Collecting Curiosities during Surveying Missions: French Jesuits and Natural History of China, 1687-1721

Jiarui Xue

Department of History and Classical Studies

Faculty of Arts

McGill University, Montréal

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ABSTRACT

In 1687, a group of five French Jesuit scholars, bearing the title *mathématiciens du roi*, ventured into the Qing Empire, heralding France's entrance onto the forefront of the Jesuit China mission. Serving as intermediaries between Paris/Versailles and Beijing, the French Jesuits made substantial strides in fostering scientific exchange, notably in mathematics, astronomy, and cartography. In comparison to their contributions in these fields, their works on natural history remain understudied, a gap that this thesis seeks to address. The thesis delves into the natural history works produced in the early stage of the French Jesuit mission in China. The studies of natural history by the French Jesuits developed in close association with their cartographic practices in East Asia. As the Jesuits embarked on mapmaking missions to meet the cartographic needs of both France and the Qing Empire, they encountered diverse species and engaged with various informants, thereby contributing to knowledge production in the field of natural history. Their scientific pursuits extended beyond serving the imperial ambitions of the two empires. Driven by personal curiosity and a commitment to seek edification from nature as mandated by their constitutions, the French Jesuits capitalized on the mapmaking journeys to gather knowledge about the natural world of China.

RÉSUMÉ

En 1687, un groupe de cinq érudits jésuites français, portant le titre de « mathématiciens du roi », s'est aventuré dans l'Empire Qing, annonçant l'entrée de la France sur le devant de la scène de la mission jésuite en Chine. Agissant en tant qu'intermédiaires entre Paris/Versailles et Pékin, les jésuites français ont apporté d'importantes contributions aux échanges scientifiques, notamment dans les domaines des mathématiques, de l'astronomie et de la cartographie. En comparaison avec leurs contributions dans ces domaines, leurs œuvres en histoire naturelle restent peu étudiées. La thèse explore les œuvres d'histoire naturelle produites au début de la

mission jésuite française en Chine. Les études d'histoire naturelle menées par les jésuites français se sont développées en étroite association avec leurs activités cartographiques en Asie de l'Est. Alors que les jésuites se lançaient dans des missions de cartographie pour répondre aux besoins cartographiques de la France et de l'Empire Qing, ils ont rencontré diverses espèces et ont engagé des interactions avec divers informateurs, contribuant ainsi à la production de connaissances dans le domaine de l'histoire naturelle. Leurs recherches scientifiques allaient au-delà de la satisfaction des ambitions impériales des deux empires. Motivés par la curiosité personnelle et la quête d'édification à partir de la nature, telle que prescrite par leurs constitutions, les jésuites français ont tiré parti des voyages de cartographie pour recueillir des connaissances sur le monde naturel de la Chine.

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INTRODUCTION

In 1681, a letter from Beijing stirred up Versailles's interest. In this letter, Ferdinand Verbiest, S.J. (1623-1688), a Flemish Jesuit stationed at the court of the Kangxi Emperor (b. 1654, r. 1661-1722), explained the emperor's increasing interest in European science and summoned more missionaries to join the mission in China.[1] In response to Verbiest's call, King Louis XIV of France (b. 1638, r. 1643-1715) instructed the *Académie royale des sciences* and the Jesuit *Collège Louis-le-Grand* in Paris to select a cadre of competent Jesuit scientists. Five Jesuits, bearing the name *mathématiciens du roi*, embarked on the ship *Oyseau* from the port of Brest in 1685. They crossed the Indian Ocean and sojourned in Siam for one year before proceeding toward China. In November 1687, they finally reached China, docking at the port of Ningbo.[2] Their journey heralded a new stage in the Jesuit mission in China, characterized by the prominent presence of French missionaries.[3]

Louis XIV believed that the arrival of Verbiest's letter signaled an opportune moment to promote French overseas interests in Asia by establishing direct contact with China. During the 16th century, the Portuguese in Macao and the Spanish operating from the Philippines took the lead in entering trade relations with China. In the 17th century, the Dutch established posts in Taiwan in 1620 and dispatched three trade embassies to Beijing between 1656 and 1686.[4] Louis XIV, aspiring to lead Europe, while sitting in the Palace of Versailles adorned with chinoiserie due to vibrant European-Asian trades, could not remain indifferent to the accomplishments of other European powers in Asia. The *mathématiciens du roi*'s mission became a vital stride of Louis XIV's ambition of entering China. Their role at the Qing court was characterized by

