Mapmakers in China and Europe 1800–1844: The Perspective of William Huttmann, Royal Geographical Society

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Abstract From the late 1700s until 1880, no official or comprehensive map based on first-hand surveys of China was created in Europe. In Qing China (1644–1911) as well, cartographers relied on the Kangxi Atlas maps until the 1860s and 1870s. These were based on exploratory surveys and created with the consultancy of Jesuit mathematicians, and had been revised and augmented several times by the Yongzheng (r. 1722–1735) and Qianlong (r. 1735–1796) emperors. Following the signing of the Treaty of Nanjing in 1842, the Royal Geographical Society in London asked the geographer William Huttmann to recommend cartographic works from which to compile a new and updated map. This paper analyses Huttmann's recommendations, placing them into the cartographic context of 1844, in order to investigate the cartographic and geographic situation in-between the large surveys undertaken during the imperial age of the eighteenth century and the colonial age at the end of the nineteenth century. As a foundation for a new map, Huttmann recommended maps of Qing cartographers to be taken as a basis, as well as the survey maps produced during the Kangxi era with the consultancy and co-authorship of Jesuit missionaries. The information provided therein was to be supplemented by reports of individual travelers. Huttmann does not mention and recommend the maps of the smaller, newly evolving geographic societies and institutions in Europe, which continued to develop scientific cartographies, but which did not include new first-hand materials.

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1 Introduction

The China War of 1860, last chapter of the Second Opium War (1856–1860) and particularly the British and French expeditions against Beijing in early fall of that year, saw 17,000 troops, among them Sikhs and Chinese coolies from Hong Kong, marching towards the Chinese capital.[1] One rather significant problem became quickly evident: this particular area of Northern China— the area between the Dagu 大沽 forts at the coast and Tianjin and Beijing, was geographically rather underexplored and no detailed maps of the area existed.[2] The problem was solved on the spot partly by asking locals in the Tianjin area for the proper way to Beijing, and partly by the immediate reconnaissance of the British and French engineers, who were always sent ahead in order to chart the way for the next days. Indeed, the first looting of the Yuanming Yuan 圓明園, summer residence of the Qing emperors, in early October 1860 by French troops was put down to the fact that they had lost their way and had been misdirected by a local towards the Yuanming Yuan (Chen 1984: 166).

European ignorance of Northern Chinese geography was a result of political relations. For 44 years, since the failed Amherst mission in 1816, the North of China had been closed off to Europeans.[3] The five trading ports opened to foreign, mainly British, trade after the first opium war in 1842 were located in Shanghai and further south towards the coast of Guangzhou. For ventures in the North, the expedition of 1860 (as well as the failed Amherst mission in 1816) had to rely on maps that had been modeled after a Qing atlas from 1760 (Eben von Racknitz 2012: 143).

The maps in this atlas had been created after extensive, decade-long survey expeditions in the Qing empire, and been executed cooperatively by Qing cartographers and Jesuit missionaries during the first half of the eighteenth century. A first woodblock print version of their findings was presented under the title of *Huangyu quanlan tu* 皇與全覽圖 (Overview maps of the Imperial Territories) to the Kangxi emperor (r. 1661–1722) in 1718. A version of this 'Kangxi atlas' as it is known in Western scholarship, reached France in 1721 and was the model for the maps published by d'Anville in 1735, accompanying a four-volume work on China prepared by the Parisian Jesuit Jean-Baptiste Du Halde (Cams 2014: 51). Published in English, German and Russian during the following decades, it found wide distribution in Europe.

[1]I would like to thank the organizers of the fruitful symposium "Mapping Asia: Cartographic Encounters between East and West" in Leiden in September 2017 of which this paper is an outcome. I would also like to thank Mario Cams for his suggestions and Josh Stenberg for his proofreading.

[2]The China expedition of 1860 and the looting and the burning of the Yuanming Yuan are described in detail in my book (Eben von Racknitz 2012). A map of the Dagu forts and the march of the troops towards Beijing was later published in: Dépôt de la Guerre: 1865, and in Loch (1900).

