From Fire-Wheel Boats to Cities on the Sea: Changing Perceptions of the Steamships in the Late Qing, 1830s-1900s

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The steamship made its first significant impression on China as an instrument of war. None of the Chinese observers at the time of the Opium War saw it as a technological breakthrough and epoch-making invention, but instead focused on how to subjugate it in practice. Their cultural memory of seafaring was dominated by the glorious voyages of Zheng He to Southeast Asia, Africa, and the Middle East in the early fifteenth century. Yet by the turn of the twentieth century, the steamship, along with the railroad and telegraph, stood as the emblem of a new stage of human progress. Though first seen as a Western modification of Chinese paddlewheel boats, the steamship shed its association with Chinese forms of technology and scientific knowledge and moved into a new realm occupied by notions such as empire, enlightenment, racial differentiation, and human progress. This essay examines the changing perception of the steamship in the context of nineteenth-century imperialism and the history of science and technology.

Existing literature on steamships in the Qing has mostly focused on warfare and shipping. Benjamin Elman has argued that the Qing's apparent failure at harnessing the steamship technology was largely a product of the Sino-Japanese War. In a similar spirit, Stephen Halsey, using the China Merchant Steamship Co. as a case study, argued that the Qing largely succeeded its goal of wresting the vital shipping business from foreign control. As a subject in the history of science, Hsien-Chun Wang examined where early Chinese efforts at understanding and replicating the steamship fell short; Wang found that Chinese engineers lacked the requisite machine tools and technical drawing to replicate the steamship effectively (43-47).

In this essay, I will provide a tentative mapping of the changing meaning of the steamship in popular perception, as an instrument of war, a technical innovation with disputed origins, and a vessel of transoceanic transport. Facts and myths about the steamship appear in a variety of sources ranging from technical manuals, to poems and letters written by coastal literati, to diaries written by travelers and diplomats on oceanic voyages. In my approach to these sources I have given particular attention to the sentiments and emotions engendered by and conveyed through the steamship and transoceanic voyages, using them as a lens to understand the larger shift in Chinese cultural milieu. In the following pages, I first examine Chinese descriptions and strategies in harnessing the steamship just before and during the first Opium War. The purpose here is not to assess the degree to which the Chinese understood steam power, but how the technology was conceptualised by casual and official observers. In the second section, I explore the steamship as a spatial and temporal experience for early Chinese passengers. I argue that as an instrument of war and a portable display of culture, the steamship was a microcosm of western culture unto itself, transporting ideas regarding progress, international law, race, and civilisation to the places it visited.

Harnessing the Fire Wheels

To Chinese observers of the 1830s and 1840s, steamships were an impressive and curious sight. Sporting large wheels, they were reputed to sail fast and in defiance of the wind. Compared to the sensational reception of Commodore Perry's "black ships" in Japan (Statler), however, few Chinese observers seemed particularly intimidated by their presence, or even necessarily considered them foreign technology. The steamship was thought of as akin to the

existing paddlewheel boats, but rather than using man-powered paddlewheels, these ships harnessed the power of fire as primary source. Wang Dahai, a Fujianese merchant who sailed to Southeast Asia in the 1790s, authored the first eyewitness account of a steamship in Chinese. He describes the mechanism of the steam-engine in a straightforward manner:

> Their ship is more than ten *zhang* in length, equipped with masts and sail, but it does not use them. Instead, it has two carriage wheels of sixteen iron leaves each. On the deck there stand two large, tubular smoke vessels, one large and one small; coal is placed below them, next to a cauldron with clear water. When the water boils, air is forced through the tubes to propel the wheels to spin (Wang 6b-7a).

Wang sees no mystery in the mechanism of the steamship. All of its key components were plainly visible, as was the fact that air can be used to drive the wheels. Similarly, Xie Qinggao, a blind Cantonese castaway rescued by a Portuguese ship, described a "fire tub" installed in western ships. Xie informed his scribe about the mechanism of the ship: "when thrust onto the wheels, the flame from the tub causes them to glide through the water" (Lü 3). Both Wang and Xie emphasise the steamship's use of fire, and both call it *huo chuan* (fire ship). The wheels on such ships were not seen to be specialised – the same could be found in oxen-drawn carts, treadwheels, or traditional paddlewheel boats. Even in the early days of the Opium War, Lin Zexu referred to steamships as *chelun chuan* ("boats with cartwheels") propelled by "fire flames" (Wenqing, Zhen and Baoyun 18).