[1] In this thesis, I employ the term "China" solely as a geographical designation encompassing the land under the governance of the Qing Empire (1644-1912).
[2] See Isabelle Landry-Deron, "Les Mathématiciens envoyés en Chine par Louis XIV en 1685," *Archive for History of Exact Sciences* 55 (2001): 427-444.
[3] See also Virgile Pinot, *La Chine et la formation de l'esprit philosophique en France, 1640-1740* (Paris: Librairie orientaliste Paul Geuthner, 1932).
[4] Jean-Paul Desroches, "Beijing-Versailles: Relations between Qing Dynasty China and France," in *The French and the Pacific World, 17th-19th Centuries: Explorations, Migrations, and Cultural Exchanges*, ed. Annick Foucrier (London: Routledge, 2005), 198.

multiple functions. In addition to being missionaries and scientists to China, they were also envoys of Louis XIV and correspondents of the *Académie royale des sciences*, representing French interests in Beijing. Functioning as liaisons between Beijing and Versailles, the French Jesuits in China facilitated the first sail of the French vessel *Amphitrite* from La Rochelle to Guangdong in 1698, thus opening the official trade between China and France.[5]

The French Jesuits were newcomers in comparison to other European Jesuit groups in China. In 1548, eight years after the founding of the Jesuits, Francis Xavier, S.J. (1506-1552) first traveled to Asia under the patronage of the Portuguese Crown, sailing from Lisbon to Goa in 1548.[6] Failure to enter mainland China notwithstanding, Xavier began the era of *Padroado*, the Portuguese Crown's de facto monopoly over Catholic missions to Asia.[7] In the 1560s, the Jesuits made their way to China via Macao.[8] By 1687, when the French Jesuit missionaries arrived, the Jesuits already had a network covering Beijing and ten provinces of China south of the Great Wall, including Zhili, Shanxi, Shaanxi, Shandong, Henan, Huguang, Jiangnan, Jiangxi, Zhejiang, and Fujian.[9] The French Jesuits did not start their mission from scratch. Based on pre-existing networks, they could carry on the work initiated by their predecessors promptly. However, their mission was not without its challenges. The French Jesuits found themselves in competition with other Jesuit groups, notably the Portuguese. Their operation in China encountered strong hostility from their Portuguese counterparts, as their presence posed challenges to the *Padroado*.

The French Jesuits encountered a different political situation than their predecessors. In 1644, China came under the rule of a new dynasty, the Qing, established by the Manchus, an ethnic group distinct from the majority of Han Chinese. As Mark C. Elliott argues, the Manchus

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[5] See Pail Pelliot, *L'origine des relations de la France avec la Chine: Le premier voyage de l'Amphitrite en Chine* (Paris: Librairie orientaliste Paul Geuthner, 1930).
[6] See Dauril Alden, *The Making of an Enterprise: The Society of Jesus in Portugal, Its Empire, and Beyond, 1540-1750* (Stanford, CA: Stanford University Press, 1996), 41-78.
[7] *Padroado* (Patronage) is a set of privileges that granted the Portuguese crown control over a set of ecclesiastical matters in Portuguese territories by Rome in exchange for the crown's commitment to support missionaries overseas. Luís Saraiva and Catherine Jami, eds., *The Jesuits, the Padroado and East Asian Science (1552-1773)* (Singapore: World Scientific, 2008), ix-x.
[8] For the history of Jesuits in China, see Liam Matthew Brockey, *Journey to the East: The Jesuit Mission to China, 1579-1724* (Cambridge, MA: Belknap Press of Harvard University Press, 2007).
[9] Ibid., 122.