[3]The Amherst mission is still largely underexplored, but Gao (2016: 595–614) provides an introduction.

Indeed, in Europe, since the late 1700s, no 'official' or comprehensive map of China, based on new actual geographical surveys, would be created until new materials became accessible in the 1870s. In China, cartographers relied on the maps of the Kangxi Atlas until the 1860s and 1870s. These maps had been revised and augmented several times at the request of the Yongzheng (1722–1735) and Qianlong (1735–1796) emperors in order to include newly conquered areas. In the literature, these maps are referred to as Yongzheng atlas and Qianlong atlas respectively.[4]

After the First Opium War (1839–1842), the 1842 Treaty of Nanjing stipulated the opening of five ports along the Chinese coast for foreign trade. This produced a demand for new maps for private travelers and merchants, particularly in the British community. Thus, in 1844 the Royal Geographical Society, founded in 1830 in London, turned to the geographer and missionary William Huttmann, asking him to sketch out a history of Chinese and Qing cartography and to compile a short account of the principal maps of China and its dependencies, and to suggest the best mode of how to create an improved map of the Qing empire.[5]

Huttmann thus gave an oral presentation on this subject one evening in 1844 to the members of the Royal Geographical Society. His work is of interest insofar as it provides an inventory of cartography on the Qing empire during a time when the political and cultural relationship (among others) between the Qing empire and Europe was changing. Also, within the discipline of cartography, the early nineteenth century certainly was, at least in Europe, a phase of transformation and development. The European cartographic system and scientific methodology was still evolving and had not yet become a globally acknowledged system; rather, only identified 'islands' had been mapped with European cartographic methods (Osterhammel 2009: 133). Qing China did not yet belong to these newly mapped 'islands'; only around 1900 did new and detailed narratives, travel depictions and descriptions from all parts of China and all provinces of the empire become available, written by geographers and geologists and other natural scientists. By then, the interest in maps had shifted: in the colonial age and after 1870, maps were no longer conceived of as cultural and social representations of an empire. Rather, they were understood as objective, scientific depictions on a representative scale, that enabled the colonial official to gather exact geographic information (Lü 2016: 38).

How then, did Huttmann evaluate Chinese (Qing) and European geography and cartography, and how did he make a difference? Biographic information on the missionary and geographer William Huttmann is rather limited and it remains unclear when he was born. A brief obituary, appearing in 1845 in *The Annual Register* gives a basic overview:

[4]Mosca (2013: 107–114) gives a very detailed account of the Qianlong court surveys and the involvement of the Jesuit missionaries.

[5]Huttmann presented the result of his survey in 1844 to the Royal Geographic Society and published it later in their Journal: Huttmann (1844: 117–127).

> In Tonbridge street; New road, Mr. William Huttman, a gentleman distinguished for his knowledge of matters relating to China and the Chinese language, formerly Secretary of the Royal Asiatic Society, and also to the Oriental Translation Fund. He had likewise for many years been a contributor to various publications of articles relating to the language, antiquities & c. of China, Japan, Thibet, Chinese territory etc. (The Annual Register 1845: 275)

Furthermore, it is known that he corresponded with Robert Morrison in 1821, and later had been discharged dishonorably from the Royal Asiatic Society in 1832.[6]

No other records of his life can be found. Also, his brief account on Chinese cartography (including Qing cartography), published in the Journal of the Royal Geographical society is not without mistakes; but there are several reasons to critically approach his 1844 report to the Royal Geographical Society as the foundation of our investigation into the question of cartographic depictions of China between 1800 and 1845. Firstly, as a former secretary of the Royal Asiatic Society, he reported neither to the military, nor to the trading companies. He was competent in the relevant languages, among them Chinese, Manchu, Mongolian and Tibetan. Secondly, as distinct from the famous armchair cartographers in Europe, who had never left Europe but who, at the beginning of the nineteenth century, would start to develop their craft in a way that would later become scientific standard, Huttmann had actually lived in China, valued Chinese and Qing cartography, and was thus able to comprehensively judge the situation. Comprehensive surveys of the kind that he introduces had been made by Jesuit missionaries, who had their own particular agendas. His client, however, the Royal Geographical Society in London, might be seen as having a relatively uncommitted perspective on the evolving discipline of cartography and geography and its state in Europe in 1844. In what follows, I will analyze the geographic works mentioned by Huttmann, placing and interpreting them in historical context.