The Opium War from 1839 to 1842 afforded Chinese observers in the coastal regions a closer look at steamships, but more importantly, it exerted a pressing need for officials to understand them. The court and officials gradually came to use term *huolun chuan* (fire-wheeled boat) for steamships, although other names were still used in personal writings. Officials also came to be interested in recruiting men who had worked in western shipyards or had the ability to understand foreign manuals containing diagrams of western ships (Lü 10-14). It is important to note, however, that the pursuit of *huolun* technology was conceived as interconnected with other kinds of technical innovation: the revitalisation of studies into what was deemed to be long forgotten arts of the Tang and Song Dynasties' shipmakers, the investigation of ship models in nearby states, especially the innovations in Korea and Vietnam, and the modeling of existing man-powered boats after the external appearance of British ships (Needham 427-30). For example, Gong Zhenlin, a magistrate of the Jiaxing county in Zhejiang province, designed a ship based on the appearance of a British steamship, but for fire he substituted manpower (Lü 10). These experiments were undertaken by mid- and low-level officials and their staff in the provinces of Guangdong, Zhejiang, and Jiangsu, with goals ranging from devising "human engines" to making underwater explosives (Rawlinson 19-21). Their enthusiastic search into native and overseas traditions brought about a small wave of technical ventures with varied success during the Opium War. Because these experiments stood on the wrong side of history, they are often used to show how much China lagged behind the West in technology and military methods. If we set hindsight aside, however, and refrain from faulting them for having to explore possibilities on their own, some fresh perspectives emerge.

Since fire was one of the five phases (*wuxing*) in Chinese cosmology, the fire-powered *huolun chuan* might succumb to the power of water – fire's natural antagonist – and several experiments tested this. In 1842, Ding Dachun, a poor itinerant scholar and diviner who was known for his "special talent and supernatural abilities," offered his advice to Niu Jian, an admiral. After studying the styles of British ships, Ding thought that their bulk and reliance on fire was a weakness. He advocated the use of water-wheeled boats and the Korean-style

turtle boats to defeat British steamers. Ding's design featured eight rowers (the four legs of the turtle) and a large canopy of buffalo hide (the turtle's back), which presumably could serve to camouflage the ship and invoke the symbolic efficacy of the divine animal. Small and fast, the turtle boats were to sail near the enemy's steamships and bore through their hulls without attracting notice. The admiral appropriated one thousand taels of silver to make eight such boats. All eight were launched into the Huangpu River, and all eight capsised. Every man died (Wang 13a).

Ding's experiment drew criticism from his contemporaries, but not for being unscientific. Wang Tao, a Shanghai based writer and translator who had traveled to Europe himself between 1867 and 1870 (Cohen 57-83), relayed this anecdote in a compendium of treaty-port happenings, published in 1875. Wang tells the reader that Ding drew criticism for the idea, but he defended it as an example of *yichuan pochuan* (the use of the ship as a weapon), citing the recent American invention of an "ironclad warship capable of crashing into and sinking steamships" (Wang 13a). Wang was referring, presumably, to ships designed with ram bows, made popular by the sinking of the USS Cumberland by the CSS Virginia in the American Civil War, and featured in popular magazines such as *Harper's Weekly*.[1] It was regrettable, Wang opined, that Chinese officials in power did not know about these recent western inventions. In any event, he valued the experiment for its innovation and did not condemn it for its shortcomings.

Native experimentation with the steam engine began in 1842, when Pan Shirong, a wealthy merchant in Guangdong, commissioned a small steamship from foreigners. In the same year, Ding Gongchen, a native of Fujian who had apprenticed on western ships in Southeast Asia, wrote a book about the western manufacture of munitions and included a chapter on the design of the steamship (Ding 1843). As historian Lü Shiqiang suggests, these projects were ultimately abandoned by the court in favor of native ships. In addition to their prohibitive costs, none of the Chinese steamships seemed practical enough for coastal defense. On the whole, they were a clumsy and slow lot, and not nearly large enough. When the Treaty of Nanking obviated the need for military innovation, the court called an end to these projects (Lü 35-37).

