand for improved

communications between London and the far-flung dominions and colonies at any cost. Steam transport over land and water facilitated the movement of imperial troops and sped the transfer of raw materials to British factories and, in turn, of manufactured commodities to the colonies. Singapore benefited greatly from these technological advances. But, like Hong Kong and Calcutta, rapid urbanization brought along issues of sanitation and health. Particularly from the late nineteenth and early twentieth, sanitation and health became critical issues to be tackled by the colonial administration. Chapter Five discusses the theme of “Technology and the Environment”. A major challenge for the municipality in rapidly expanding colonial cities like Singapore, Hong Kong and Calcutta is how to deploy imported sanitation technologies and ideas of environmental aesthetics to prevent disease and promote healthy living within the European community. However, the health of the masses could not be disregarded because Europeans and Asian immigrants alike lived in the shared environment. In any case, the evolution of public health from sanitary measures to environmental health and the wider concerns of social medicine progressed very slowly in nineteenth-century Singapore. Overcrowding, coupled with *laissez faire* policies, lethargy and lack of will by local authorities in the face of apparently insuperable technical difficulties and inadequate financial resources compounded the tasks of the municipal planners and engineers.

While trade was the engine of growth, attempts were also made by Europeans planters and economic botanists to exploit the land for imperial gains. Chapter Six discusses the transfer of colonial scientific ideas in agricultural science and botany to Singapore. Despite the dominance of commerce, a modest start was made in the application of science to the production of tropical export crops during the early decades of the nineteenth century. Colonial botanists, like Henry Ridley, participated in agricultural research of tropical export crops, such as, sugar cane, cinchona, and natural rubber. The Botanic Gardens of Singapore turned the rubber tree into the mainstay of Malayan agriculture. Together with other gardens set up throughout the British Empire, it received a constant stream of information and life plants and by the rotation of personnel, all monitored and planned through Kew. However, it soon dawned upon those who tried to make a fortune out of the land that the island was not endowed with fertile soil. Scientific husbandry and mechanization of agriculture hardly occurred. As it was then and now, Singapore had to depend on imported

food. Chapter Seven then documents the role of science and technology in one key feature of the changing pattern of everyday life of the people — food — and seen through the revolutionary incorporation of the Singapore Cold Storage in 1903 and its subsequent growth before 1940. As an agent of change, the company was a powerful engine of innovation and change in food habits and in the development of new food-retailing systems. It imported and retailed “imperial” food catered largely to the European consumers. While a more balanced diet, improved sanitation and modern medical facilities, gave the European population and the well-to-do locals, better health, the masses did not enjoy the benefits of the advances in food technology, “scientific” sanitation and healthcare measures until way into the decades of the twentieth century.

Technology transfer is not just about erecting complexes and monuments in the colonies of imperial powers. It is also about knowledge and learning activity. The perceptions the Europeans had of the learning capacity and culture of their colonial subjects certainly shaped the kind of education they offered. Chapter Eight argues that the upgrading of English and technical education in Singapore during the years 1900 to 1940 was hampered by administrators who were not willing to implement progressive changes. The availability of an English education was limited and, at the same time, vernacular education was actively supported. The perception of the British administrators that Singapore was a trading port and thus had no need for highly trained personnel in scientific and technical professions led to the underdevelopment of a technological culture. Finally, in Chapter Nine, the issue of development of an industrial base and transfer of industrial technology is explored. Despite the extensive application of modern technology to the transformation of the port and the urban environment, by the end of 1940 (and even up to 1965 when Singapore gained its independence), Singapore remained nothing more than a staple port. The development of an industrial and manufacturing base was insignificant and hence, transfer of industrial technology to local businessmen was also capped. Answerable to their shareholders in Britain, British agency houses were not willing to diversify into manufacturing activities that did not really complement their interests in the rubber industry or were in direct conflict with imported products manufactured by their fellow countrymen in Britain. On the other hand, Chinese businessmen, who had successful ventures in the rubber and pineapple industry, were more willing to invest in manufacturing enterprises and to

depend on European engineers for technical or managerial support. The rise of these Chinese industrial conglomerates, however, were far and few. It was in the field of Chinese banking that British technology transfer, in terms of knowledge and institutional practices, was most direct and generally successful.