2 Cartographic Depictions of China up to 1800

The question of whether Qing cartography was, scientifically speaking, the equal of European cartography, and the role of European Jesuit missionaries in the transmission of scientific principles, has been much debated. Joseph Needham, for example, has emphasized the fact that indigenous Chinese cartography had its own scientific roots (Needham 1959: 457–590). Cordell Yee on the other hand argues that, by focusing on the history of science in China, one tends to overlook other, what he terms, 'traditional' Chinese maps (Yee 1994: 170). These, however, are pictorial and not created to-scale, though accompanying texts do often contain the exact measurements.

[6]Huttmann (1821: 566–577), found in: Lehner (2004: 40). The discharge is announced in: Asiatic Journal 1832: 231.

Laura Hostetler also suggests that both types of cartography (Chinese indigenous and the Qing survey maps created with Jesuit mathematical knowledge) worked in 'tandem' and not antithetical to each other. She argues persuasively that the success of the Qing emperors in extending the empire during the early modern period (seventeenth to eighteenth century) was in part due to the ability to communicate the expansion of the empire both internationally in the emerging language of scaled maps, and at home. Therefore, maps depicting the early Qing empire are hybrid maps combining both European and Qing mapping techniques, and appealing to the elites of the Qing empire as well as Europe (Hostetler 2009: 98).

After the eighteenth century, it was generally assumed in Europe that the Qing empire's geographers were much better informed on the geography of Central Asia than their European counterparts (Osterhammel 2009: 133). Even Huttmann gives credit to their cartographic practices when he justifies his recommendation of Chinese geographical and cartographical works by a quote from d'Anville, who edited the Jesuit atlas during the 1730s: "The Chinese originals do great honour to China, and prove the superiority of the Chinese, as geographers, over every other Asiatic people" (Huttmann 1844: 118).

But which maps did Huttmann recommend? A map to be published after 1844 by the Royal Geographical Society would, according to Huttmann, have to be subjected to modern scientific European standards of mathematical measurement, as they had been transferred by the Jesuit missionaries to the Qing court in the seventeenth century. Although Huttmann mentions Jesuit and Qing geographical works alike, most Chinese cartographic works he mentions are in a way connected to the European cartographic tradition. The only atlas made entirely in China and published before the Kangxi atlas is the *Guangyu tu* 廣輿圖 (Enlarged Terrestrial Atlas) which he attributes wrongly to the Yuan Dynasty geographer Zhu Siben 朱思本 (1273–1333) and his travels in the Yuan empire between 1311 and 1320. The *Guangyu tu* is in fact a Ming-dynasty work, compiled in 1579 by Luo Hongxian 羅洪先 (1504–1564), who, however, based his work on the *Yudi tu* 輿地图 (Terrestrial map) by Zhu Siben.

In Huttmann's report, the Kangxi atlas occupies a very prominent position, much more so than the revised versions created under the Yongzheng and Qianlong emperors. It was commissioned by the Kangxi emperor, and compiled by means of a decade of surveying work in the Qing empire by a group of Jesuit and Qing geographers. The maps resulting from these surveys were the foundation for the maps published in Europe by Jean-Baptiste Bourgignon d'Anville (1697–1782) in 1735 (Cams 2014: 51–69).