From the 1840s to the 1860s, the steamship's novelty continued to be attributed to its use of fire as a power source. To some contemporary observers, it was conceptualised as part of the exotic and diverse cultural landscape of the Chinese coast. For instance, to Shi Hongbao, a sojourner native to the Lower Yangzi who lived in Fujian for a decade as a secretary, the southern province was rich in exotic plants, strange customs and historical anecdotes. Shi traveled through the province, filling his notebook with over nine hundred entries divided into four rough categories: cosmos, earth, people and things. One finds the entry for *huolun chuan* in the midst of native or tributary items of an ingenious nature: a Buddhist ritual shell (*shankha*) with the ability to calm storms for ocean voyagers, a water-powered armillary sphere (*hun tian yi*) with the ability to predict astrological phenomena with absolute precision, and a pearl from the belly of a spider with the ability to calm tornadoes. That the *huolun chuan* entry is found in this cluster, rather than the ones pertaining to ships elsewhere in the volume suggests that the author considered the steamship akin to native or tributary ingenuities already possessed by China.

Shi's entry on *huolun chuan* began with the first Chinese record of the *lunchuan* (paddlewheel boats) from the eleventh-century *Xin Tangshu* (New History of the Tang Dynasty), followed by examples from the Song. The key feature of these ships is the use of manpowered treadmill paddlewheels (*che lun*). "The English stole the model from us," Shi

says, "but they did put a new spin on it by using fire" (Shi 3b). Shi understood the steam engine in a similar way to what Wang Dahai and Xie Qinggao had written in earlier decades, as consisting of a large fire pit connected to wheels. The crew would light a fire to drive the ship forward; when the ship needed to stop, they put out the fire. To Shi, fire was a liability in battle because of its unwieldiness. What would happen, he asked, if the enemy's ship sailed along with the wind, and our crew took too long to light a fire? What would happen, if the ship suddenly ran into shallow water or was blocked by floating logs and seaweed, and needed to be stopped, but the crew could not put out the fire in time (Shi 4a)? Shi concluded that the people who advocated fire-wheel boats were ignorant of history.

This entry shows that in the aftermath of the Opium War, the steamship was conceptualised according to existing knowledge of maritime technology. To observers such as Ding and Shi, it was an inferior version of the Chinese paddlewheel boats, evidence of foreign attempts to imitate indigenous artisan traditions of China. Interestingly, Shi's belief that the *huolun chuan* was derived from ancient *lunchuan* mirrored that of the British officers during the Opium War. They insisted that the treadmill paddlewheel junks were Chinese imitations of their own British ships (Needham 427). They were amazed at the speed at which the Chinese were imitating what they had seen of western designs. This association of the steamship with Chinese traditions, however, did not stymie invention, but rather emboldened Chinese engineers to improve on existing designs for higher speed and efficiency.

A few technical documents from before the Second Opium War explicate the internal designs of the steam engines. Chinese historian Wang Bin has documented six distinct Chinese accounts of the steam engine published between 1834 and 1855, three in literature authored by western missionaries, and three by Chinese engineers. Wang's study reveals the great variety in the types of steam engines covered in these works, and the significant inconsistencies in their technological terminology (Wang, Study 61). An examination into Ding Gongchen's *Yanpao tushuo jiyao* (1843), the first Chinese authored text on the steam engine, shows how he conceptualised the machine:

> In the last decade a new device has come to existence. Such a wonder it is, that it surpasses even the works of nature! What is the name of this novel device? It is called *huolun che* (fire-wheel carts), and it has already spawned a variation – the *huolun chuan*. Its origin comes from a child who saw smoke arising from the spout of a tea pot. The child made a pinwheel and placed it next to the spout. The smoke from the spout propelled it to spin unceasingly. An elderly man saw it and came to a sudden realization of its main mechanism (*ji*). Thus the *huolun che* came to be made (Juan 4, 13a-b).

Ding's description of the origin of the steam engine is notable in several respects. First of all, he sees the steamship as a descendent of the train (popularly known as "fire-wheel carts"), which in turn was inspired by the pinwheel. As historian Zhang Baichun notes, in classical Chinese *ji* is often glossed as the controlling mechanism of intricate devices. In a Qing dynasty commentary of the famous dictionary *Shuowen jiezi*, the meaning of *ji* is given as having the function "to control the beginning, therefore everything that controls a beginning can be called *ji*" (Zhang 179). By identifying the smoke-driven pinwheel as the *ji* of the steam engine, Ding's reveals the complex and intricate machines as a work of nature.