maintained their rule by navigating Chinese political norms adeptly, all the while safeguarding their distinct identity.[10] As a result, the success of the French Jesuits in China depended on their ability to accommodate both Manchu and Chinese cultures. This included mastering both languages and observing both traditions in their service at the Qing court. The French Jesuits worked as faithful servants of Kangxi while carrying out the Verbiest's vision of spreading Christianity through scientific services. Serving as Kangxi's mathematical tutors, they explained to the emperor treaties in geometry in his native language and showed him the uses of European instruments of measurement.[11] They likewise played an active role in medical exchange by translating Chinese works of medicine and herbology into French, and by introducing anatomy and new materia medica to China.[12] This included one of the most famous remedies, cinchona, which miraculously alleviated Kangxi's intermittent fever. All these efforts upheld Kangxi's trust in European missionaries and led to a more tolerant policy towards Christianity in China, which lasted until 1721.

Kangxi welcomed Jesuit missionaries, recognizing their expertise in cartography as beneficial to his rule. Besides the Manchus and the Chinese, the Qing ruled over a plethora of other groups including the Mongols, the Tibetans, the Islamic peoples in the northwest, and many ethnicities in the southwest. These peoples were semi-autonomous under Qing governance, overseen not by regular administration but by a special agency that governed outlying peoples and frontier affairs, the *Lifanyuan* (理藩院). The Qing's sphere of influence extended to the empire's tributary states like Chosŏn Korea, Ryukyu, and Southeast Asian maritime states. In governing such a diverse entity made up of multiple nations, Kangxi desired detailed maps to

[10] Mark C. Elliott, *The Manchu Way: The Eight Banners and Ethnic Identity in Late Imperial China* (Stanford, CA: Stanford University Press, 2001), 3.
[11] See Catherine Jami, "Western Learning and Imperial Scholarship: The Kangxi Emperor's Study," *East Asian Science, Technology, and Medicine* 27 (2007): 146-172.
[12] See Beatriz Puente-Ballesteros, "Jesuit Medicine in the Kangxi Court (1662-1722): Imperial Networks and Patronage," *East Asian Science, Technology, and Medicine* 34 (2011): 86-162; Jesuit translations of Chinese medical works, including *Maijin* 脈經 [Classics of Pulse], *Bencao Gangmu* 本草綱目 [Compendium of Materia Medica], *Shennong Bencaojing* 神農本草經 [Shennong's Classic of Materia Medica], *Bencaojing Jizhu* 本草經集註 [Classic of Materia Medica with Annotations], and *Mingyi Bielu* 名醫別錄 [Records of Famous Physicians], were published in Jean Baptist du Halde, *Description géographique, historique, chronologique, politique, et physique de l'empire de la Chine et de la Tartarie Chinoise*, vol. 3 (Paris: P. G. Le Mercier, 1735), 384-459.

maintain control. Moreover, Kangxi was well aware of the expanding European colonial forces, notably Russia in the north and Western European nations from the seas, surrounding his empire. In competing with these European powers, maps were deemed necessary to aid his ambitions of advancing into Inner Asia and Taiwan.[13] Upon the emperor's request, the *mathématiciens du roi* and their successors carried out several land surveying missions throughout the country, with techniques and equipment brought from France. In 1718, their survey results were compiled into the Kangxi Atlas (*Kangxi huangyu quanlan tu* 康熙皇輿全覽圖), the most precise map of China the world had ever seen.[14]

In contrast to the contributions made by the French Jesuits in China in mathematics, astronomy, cartography, and medicine, their works on natural history have garnered little scholarly attention. This thesis aims to address the gap by exploring the natural history of China in Jesuit writings. The natural history studies conducted by them cannot be viewed in isolation from their terrestrial surveying duties. The French Jesuits' contribution to the natural history of China was closely tied to field trips, which they underwent while carrying out land surveying across the Qing Empire. In the 17th and 18th centuries, France played a leading role in cartographic practices in Europe, corresponding to the rise of French imperial power overseas. In East Asia, the rise of Qing cartography likewise paralleled the empire's expansion.[15] The French Jesuits served as go-betweens for France and the Qing Empire, fulfilling the cartographic needs of both empires: They introduced French cartography to the Qing court and provided geographical data of Asia to the French *Académie royale des sciences*. Their scientific endeavors, nevertheless, went beyond serving the imperial ambitions of France and the Qing Empire. Motivated by individual curiosity and a quest for edification from nature as required by their constitutions, the French Jesuits capitalized on the opportunities to conduct surveys to gather knowledge about the natural world of China.