The Yongzheng emperor did not send out new survey expeditions, but used the already compiled survey maps of the missionaries as foundation for a revision. In 1725, Fr. Régis (1663–1738) and Fridelli (1673–1743) drew maps for this revision extending into Central Asia with information obtained from local Qing officials. The ambition to feature the most scientific (i.e. mathematically correct) maps is demonstrated by the depiction of Russia, which, it has been thought, may have been taken from a German atlas that in 1727 was given to the Yongzheng emperor by the Serbian envoy in the service of Peter the Great (1672–1725, r. 1721–1725), Sava Vladislavich (1669–1738) (Mosca 2013: 106).

The second half of the eighteenth century witnessed costly wars carried out by the Qianlong emperor, the largest and last expansion of the Qing empire and the incorporation of Xinjiang. In 1746, commissioned by Qianlong, the last compilation of imperial geography was compiled (without Jesuit involvement), the *Da Qing yitong zhi* 大清一統志 (Comprehensive Gazetteer of the Great Qing Realm). The Kangxi and Yongzheng missionary survey maps, too, were revised and published anew in 1761, now including India, Afghanistan, Persia and Arabia. This map again came to the attention of foreign traders, and apparently deemed to be highly useful: a copy of it is mentioned by Huttmann as having been presented in 1825 to the East India Company by John Reeves (1774–1856).[7]

Returning to the Huttmann text: he omitted the Yongzheng maps and describes only fleetingly the survey expeditions between 1756 and 1759. As a result of the victories over the Junghars and the Khojas, Qianlong dispatched new survey expeditions consisting of the Portuguese Jesuits Felix da Rocha (1713–1781) and Joao d'Espinha (1722–1788) as well as the Qing officials He Guozong 何國宗 (d.1767), Minghatu 明安圖 (1692–1763) and Fude 富德 (d.1776).[8]

Huttmann mentions only the two Jesuits, while the Qing participants, cartographers and geographers, have been identified and uncovered during the last 15 years. Their findings were compiled with the information given by locals, appearing in a new survey in 1761, the *Xiyu tuzhi* 西域圖志 (Illustrated gazetteer of the Western Regions). Hallerstein, Anton Gogeisl, da Rocha and d'Espinha served as consultants and co-authors in this project. Michel Benoist completed the copperplate printing of the 1761 edition, most likely between 1769 and 1771; in 1773, the Jesuit order in China was disbanded, but some missionaries stayed on and participated in 1774 in the creation of survey maps during the Second Jinchuan War (1771–1776). In 1776, the Qianlong emperor gave his last mapping task to the Jesuits and ordered the area around Mukden to be charted (Mosca 2013: 111).

Huttmann mentions the surveys done between 1768 and 1773 by Jesuit missionaries Hallerstein, d'Espinha and da Rocha, whose work informed the second updated edition of the *Xiyu tuzhi* from 1782 (the last one on which the Jesuits consulted).[9] Huttmann esteems these maps important in so far as they had been made at the orders of general Agui, whom he believes to have been competent. The maps also included the Miao areas, newly conquered in 1775 [for a biography on Agui refer to Hummel (1943: 6–8)].

Large cartographic projects, sponsored and supervised by the Chinese emperor and carried out cooperatively by European Jesuits and Qing cartographers, came to an end in around 1776 and with it the 'consultancy', involvement and co-authorship

[7]Huttmann (1844: 120). For an exact account of the Jesuit involvement of the creation of maps please refer to Mosca (2013: 110 ff).

[8]Mosca (2013: 107). The Khojas were a group of religious leaders ruling the Oases of Southern Turkestan, and before 1755 under the rule of the Junghars. Perdue (2005: 289 ff), I would like to thank Matthew Mosca for his insight in this topic.

[9]Huttmann (1844: 121). Huttmann believed them to be the foundation for the maps that Klaproth published in his translations of Timkovski.

of the Jesuit missionaries. Rather than being responsible for the whole process of map making, it is more reasonable to assume that the Jesuits were in charge of the proper mathematical calculation during the production of the maps, but had no say in the final drafts, which remained in the hands of the Qing officials and court map makers [this argument had been made by Mosca (2013: 114)].