Ding's anecdote of the child watching a boiling tea pot also carries an imprint of the Victorian mythology about James Watt and the boiling kettle. As David Miller has shown, the anecdote of the child genius was an important link in establishing the credentials of James Watt as a scientist rather than an ingenious craftsman (345). In fact, the circulation of the myth went far beyond Europe, and entered China in the 1840s as a byproduct of the Opium War. It is likely that Ding had heard about the story of James Watt from the European sailors with whom he socialised in his earlier maritime career. Watt's story, however, undergoes a thorough transformation in Ding's narrative: Ding attributes the invention of the engine to a flash of inspiration of a much older man who derived insight into nature from the carefree play of a child. The ingenuity of the observant child came to be no more than part of nature itself, as he seemed unaware of the deeper principles behind his toys. As historian Henriette Harrison notes, children's songs and rhymes have traditionally been seen as heavenly portents in late imperial China (Harrison 162). Ding likely borrowed a page from this existing convention to give the story a ring of authenticity.

From the early 1860s, newly established institutions such as the Jiangnan Arsenal and Fuzhou Shipyard published books on western science and technology with a view to educating the public on western machinery. These publications sought to correct misconceptions about the steam engine by providing a more accurate depiction of how these machines worked, in an effort to go beyond mechanical copying of the shapes and diagrams of foreign machines. Although terminology varied, these works contain detailed explanations of the internal intricacies of the steam engine. While a casual observer might crudely describe the boiler as a "fire tub," the editors and translators of these volumes aimed at conveying the "*jingwei*" (precision and subtleties) and the "*shenmiao*" (mystery and wonder) of the technology pursued by westerners. In a preface to a collection of thirteen scientific publications by the Jiangnan Arsenal, the author extols the student of science to "not only know what to do, but to understand why he was doing it" (*jiwen*, Juan 12, 1a-b). In a related article on the discovery of the steam engine, the author states:

> The steam engine was featured as a prime example of how human ingenuity can tap into the inexhaustible potential of natural power. If we stop a man on the street and ask him: "How do we gather the formless and voiceless qi permeating in heaven and earth?" No one is likely to know. The fire-wheel engine was just invented a little more than a hundred years ago. Its origin can be traced to a man who sat by a fire stove and observed the kettle. Once [the water] received power from the fire, its lid was blown off by the qi rising within. He had a sudden realization: since there is inherent power within the qi, why not exploit it? He intended to produce such a machine, but died before he succeeded (jiwen, Juan 3, 10a-b).

The story of James Watt and the tea kettle had now come to resemble the popular English telling. Meanwhile, authors of accounts of the steamship also faced the challenge of deducing from a finished product what must have been necessary to make it possible. Unsurprisingly, they focused their attention on the individual work ethic of the engineers. The trope of death by exhaustion of the mind was sometimes invoked in describing the lives of the engineers. When Zhigang, a Qing envoy on the Burlingame visited a Lyon weaving factory in 1869, he firmly held that the Joseph Jacquard, the inventor of the mechanised loom, died of a similar condition of exhaustion (Day 75). The author of the steam engine manual seemed to assume

that once this property of qi was grasped, it only remained to work diligently until the machine was realised.

Contrary to missionary-authored manuals on steamships, which prefer to use the compound word *zhengqi* (steam qi)[2], most Chinese authors simply use *qi* unadorned. This difference suggests that although the Chinese authors understood that the qi animating steam engine arises from boiling water, they probably still identified it with the conventional notion of qi, a Neo-Confucian term denoting the stuff of the universe. Their authors did not conceptualise western science as a radical departure from existing knowledge, but rather saw it as an extension of the Neo-Confucian emphasis on mind cultivation and the observation of nature. The invention of the steam engine amounted to a revelation of the interconnection of cosmic forces and human affairs.

The Steamship as Contact Zone

Steam heralded an era of European triumphalism. Far from existing in separate spheres, new forms of technology – steamships, railways, and telegraphs, for example – functioned as "tools of empire," engendering new representations and symbolism instrumental to the political and social narratives of imperialism (Marsden and Smith 11). The transoceanic steamers in particular, as an embodiment of imperial power, disseminated a distinct representation of time, space, and world order. As the Qing began sending envoys and diplomats to Europe, the steamships they boarded provided a new ideological framework for conceptualizing the world. Although the Chinese passengers on these journeys were few, those few were from the official class and had an outsised impact. Their accounts of the west often began with a description of the journey on the steamship, where they experienced a first-hand intimate exposure to the outlook of European imperialism.