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[13] See Laura Hostetler, *Qing Colonial Enterprise: Ethnography and Cartography in Early Modern China* (Chicago: University of Chicago Press, 2001), 33-49.
[14] See Mario Cams, "Converging interests and scientific circulation between Paris and Beijing (1685-1735): The path towards a new Qing cartographic practice," *Revue d'histoire des sciences* 70, no. 1 (2017): 47-78.
[15] Hostetler, *Qing Colonial Enterprise*, 64-71.

Jesuits as Collectors of Natural History

The French Jesuits in China took advantage of their mission to collect various aspects of science, including an abundance of natural history information, driven by their curiosity about nature. Even though the Jesuits constituted a religious order, the aim of their letters of edification was not to derive inspiration from religious experiences or extensive theological discourse but rather to document present and factual knowledge. When reading Jesuit correspondences, two primary themes stand out: global news and scientific breakthroughs.[16] As Steven J. Harris argues, the Jesuits, as a long-distance corporation, had an "institutional need" to gather natural knowledge that could enhance the operation of the order. This included travel information for future travelers to reference, geographical data for improving navigation, and botanical insights that could contribute to the knowledge of healing.[17] On the other hand, Jesuit natural history was not a purely secular endeavor. The study of nature was intricately intertwined with Jesuit theology. As the belief held that nature was a manifestation of God's creations, the study of nature was closely tied to the practice of knowing God. As outlined in the Ignatian Constitutions, the purpose of Jesuit correspondence was to facilitate communication "so that each region can learn from the others whatever promotes mutual consolation and edification in our Lord."[18] In this sense, collecting new knowledge about nature could lead to religious edification, shedding light on a better understanding of God's creation. These are well summarized in Harris's words: "The coherence of the Society's overseas science depended upon Jesuits' ability to retain the traditional meaning of Scientia as 'knowledge of God' and intertwine it with the emerging meaning of Scientia as 'knowledge of nature.'"[19]

The French Jesuits dispatched to China served as missionaries, envoys, astronomers, mathematicians, and cartographers, but they were not formally trained as botanists or naturalists.

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[16] Luke Clossey, *Salvation and Globalization in the Early Jesuit Missions* (Cambridge: Cambridge University Press, 2008), 202-212.
[17] See Steven J. Harris, "Long-Distance Corporations, Big Sciences, and the Geography of Knowledge," *Configurations* 6, no. 2 (1998): 269-304.
[18] John W. Padberg, S.J., ed., *The Constitutions of the Society of Jesus and Their Complementary Norms: A Complete English Translation of the Official Latin Texts*, (St. Louis, MO: The Institute of Jesuit Sources, 1996), 335.
[19] Steven J. Harris, "Jesuit Scientific Activity in the Overseas Missions, 1540-1773," *Isis* 96, no. 1 (2005): 79.

What constitutes natural history produced during the Jesuit China mission? The distinction between professional and amateur naturalists was blurred in the early modern period, particularly before the formalization of Linnaean nomenclature. Writers of natural history were themselves travelers, traders, and missionaries. In comparison to the knowledge of mathematics and cartography, which were produced within the orbit of the *Académie royale des sciences*, Jesuit natural history did not develop into complex technical discourses. The intended audiences of Jesuit publications were not scientists from the *Académie* but rather learned Parisian elites. The contents on natural history were conveyed into approachable discourses, yet were frequently framed as researches of novelties and wonders, aiming to evoke a sense of awe. A combination of good taste and scholarly prestige was embodied through rich collections of curious matters. Writings of natural history were hence aligned with the desire to promote cultural values and perhaps other practical interests.[20] Even though it did not develop into technical discourses that characterized the works produced by or for the *Académie*, Jesuit natural history was still labeled as "science" and "refined culture" to make it appealing to the public. Jesuit writings of natural history served the purpose of promoting their prestige as an order of savants, in addition to seeking religious edification. The name of the series of Jesuit publications, *Lettres édifiantes et curieuses* (1702-1776), is self-evident. Its first editor, Charles Le Gobien, S.J. (1652-1708), added the word "curious" in the title, signifying that Jesuit letters were not only for religious edification but also the product of curiosity—exploring the unknown. The Jesuits did not conceal their interest in maintaining active ties with Parisian lay scholarly circles.[21] Natural history, sophisticated yet not too technical, became the common language between Jesuit scholars and lay elites. Jesuit natural history, as a part of their knowledge productions that were essentially a show of cultural refinement, staked a claim to scholarly prestige and learnedness and attracted more studious individuals to join the order.[22]