The services of Jesuit mathematicians, it seems, were no longer required during the late reign of Qianlong. Between 1784 and the 1840s, only a handful of European Catholic and Russian missionaries lived in Beijing, the capital of the Qing empire. They had by and large lost their influence on the Qing emperors and their presence in the city was tolerated rather than embraced. Whereas the Qianlong emperor still was very interested in the further development of other parts of his scientific projects, no new missionary surveys were carried out. Meanwhile, most of the Kangxi-era Jesuit mathematicians as well as their disciples had died. By 1790, none of these scholars was still alive: Benoist and Hallerstein died in 1774, da Rocha in 1781 and d'Espinha in 1783, by which time their expertise was no longer required (Mosca 2013: 113).

3 Cartographic Depictions of China After 1800

Rather than withdrawing inwards and excluding themselves from the world, as has been suggested, the Qing officials, and particularly the emperors, stayed open, interested and curious to all forms of Western technology, though they denied this publicly for reasons of domestic policy (Waley-Cohen 1993: 1544).

Yet, when the Qianlong emperor famously refused to establish trade relations with Great Britain and feigned disinterest in the proffered Western technological objects, this was interpreted as xenophobia, resistance to progress and close-mindedness, an attitude Europe considered intolerable, given the political, philosophical and technological developments of the eighteenth century. Additionally, Europe had developed a desire of supremacy in its interpretation of other cultures: thus, the closed Canton system was seen as a contradiction to the free world markets promoted by Adam Smith. Through European eyes, the relatively traditional societies compared unfavorably to changes of their own post-revolutionary and industrializing societies (Waley-Cohen 1993: 1543). China, on the other hand, was not wholly hostile to certain technologies. Chinese mapmakers continued to use the Jesuit technologies of mapmaking in their own cartographic updates, which confirms that Qing geographers, rather than imitating European cartographic traditions, integrated such practices creatively into their own cartography (Cams 2017: 188).

In 1844 Huttmann specifically recommends that two Chinese atlases be taken into account. The first of these is the update of the missionary surveys published in 1832 by Li Yanghu, of which, however, no copy was obtainable in England at the time, as Huttmann wrote.[10]

Secondly, he recommended the use of a Chinese atlas published by Li Mingche 李明徹 (1751–1832) in 1825 under the title of *Da Qing wannian yitong dili quantu* 大清萬年一統地理全圖 (Complete Geographical Map of the Everlasting Unified Qing Empire). Li Mingche had been acquainted with European principles of geography, writes Huttmann, and his work included one general map of the Qing empire, as well as forty special maps of the provinces which contain the latest information on the cities and place names (Huttmann 1844: 125).

After this assessment, Huttmann concludes with the recommendation that all the information obtained from these several maps should be used for the creation of a new map. As the scientific foundation for the new map, he recommends the Kangxi map, despite the more recently printed version of the Qianlong map. The Kangxi map, in his estimation, was mathematically much more reliable, as had been verified by the travels of Sir Francis Davis (1795–1890) in 1816 and by Igor Timkovski (1790–1875), whose maps had been published by Julius Klaproth (1783–1835).[11] The Li Mingche map, on the other hand, he deems relatively reliable and up-to-date with respect to the administrative system and the names of major and minor cities and villages; its use is recommended for these purposes.

In both assessments, he basically reflects the opinion of some of the elite Chinese scholars working in the field of cartography and geography at the turn of the nineteenth century, who had become skeptical and more critical towards Jesuit techniques and scientific methods. Generally, scholars of the *kaozheng* 考證 or evidential scholarship movement at the end of the Qianlong era considered Jesuit writings and methods important, but not entirely reliable. Li Mingche's work for example was commissioned as the part of a Qing local gazetteer by Ruan Yuan 阮元 (1764–1849).[12] Li Mingche, a daoist monk from Guangzhou, was an exceptional figure in so far as he had no connections to the Confucian elite usually tasked with mapmaking. At the end of the nineteenth century, the Jesuit survey maps came to his attention and he studied their calculation techniques. Ruan Yuan by coincidence met him through one of his aides, was impressed by Li's mathematical skills adapted indirectly from the Jesuits, and asked him to do the cartographic mathematical calculations for his gazetteer, thus turning this gazetteer into one of the most exact ones available at the end of the nineteenth century (Mosca 2013: 211).