In his *A Steamer Book!* published in 1880, Victorian traveler William Helmuth pronounces that "the transatlantic steamers of to-day *are* regular cities" (30). The passenger steamer contained everything one would find in a Victorian city: shops, barbers, taverns, bars, butchers, hospitals. The main cabin, serving as a community center, was used simultaneously "a grand saloon, a parlor, a drawing room, a dining room, and as a chamber for invalids" (351). The rooms are linked with bells, just like a city with telegraph lines. At the end of the "city" was a secluded walk known as "the love lane," where couples met. The steamship even had its own "sovereign," whose orders, according to Helmuth, "are obeyed with alacrity and precision" (65).

Helmuth's western contemporaries would have wholeheartedly agreed with his characterisation of the steamship as "a city on the sea." To them, these vessels meant more than a show of technological superiority. Explorers and travelers to Africa and Asia had long been aware of the demonstrative utility of the steamship against "unruly" natives and arrogant mandarins. As Michael Adas notes, for example, they exploited African confusion about the steamship and terrorised them into submission by inviting them on board and telling them that the funnel was a large cannon (161). To the Chinese, the steamship was often utilised as a platform for demonstrating military superiority, the discipline and skills of the navy, maritime procedures and protocol, and the daily life of the upper class. The *Chinese Repository* of 1835 records the Chinese reaction to the first appearance of a small steamer, the *Jardine*, sailing near the Bogue against Chinese regulations. A Qing inspector boarded the ship with over a hundred soldiers. After making sure that it was free of arms and cargo, the inspector received a most unusual treat from the British merchants on the steamer. He "partook with a great deal of zest of several glasses of sherry with some biscuits and some snuff." According to *The Chinese Repository*, the treatment worked instantly to disarm him –

to the point of making him friendly towards the British merchants ("Journal of Occurrences" 438). Conversely, a peaceful visit could be turned into a show of terror for the desired effect. Such was the case when Commodore Lawrence Kearny, American commander of the US squadron in the East Indies, anchored the frigate *Constellation* in the Chinese inner waters in the spring of 1842 and invited a Chinese admiral aboard for observations. The editor of *The Chinese Repository* draws attention to the changing facial expressions of the admiral, when he writes: "the marines particularly attracted his attention, and for several minutes, while going through their evolutions, he stood like a statue fixed in perfect amazement." Without warning his guest, the captain ordered a military demonstration in the space surrounding and next to the admiral. As the marines rushed up the deck with swords and bayonets to take their proper stations, "the lines of his face were screwed up to the highest pitch he could command" ("Reminiscences of a Trip" 333).

After the Opium War, steamships harbored at treaty ports served as living museums of western culture. Guo Songtao, a high-ranking official in service of the Anti-Taiping forces of Zeng Guofan, arrived in Shanghai in 1856 to raise funds for Zeng's army. He was invited to tour the English Consul's paddlewheel steam mail. The ship was a mixture of the genteel dimension of Victorian culture and the military side of the British Empire. These two aspects appear alternately in a long sequence of observations Guo wrote in his diary. He notes the "extremely handsome foreign (*yi*) managers," respectfully standing by the staircase to guide the guests, followed by dozens of cannons on the deck weighing thousands of pounds each. He then observed the English Consul who warmly "took off his hat" and "held hands" with him upon their first meeting, followed by a visit to the enormous copper-plated paddlewheels and boilers. Finally, his attention dwelled on the banquet hall, with the long dining tables with glistening silverware, full platters of cakes, biscuits, wine. The walls of the hall featured vividly painted portraits of monarchs and explorers; one of them, of an elderly man, "had the lofty air of a Daoist" (Guo 32-33). The reader senses wonder and tension in Guo's juxtaposition of these two sides of Victorian culture. He had known that these foreigners were clever handcrafters, but it was not until he paid a visit to the ship's interior that he linked them with a sense of culture, ritual and historical memory. In Guo's description, the steamer was more than a military vessel or mere technological instrument; it embodied a culture confident in its own rules, etiquette and products. The alternation between genteelness and force tempered but also gave coherence to the menacing appearance of iron, steel, and guns.