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[20] See Sarah Easterby-Smith, "Selling Beautiful Knowledge: Amateurship, Botany and the Market-Place in Late Eighteenth-Century France," *Journal for Eighteenth-Century Studies* 36, no. 4 (December 2013): 531-543.
[21] Catherine M. Northeast, *The Parisian Jesuits and the Enlightenment: 1700-1762* (Oxford: Voltaire Foundation at the Taylor Institution, 1991), 16-23.
[22] See Mordechai Feingold, "Jesuits: Savants," in *Jesuit Science and the Republic of Letters*, ed. Mordechai Feingold (Cambridge, MA: MIT Press, 2003), 1-45.

The development of natural history as a professional discipline in the 18th century was associated with famous names like the de Jussieu brothers (1686-1758; 1699-1777), Comte de Buffon (1707-1788), Charles Linnaeus (1707-1778), etc. These individuals, whom Londa Schiebinger describes as "armchair botanists," never left Europe and relied on a network of amateurs—travelers, merchants, and missionaries—to collect seeds, samples, and knowledge worldwide.[23] Knowledge of natural history was centralized in Europe, within botanist gardens and laboratories like the *Jardin du Roi* or the *Ménagerie royale*, leading to the rise of a professional discipline. Similarly, the works by the French Jesuits in China contributed to the European understanding of the natural history of China. They actively collected information on natural history and forwarded it to Europe via their correspondence and publication network. Therefore, in many ways, the term "collector," instead of "researcher," would be a more appropriate term to characterize the French Jesuits who worked in the field of natural history.[24] In summary, first, they actively collected natural history items, recognizing that the abundance of collections of curious matters built up their image as prominent scholars. Second, their role was essentially that of travelers who collected and thereby helped centralize natural history knowledge for European institutions.

Natural History in Open-Air

An effective approach to examining Jesuit natural history is to take into account the notion of science in the open air. Open-air science, first introduced by Michel Callon as *recherche de plein air* and then rephrased by Kapil Raj, refers to a process of knowledge production that encompasses everything researchers encounter in the field. It does not develop in enclosed spaces, such as in academies or laboratories, with communication among specialists

[23] Londa Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World* (Cambridge, MA: Harvard University Press, 2021), 57-62.
[24] For collection and culture of curiosity, see Neil Kenny, *The Uses of Curiosity in Early Modern France and Germany* (Oxford: Oxford University Press, 2004), 160-308. Kenny argues that a cluster of institutions in early modern Europe turned a wide range of knowledge and objects into matters of curiosity. Collection of curiosities, both material objects and discursive ones, promoted a culture that serves the practical purpose of commodifying knowledge, the sociability of collectors, etc.

within the framework of disciplinary specifications. Instead, it evolves outside indoor professional settings, extending beyond scientific works confined to one location and often engaging with a variety of non-scientific local practitioners.[25]

Knowledge production in the open air did not lead its practitioners to produce learned tomes or monographs but involved the integration of knowledge from various sources. Surveying and map-making played a pivotal role in the emergence of natural history research. The French Jesuits in China were specialists in surveying. As they conducted land surveys across the empire, they encountered diverse species in different open-air environments. Terrestrial surveying required extensive travel, involving interactions with local guides to secure sources of food, access natural remedies, and avoid potential dangers in nature. This led to exchanges related to natural history, characterized by Raj as knowledge circulation—exchanges in a dynamic, multichannel setting involving agents with different cultural backgrounds. Local informants were not passive actors providing "raw information" to be reworked by European scientists. Instead, they were agents who actively contributed to the knowledge construction.[26] This is suitable for characterizing the works on natural history by the French Jesuits in China. By engaging with various sources, from literati well-versed in systematic knowledge to commoners with folk wisdom, during their mapmaking expeditions, the French Jesuits were more open to embracing insights into local species that arose within distinct cultural contexts. Through the Jesuit network of correspondence, local insights into the natural history of China reached Europe, showcasing the role of local informants in shaping knowledge production in the metropole.