[10]This map is mentioned in the Chinese repository, Vol. IX, p. 64. Huttmann assumes it to be in the Royal library in Paris as mentioned in a "Journal asiatique" in 1843. I have not been able to identify Li Yanghu.

[11]Sir John Francis Davis, later governor of Hong Kong, published his work in 1836, Timkovski's travels 1820–1821 were translated into French and published by Julius Klaproth in 1827, together with an atlas.

[12]On Ruan Yuan see Wei (2006).

Huttmann concludes his presentation to the Royal Geographical Society with the statement that, if information from these sources is combined, it would become possible to create a map that is actually more precise than any other map on any other Asian country, India included. However, concerning the financing of a map like the one he proposes, he is not optimistic:

> The statements in this paper show the imperfection of even the newest and best maps of the Chinese empire published in European languages, and that abundance of excellent materials for the construction of a new and comparatively perfect map of the Chinese dominions exist either in England or in China, whence they could easily be obtained. The only point that remains unsettled is who should defray the expense of compiling and engraving such a map or atlas. Had the connection of the East India Company with China continued, there is scarcely any doubt that, with their accustomed liberality, they would have defrayed the expense; and even now, although that connection has been dissolved, it is not at all improbable that they would afford pecuniary assistance in the execution of such a work, especially as their territories approximate to the Chinese empire both on the north and east. Although her Majesty's Government does not usually aid such undertakings, yet the great political and mercantile interest this nation has in China may perhaps induce the ministry to afford assistance in the publication of so useful an auxiliary to our commerce as a good map of China. Many individuals also, who are desirous of promoting geographical knowledge, would be likely to contribute funds towards the publicatlon of such a work if it should be undertaken by your Society. Neither should this fact be overlooked, that it is almost certain that the proceeds of the sale in Europe, America, and China; would ultimately repay a considerable proportion if not even the whole, of the outlays (Huttmann 1844: 127).

Huttmann was writing at a time when no more than a few travelers had been to China. Of the Europeans, he mentions solely Timkovski, his translator Klaproth, and Davis (Davis 1836; Timkovski 1827). He omits the travel reports from the Macartney mission of 1793 as well as the report by Henry Ellis (1777–1855), who published on Lord Amherst's 1816 embassy.[13] Robert Fortune (1812–1880) as well as Evariste Huc (1813–1860) would publish their very influential observations and travel accounts only later.[14] He does briefly mention Karl Gützlaff (1803–1851), who did pioneering work during his three travels in the 1830s, but not Joseph de Guignes (1721–1800), who travelled at the beginning of the nineteenth century between Beijing and Manila (De Guignes 1805).

Neither does he include other scientific maps on China, particularly survey maps which had been created in Germany, among them the maps and works by Adolf Stieler (1775–1836), Carl Ferdinand Weiland (1782–1847), as well as Hermann Berghaus (1828–1890) and Friedrich von Stülpnagel (1786–1865), who also worked in Weimar. Though none of these men had been to China or Central Asia (they compiled the information for their maps from other maps, already published in Europe), their vision of the world would influence the geographically interested citizen until far into the twentieth century.

This seems to reflect the general situation of cartography in Europe between 1800 and 1860. On the one hand, the large and rich East India Company, who

[13]Ellis (1817).