From the mid-nineteenth century onward, Euro-American passenger steamers carried Chinese diplomats, travelers and students to Europe, the Americas, and elsewhere in Asia.[3] The demonstrative aspect of the steamship was well understood by China's "western advisors," who were often entrusted to make travel arrangements and accompanied the Chinese on their transoceanic voyages. The most telling example of this comes from Halliday Macartney, Secretary of the Chinese Embassy in London in 1876. An ex-British army surgeon now under Chinese employment, Macartney "employed all his tact and influence" in order to change the embassy's itinerary – to keep them off a French steamer and get them on one belonging to the British steam company, P & O. He also made sure that the whole journey from Shanghai to London should be on one steamer, so that the Chinese Ambassador "would be impressed by stopping *en route* at only British points of call – the six great stages of [the] Imperial tracks across the Oceans, viz. Hong-Kong, Singapore, Ceylon, Aden, Malta, and Gibraltar" (Boulger 265). At the request of Sir Thomas Wade, British minister to China, P & O delayed the steamer two full days to wait for the embassy, at considerable expense (Frodsham 1).

The space on and traversed by the steamship was, to borrow Mary Louise Pratt's phrase, a "contact zone" where peoples of different cultures came together "within radically asymmetrical relations of power" (6). Chinese passengers were embedded in a set of new relationships exhibiting European cultural practices, imperial dominance, and ideas concerning race and class. In this sense, the journey on the steamship can be seen as a packaged pedagogical tour preceding their arrival in Europe and America. Yet the Chinese passengers were not passive. Thrown into the midst of hundreds of passengers of various nationalities, languages, and customs, many turned to writing and meditation as an attempt to deal with their feelings. Their journals reveal a mixture of disorientation, anxiety and intense fascination. The daily routine of their shipmates' activities helped them gain a sense of normality and control of their physical environment. Some naturally devoted their time to studying the interior of the ship, the menu, dining customs, and the dynamic of the guests. These meticulous, if mundane, notes of dining schedules, table layouts, and daily menus, suggest a degree of internalisation of the western customs and an anxiety to perform appropriately. Accommodations of passengers of different classes are duly noted, with added emphasis on the contrast between the First and Third classes. For example, Zhang Deyi, a student translator who sailed to Europe accompanying envoy Binchun in 1866, notes that first class passengers had "three snacks and two grand meals" daily, whereas the "lower guests" had a "small basket of white rice, no vegetables or tea, just barely above the coarsest meals" (Zhang, Hanghai 449). Their time was variously occupied by conversing with fellow passengers, keeping track of the ship's location, playing games, reading, writing, and listening to the ship's band.

More importantly, the steamship was a place where Chinese travelers observed the rules of contact between the coloniser and the colonised and contemplated where they stood in this relationship. The space that the steamship traveled through was one of radical differentiation between the Europeans and the non-Europeans: the former were the pampered masters, while the black slaves stood on the opposite end, toiling away between the ships' coal compartments and the furnace. The rest were cast as exotic curiosities. As Binchun observes:

> On this ship are people from twenty-seven nations speaking seventeen languages, each wearing exotic and strange clothes: some look long and lean, some gigantic without match...some with crossed sideburns and puffy hair...looking like martial opera and ghost-beating drama of the Yellow Sect. People from the major European nations are always an exception in that most of them are handsome and civilized, and their womenfolk are also beautiful and graceful, wearing light frocks with delicate trim (Binchun 100-101).

According to literary scholar Tian Xiaofe, Binchun draws on the rhetorical strategy from fictional and theatrical genres related to "heaven and hell" to dichotomise the appearances of Europeans and the non-Europeans (172). By approvingly describing the Europeans as "handsome" and "civilised" while portraying the others as exotic and vulgar, he not only distanced westerners from non-westerners, but also drew himself close to the former. Accounts from other travelers show a similar tendency to empathise with the Europeans. Chinese elite passengers perceived themselves as being on a level with Europeans and Americans and internalised their hosts' sense of superiority to the black and Indian servants. Guo Liancheng, who traveled on board a British steamship to Rome in 1859, made no attempt to conceal his contempt for the black people on board: "the blacks, when dining, never use knives and forces, nor chopsticks. They sit on the floor; they pour yellow pepper water over cold tubs of rice, and use their black hands to shovel rice balls into their mouths."