In 1721, due to a decrease in opportunities for travel among the Jesuits in China, their natural history works gradually moved away from the characteristic of open-air science. This shift coincided with Kangxi's ban on the preaching of Christianity in China. Although Jesuit missionaries were permitted to stay in Beijing as court scientists, their freedom to travel was restricted, and they refrained from undertaking large-scale surveying projects. While some

[25] Kapil Raj, *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650-1900* (Hampshire: Palgrave Macmillan, 2007), 14.
[26] See Kapil Raj, "Beyond Postcolonialism… and Postpositivism: Circulation and the Global History of Science," *Isis* 104, no. 2 (June 2013): 337-347.

French Jesuits continued their natural history research by translating Chinese herbology and cultivating plants in the garden of their residence in Beijing, the lack of travel experiences led to a departure from open-air science in their natural history works.

Sources and Literature Review

This thesis delves into the writings of six French Jesuits who joined the Catholic mission to China during the late 17th and early 18th centuries and were active in conducting natural history studies: Louis Le Comte, S.J. (1655-1728), Jean-François Gerbillon, S.J. (1654-1707), Jean-Baptiste Régis, S.J. (1663-1738), Pierre Jartoux, S.J. (1669-1720), and Joseph-Anne-Marie de Moyriac de Mailla, S.J. (1669-1748). Chapter 1 focuses on Le Comte, one of the *mathématiciens du roi* commissioned by the *Académie royale des sciences* to gather geographical data on major cities in China. Le Comte spent three years in China from 1687 to 1691, initially traveling in the north-central region and later to the southeast. Upon his return, he published two volumes titled *Nouveaux mémoires sur l'état présent de la Chine* (1696). The book, written in a typical Jesuit style of documenting curiosities features Le Comte's descriptions of various fruits, plants, and materia medica encountered during his travels.[27] Le Comte's journey in China faced challenges due to the geopolitical rivalry between France and Portugal in Asia. The geopolitical circumstance impacted his travels and thus influenced the scope of his natural history observations and likely motivated him to narrate his experiences in support of the French Jesuits' cause in China.

In contrast to Le Comte, Gerbillon, who was based in Beijing, had a better chance of safeguarding the French cause in China from political struggles. As one of the most trusted foreign courtiers of the Kangxi Emperor, Gerbillon undertook eight trips to the Russian Far East and Mongolia between 1688 and 1698. He initially served as an interpreter for the Qing delegation and later as a part of Kangxi's imperial entourage. During his travels, Gerbillon meticulously documented the landscape, botany, zoology, and ethnography of Mongolia in his

[27] Louis Le Comte, *Nouveaux mémoires sur l'état présent de la Chine*, vol.1 (Paris: Jean Anisson, 1696), 209-224, 301-302, 335-336, 456-472.

diary, which forms the focal point of Chapter 2. Gerbillon's diary was initially published in the fourth volume of the *Description… de la Chine* (1735) compiled by Jean-Baptiste du Halde, S.J. (1674-1743), a Jesuit sinologist and the second editor of the *Lettres édifiantes et curieuses*.[28]

Chapter 3 concentrates on the natural history works produced during the making of the Kangxi Atlas between 1708 and 1718, an undertaking completed by the second generation of French Jesuits in China succeeding the *mathématiciens du roi*. Capitalizing on the opportunities presented by Kangxi's request for a comprehensive atlas, the French Jesuits embarked on journeys to the outskirts of the Qing Empire. During their land surveying project in Manchuria and the Upper Amur region in 1709, Régis contributed an account of crops, wild plants, and animals encountered there. Excerpts from Régis's manuscript can also be found in du Halde's *Description... de la Chine*.[29] In the *Lettres édifiantes et curieuses*, topics on natural history were also featured. In 1711, Jartoux provided a very detailed description of ginseng, which he came across during his survey of Manchuria with Régis.[30] In 1715, Mailla presented a letter that included a botanical and zoological description of the island of Taiwan where he was assigned to conduct surveys.[31]