[14]Fortune (1847, 1853, 1857), Huc (1855–58), Gützlaff (1834).

certainly would have paid for such an important undertaking, had been disbanded. On the other hand, new geographic interest was revived. Huttmann mentions St Petersburg and Paris as centers of cartography concerning China, but elsewhere, too, geographic interest had started to flourish. In place of the prosperous East India Company, many new privately initiated societies were founded. The Royal Geographical Society in London, to whom Huttmann reported, is one example. But also in Germany there was an upsurge in interest in geographic information from everywhere around the globe, and thus Carl Ritter (1779–1859), with the participation of Alexander von Humboldt, had founded in 1828 *Die Gesellschaft for Erdkunde* in response to the rapid expansion of a literate middle class hungry for exotic and travel narratives, especially geographical and ethnographic accounts. Among these were also *Petermann's Geographische Mittheilungen*, published by Justus Perthes (1749–1816) in Gotha, developing during the latter half of the nineteenth century into one of the most respected geographic journals of Europe, due to their high-quality and up-to-date cartographic products. The city of Gotha had during the eighteenth century already been a place of creative production and collection of knowledge. When Perthes founded his publishing house in 1785, he was initially known for the publication of the famous Court Calendar of Nobility, but established himself during the early nineteenth century as an expert of cartography. In 1854, August Petermann (1822–1878) arrived, a highly skilled cartographer with an excellent academic network and financial acumen, who founded the geographical journal the following year. During the next decades, Petermann provided the newest geographic reports, accompanied by first-rate maps, turning into one of the most important mediators of newly constructed world knowledge. After 1860, Petermann maintained his high standards by sending his own exploratory missions, mainly to Africa, but later also to China and Tibet, with correspondents such as Ferdinand von Richthofen (1833–1905) and later Sven Hedin (1865–1952). Their geographical and cartographical surveys were among the first to arrive in Europe after the missionary surveys conducted during the Qianlong era.

In China, the end of Jesuit missionary involvement does not seem to have made much of a difference in cartography. The survey maps created with the consultancy of the Jesuits were updated during the early nineteenth century, and coexisted with what Huttmann called native cartography. Qing cartography itself also progressed greatly during the 1840s and 1850s. Huttmann wrote his report in 1844, which was too early to include Chinese works such as the *Yinghuan zhilue* 瀛環志略 (Short account of the maritime circuit), a world geography by Xu Jiyu 徐繼畬 (1795–1873) and the compilation of world knowledge by Wei Yuan 魏源 (1794–1856) (Yee 1994: 108). In China as well, the transformation of the world, by which is largely meant the modernization of the West and a global shift of political and economical power, was being noticed, and at the beginning of the nineteenth century, Chinese intellectuals started to collect information on Europe and the United States, a tendency which became more pronounced after the end of the Opium War in 1842. European scientific standards would replace Chinese cartographic traditions only at the end of the nineteenth century.

4 Conclusion

The opening of five Chinese port cities to international trade stipulated in the Treaty of Nanjing in 1842 renewed the European, but mainly the British, interest in exact cartographic information on all parts of China. The Royal Geographical Society, founded in 1830 in London thus commissioned an investigation into existing maps and asked geographer and missionary William Huttmann to provide a sketch of the history of cartography on China as well as a suggestion for the best materials from which to compile a new map that could be used for dealing with the newly opened empire. William Huttmann was deemed an appropriate choice because he had lived for some time in China, and was expected to know the languages and be familiar with the literature on China, especially regarding cartography.

An analysis of his statement, published in 1844, at a time of cartographic and geographic transformation in Europe and in China, gives a fleeting glance at the state of international geography before the stage of fully fledged colonial cartography was reached at the end of the nineteenth century. Huttmann himself set great store by scientific measurements, introduced into China by Jesuit missionaries during the era of Kangxi, but highly esteemed what he called 'native' Chinese geographical skills as well. He briefly elucidates the most important cartographical works by Chinese geographers, but proceeds quickly to the survey commissioned by the Kangxi emperor and created in cooperation between Jesuit mathematicians, Qing scholars, and Manchus in the late seventeenth and early eighteenth century. This work was later known as the Kangxi atlas.