(Guo, Xiyou 18) When the ship sailed across the Mediterranean Sea, Guo records what he hears about the Libyans: "the natives' bodies are pitch black, only their teeth are white," and "they are the ugliest people in the world, their land nicknamed 'country of the black men'," or 'country of the dog heads'" (31).

Furthermore, Qing envoys, diplomats, and private travelers on transoceanic steamers contrasted European colonists with native people in Southeast Asia, Africa, and the Middle East. Every fueling stop was a demonstration of European superiority over the native populations. Under European tour guides, the Chinese were shown the sturdy fortifications, the neat rows of garrisons, the broad and clean streets, and the newly built governor's mansions. A most common feature of their writing was the sharp contrast between European wealth and power and the pitiable state of the natives. In Annam, Zhang Deyi observes that most natives houses were "half submerged in water, nearly dilapidated to the point of collapsing" whereas the French built western-style houses further south; they not only paved roads but also dispatched soldiers to patrol them (Zhang, Hanghai 460). Binchun likened some colonial outposts to "peach blossom springs," a reference to a 5th-century poem about a man's discovery of a miniature utopia hidden from a world of chaos (97).

A number of accounts show a belief that benevolent European powers were a sustaining lifeline to natives who would otherwise have lived precariously at nature's whim. It was a common sight, from the vantage point of the ship, to see crowds of peddlers attempting to sell native goods to the passengers: handmade jewelry, minerals, spices, woven goods, wild game, brushes made of animal hair. In Singapore, for example, Bajau children surrounded the steamer on small wooden boats and whistled to ask for coins. They then dived into the water and emerged with the coins tossed by the passengers, laughing and clapping – a tradition still in practice today as a tourist attraction. The embedded message of colonial mastery over native populations – the mighty steamer towering over primitive hand-carved boats, affluent passengers dispensing copper coins to impoverished naked children – would not have been lost on the Chinese passengers of the nineteenth century, many of whom independently recorded it. In Aden, the British owned seaport city in modern day Yemen, Zhang learned that the British built the city from scratch by transporting cargos on steamships and made every provision to save the native population. He says: "The land has absolutely nothing to produce, and every necessity – staple and animal – must come from elsewhere" (470). The steamships drew a clear line between civilisation and barbarity, making it only too easy to treat the non-European populations around the world as a service class catering to the crew and members of the ships, in desperate need of European salvation.

Not all Chinese passengers bought into the Eurocentric rules and the outlook in the packaged tour. Liu Xihong, Vice Minister to England in 1876, adamantly refused to play along with what he deemed the humiliating standards aboard ship. Halliday Macartney, in his letters from the journey, captured a few anecdotes relating to Liu.

> 2 Sunday. – The two Ambassadors, having resolved on trying foreign food, as far as Hong-Kong at least, came to table. The passengers and the whole ship, indeed, were much impressed with the bearing and manners of the first Ambassador, but were much less so with Lieu tajen, who on several occasions committed many grave breaches of good manners. During dinner he choked and spat, and on one occasion, after an unusually successful attempt at expectoration, called his servant and ordered him to bring the spittoon, into which he spued rather than spat. This was exceedingly disagreeable to the gentlemen sitting on the opposite side of the table, who turned away their faces and manifested the most decided signs of disgust.

> 3 Monday. – At breakfast he called for an egg, and proceeded to open it in such awkward manners that his fingers went into it, his long nails, or rather claws, meeting from opposite sides. With the yolk of the egg dripping from the points of his fingers and streaming over his hands he presented a curious specimen of the *corps diplomatique*.
> 4 Tuesday. – Having finished his dinner before the rest of us, he retired from the table and entered his cabin. We were still at our wine when his servant was seen to snatch up a lamp and go into his state-room. The captain instantly sent one of the stewards to see what he was doing with it, and in a minute he returned stating that H. E. was enjoying his smoke. The captain sent back the steward for the lamp, and with instructions to put out the Ambassador's pipe. That being carried out H. E. accompanied by his servant, went upstairs apparently in anything but the best of humors (Boulger 267-68).