The conclusion revisits the central theme of the book by appraising the relationship between Western science, technology and *entrepôt* colonialism, as seen in colonial Singapore. The British imparted two outstanding legacies. These were the creation of a world-class port and a modern city. The port was Singapore's economic lifeline during the period of British rule. Its steady growth was due to the benefits of British expertise in port management and shipping technology. While the colonial government failed the acid test of providing sufficient housing for the masses, it gave Singapore a modern infrastructure with good roads, piped sewers, reservoirs, public transport, airports, telecommunication and air services. These technological projects were perceived by British administrators as visible symbols of colonial power and for the population at large, a reminder of the supremacy — and invincibility, at least before the surrender of the “Invincible Fortress” to the Japanese imperial forces — of the British race.

Notes

1. The statue was unveiled by the Governor, Frederick Weld, who in his speech, described Stamford Raffles as “an illustrious administrator and statesman, whose sagacious foresight laid foundations upon which have been built up a great centre of commerce, a focus from which British influence, carrying with it the light of civilization, radiates far around, and which has not only been a blessing to thousands, but has added, directly or indirectly, in no inconsiderable measure to the extent and resources of that vast Empire over which Her Majesty rules”. See *Straits Times Weekly Issue*, 6 July 1887.
2. Lee Kuan Yew, *From Third World to First: The Singapore Story: 1965–2000* (Singapore: Times Editions, 2000), p. 67.
3. Donald Moore, *The First 150 Years of Singapore* (Singapore: Donald Moore Press, 1969), p. 15.
4. Quoted in *ibid.*, p. 30. The geographical locale factor for Singapore's successful economic transformation is elaborated in Philippe Regnier, *Singapore: City-State in South-East Asia* (Honolulu: University of Hawaii Press, 1987). Regnier stresses on the complex web of interrelationship

- between Singapore and (a) the immediate region and (b) the rest of the world. Situated at a major crossroads of international trade, the city-state's economic success since 1965 was largely due to its ability to continue to function in its historic vocation as an international trading emporium during the period of British rule, and supported by constant upgrading to its modern infrastructure.
5. From the 1700s, the East India Company expanded rapidly on the back of its trading activities and, at its peak, the company employed a third of British workforce and was responsible for 50 per cent of global trade. The company was dissolved in 1874. Today, the 400-year-old brand was acquired and relaunched by an Indian entrepreneur as a high-end, luxury shop in London's upmarket Mayfair district, selling tea, biscuits and chocolates. See also Anthony Webster, *The Twilight of the East India Company: The Evolution of Anglo-Asian Commerce and Politics 1790–1860* (Woodbridge and Rochester: Boydell Press, 2009). Webster examines the intricate commercial and political relationships between the company, the British state and British businesses in finance and industry. He argues that, despite the demise of the company, the operations of the company had led to a flood of capital investment — but dismissing the negative impact on the indigenous Indian industries.
 6. See Kwa Chong Guan, *Singapore, a 700-year History: From Early Emporium to World City* (Singapore: National Archives of Singapore, 2009).
 7. Peter N. Stearns, *The Industrial Revolution in World History* (Boulder: Westview Press, 1993), p. 83.
 8. See, for example, Sheridan M. Tatsuno, *Created in Japan: From Imitators to World-Class Innovators* (New York: Harper & Row, 1990) and Ian Inkster and Fumihiko Satofuka, eds., *Culture and Technology in Modern Japan* (London: I. B. Tauris, 2000).
 9. Jonathan Eyal, "History as it should be taught", *Straits Times*, 17 July 2010.
 10. See the seminal works of the following authors: C.M. Turnbull, *The Straits Settlements 1826–67: Indian Presidency to Crown Colony* (Singapore: Oxford University Press, 1972); Edwin Lee, *The British as Rulers: Governing Multicultural Singapore, 1867–1914* (Singapore: Singapore University Press, 1991); Wong Lin Ken, "Singapore: Its Growth as an Entrepôt Port, 1819–1914", *Journal of Southeast Asian Studies* 9 (1978): 50–84.
 11. Two recent works are Sarah Stockwell, ed., *The British Empire: Themes and Perspectives* (Oxford: Blackwell Publishing, 2008) and Radhika Mohanram, *Imperial White: Race, Diaspora, and the British Empire* (Minneapolis and London: University of Minnesota Press, 2007).
 12. This book adopts Wikipedia's definition of the term "technology transfer":

“Technology transfer is the process of sharing of skills, knowledge, technologies, methods of manufacturing, samples of manufacturing and facilities among governments and other institutions to ensure that scientific and technological developments are accessible to a wider range of users who can then further develop and exploit the technology into new products, processes, applications, materials or services”. It is not merely the physical introduction into the receiving country of various kinds of supposedly more efficient Western hardware. It involves transmission of the complex of knowledge, materials, and methods pertinent to the operation of the technics or technical systems in question.