Kangxi's attraction to the mathematical precision of Jesuit computations and their application to Qing cartography becomes immediately evident when his interest in imperial expansion is taken into account. Traditional Chinese imperial geographies and maps served hitherto only to illustrate the calculations of distances. These were given in written form and accompanied the map rather than being present on the map. The Kangxi emperor recognized the usefulness of the exact measurements on the actual maps, rather than in written form, as it communicated the extension of his empire not only to the King of France, but also to the local dignitaries of Central Asia. Jesuit missionaries, with an expertise in the field of calculation, thus were sent along on several field surveys. Their calculations were unrivalled by Manchu officials or other imperial subjects and were used for new maps of the Qing empire. Jesuit missionaries were also involved in the updates of the Kangxi atlas, in the form of the Yongzheng and the Qianlong atlases. Although they never had full authority over the process of mapmaking (this authority resided with Qing scholars) and were only consulted, their mathematical skills were deemed to be the most exact, an opinion which was held by both the Qianlong emperor and Huttmann. After 1782, all maps based on the missionary survey were edited and compiled without Jesuit support: although some Jesuits remained at the court of Beijing, the Chinese emperor was no longer interested in this particular aspect of cartography, and the last disciples of the Jesuit cartographers of the Kangxi era had passed away.

In the end, Huttmann recommended to the Royal Geographical Society to take the Kangxi atlas as the basis for a new China map, while integrating new calculations done by Russian geographers, and additional information form a Chinese atlas published by Li Mingche in 1825 under the title of *Da Qing wannian*, part of a gazetteer published by Ruan Yuan.

What can Huttmann's text tell us about the general state of geography and cartography in Europe and China at that time? In short, he provides a survey about the richly developed geographic field in China and leaves us to ponder about the field of cartography in Europe.

First, Huttmann esteems and recommends Chinese geographical works and the Chinese survey maps created with Jesuit involvement alike for the 'new map' he envisions, but is always critical about the quality of the calculations done by the Jesuits, recommending the Kangxi-era atlas rather than its Qianlong-era version. From the existing European travel literature he only selects very few works from authors based in Paris and St. Petersburg, leaving out others, as knowledge of the area and the language seem to have been important criteria for him in determining whether a book or work was useful or not.

He shows no interest at all in the emerging scientific cartography in Europe and the maps already existing in Europe, done by resident, non-travelling cartographers. Excellent maps had been made from the compilation of the maps of d'Anville by German mapmakers Stieler and Berghaus. But their maps were only technically improved and did not use first-hand surveys; additionally, they were written in a German transcription of the Chinese language, thus omitting the subtleties of the maps of the High Qing and the Kangxi era, during which a map communicated the extension of the realms in several different languages. The history of German cartography in the nineteenth century reveals only the development of new details of representation: the coloring of mountains, borders, etc. rather than the inclusion of new, first-hand information. Huttmann seemingly prefers imperial cartography with ample funds: Huttmann particularly laments the fact that between 1800 and 1844, large institutions with an interest in good maps like the East India Company were in decline in Europe. Indeed, during the 1850s, national geographic societies came into existence, each collecting a multitude of new materials and observations of travelers worldwide for later publication.

Cartography in Europe as well as in Asia up to the end of the eighteenth century has been the subject of thorough analysis in terms of cultural representation and symbols of imperial power. Huttmann's observations in 1844 show respect for Chinese cartography, in which he discovers only a change insofar as the Jesuits are no longer involved. Other than that, Chinese cartography continues to develop. European cartography on the other hand was in transformation: no longer able to use the funds of the rich East India Company, and not yet able to secure funding from private sources, imperial cartography seems suspended and fractured within the emerging nations, with cartographic centers remaining in St. Petersburg and Paris. After 1860, cartographic principles developed in Europe seem to have taken over in almost all parts of the world. As the principal and most skilled mapmakers, German and French cartographers emerged and cartography and

geographical knowledge became open to everyone, with interests shifting toward ‘colonial maps’.

In China, the various mapping cultures were replaced by a monoculture only at the end of the nineteenth century. This was not due to the fact that Western mapping techniques were superior, but rather due the experience of a global homogenization of mapping techniques that arrived with modernity. It is not known whether the Royal Geographical Society acted on Huttmann’s recommendations.

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