Macartney's letters points to the fact that Liu's failure to conform to western dinner etiquette made him something of an outcast during the journey. Liu's attitude towards western culture was significantly hardened by his estrangement on the steamship. He resolved to pit himself against Guo Songtao, the minister who played along with westerners according to their rules, and resisted the general attitude of accommodation that Guo championed. Soon after the mission arrived in England, Liu began a feud with Guo over a multitude of issues of etiquette, and embassy administration. A persistent theme in Liu's objection to Guo was that by conforming to western rules, he compromised the dignity of the Qing Empire. In the following months while the pair worked in London, Liu duly noted and even spied on every occasion where Guo performed according to western etiquette. This list he compiled, which includes instances of Guo's "requesting Western music" at a concert, he sent back to the court as evidence of Guo's treachery (Zhang, Sixiang 157-168). Liu has been criticised by modern historians for his ultraconservatism, but his decision to target Guo's conformity with Western customs suggests an understanding of culture as a tool of imperialism, a realisation that behind the seemingly petty disputes over etiquette and ritual was the reality of clashing empires.

In the latter half of the nineteenth century, the steamship gradually moved from the periphery of Chinese technical vision to a place of centrality. The standardisation of scientific and technical terms, slow and contentious though it was, gradually infused the steamship with ideas about enlightenment and progress. By the turn of the century, it would be difficult to find anyone who associated steamships with the older tradition of wheeled boats. As perceptions of Chinese and western ships widened, stories of native ships focused on dichotomizing the two: the Chinese as charming, quaint, and backward, and the western as scientific, practical, and normal. Jiang Menglin, a Republican educator born in the 1880s, tells the story of his father's experiments with the steamship. A wealthy Qing banker who loved inventions and handcraft, Jiang's father attempted to design his own man-powered "steamboat." The launch of the ship drew an excited crowd who "gesticulated as if helping the boat to go faster"; "some even lent their arms to the handle and helped to turn the wheels" (Chiang 32). The boat, being powered only by men, would only reach the speed of a typical rowboat. Jiang describes how he persuaded his father to give up his experiments:

> Even when it failed, however, Father never gave up the idea of making a further attempt until he was told the story of James Watt and his boiling kettle. Then he began to see that there was something deeper than appeared in the thing itself. From that time on he was heart and soul for giving his boys a modern education which

> would someday enable them to learn the foreigners' "tricks" in making wonderful things. (Chiang 32-33)

What stopped Jiang's father from keeping up with his experiments was nothing less than a denial of the legitimacy of his system of knowledge. Stories like Watt and his boiling kettle, Newton and the falling apple, and Galileo and the swinging chandelier, propagated by the new education system, became part of a new folklore about science. These stories were in no way inherently "un-Chinese," but together they constituted a symbolic regime of modern knowledge, the antithesis of traditional knowledge. Years later, the "steamer" was found rotting on the banks of the canal, a forgotten relic of a bygone age.

Within this new regime of knowledge, *huolun chuan* was no longer an appropriate name for the steamship. It was criticised by no less an authority than Yan Fu, a prominent translator at the turn of the century, for being neither elegant nor accurate, a product of carelessness and vulgarity (Vlahakis 197). The steam engine had a new word – *qiji* (steam machine) – taken from an 1868 text produced by Alexander Wylie and Xu Shou; concurrently, *ji* became a common suffix to western machines (Zhang 181). Similar to the Japanese convention, the prefix "qi" was used in combination with other characters to form a set of new words for steam-powered machines. Thus, rather than being associated with "wheels" and the Chinese tradition, the steamship was placed into a semantic field demarcated for western inventions. It was recognised as a marker of difference between the East and the West, rather than a variation of traditional designs with small modifications. The messianic Kang Youwei pronounced Watt's steam engine as "the ancestor of all change for myriad things" and "a magic space-shrinking tool" (Kang 56). Using western technology as an inspiration for a rejuvenation of Chinese culture, Kang's passionate call echoes the goals of the self-strengthening movement between the 1860s and 1890s. Yet the connection between the power of steam and civilisation, so apparent to Kang, did not emerge immediately in the decades after the Opium Wars, but from a process laced with multilayered negotiations between Chinese engineers, officials, travelers and diplomats within the larger scope of European imperialism.

Notes

[1] The author extends her sincere gratitude to Stephen Davies for pointing out the connection between Wang Tao's comment and American innovation in ship designs following the Civil War.

[2] In the case of Benjamin Hobson's Bowu xinbian, a homophone with a water radical is used to indicate that "steamed qi" has a different chemical property from other forms of qi.

[3] A large number of Chinese passengers on steamships in the late nineteenth century were coolies and slaves being shipped to the plantations in South America and South East Asia. Their experience, in sharp contrast with that those of the subjects of the present article, deserves a separate investigation.

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