While the French Jesuits in China made noteworthy contributions to natural history, their writings in this area have received relatively less attention compared to their works in astronomy, mathematics, and cartography. Medical interactions between the Jesuits and the Qing court represent another significant area of scholarly interest, with some works falling under the purview of natural history. For instance, Linda Barnes explores Sino-European medical exchanges, drawing from studies of Chinese materia medica conducted by the French Jesuits and

[28] Du Halde, *Description… de la Chine*, 4:87-422.
[29] Ibid., 4:1-17, 423-430, 459-472.
[30] Pierre Jartoux, "Lettre du Père Jartoux, missionaire de la Compagnie de Jésus, au P. procureur général des missions des Indes & de la Chine. A Pékin, le 12 d'avril 1711," in *Lettres édifiantes et curieuses, écrites des missions étrangères par quelques missionnaires de la Compagnie de Jésus*, vol. 10, ed. Jean Baptist du Halde (Paris: Jean Barbou, 1713), 159-185.
[31] Joseph-Anne-Marie de Moyriac de Mailla, "Lettre du Père de Mailla, missionnaire de la Compagnie de Jésus, au Père de Colonia de la même Compagnie. À Kieou Kian-Fou dans la province du Kiam-si, au mois d'août 1715," in *Lettres édifiantes et curieuses, écrites des missions étrangères par quelques missionnaires de la Compagnie de Jésus*, vol. 14, ed. Jean Baptist du Halde (Paris: Le Clerc, 1720), 1-85.

the scientists from the *Académie royale des sciences*.[32] She also examines Le Comte's discussion on the medicinal use of tea, attributing it to a combination of intellectual curiosity and commercial motivation.[33] However, natural history plays a limited role in Barnes's work, as the realm of healing encompasses not just medicine but also a diverse array of practices, ranging from surgery, rituals, and magic, to interactions with supernatural forces. The medical exchanges between China and Europe extended beyond the mere exchange of materia medica. They also involved the exchange of ideas and practices, such as anatomy, inoculation, Galenic principles, Chinese healing philosophies, etc. Moreover, such works on medical history do not engage natural history as a dynamic science. Their emphasis on materia medica centers on the practical utility of plants, rather than approaching them from the standpoint of pure curiosity. Plants and animals with no medical uses were rarely considered within the realm of medical history, let alone acknowledging the significance of travel and open-field research.

The study of the natural history works by the French Jesuits in China holds a secondary position in the scholarly literature on Jesuit science, notwithstanding a few notable works dedicated to the topic. The most classic one is Joseph Needham's magnum opus, *Science and Civilisation in China*, in which botany is the main theme of the first part of the sixth volume.[34] Needham highlighted instances of cross-cultural exchange facilitated by the Jesuits, notably the introduction of cinchona to China by the French and Chinese citrus to Europe by the Portuguese.[35] Emil Bretschneider, a 19th-century sinologist and botanist, identified the species mentioned in several Jesuit writings using binomial nomenclature.[36] His book serves as a valuable research index but lacks in-depth historical analysis. Some modern historians look into Jesuit natural history. Marie-Pierre Genest explores the key contributors who facilitated the introduction of Chinese plants to France, such as François Xavier d'Entrecolles, S.J. (1664-1741),

[32] Linda L. Barnes, *Needles, Herbs, Gods, and Ghosts: China, Healing, and the West to 1848* (Cambridge, MA: Harvard University Press, 2007), 99-104.
[33] Ibid., 100-101.
[34] See Joseph Needham, Lu Gwei-Djen, and Huang Hsing-Tsung, *Science and Civilization in China*, vol. 6, *Biology and Biological Technology*, pt. 1, *Botany* (Cambridge: Cambridge University Press).
[35] Ibid., 323-325, 363-377.
[36] See Emil Bretschneider, *Early European Researches into the Flora of China* (Shanghai: American Presbyterian Mission Press, 1881).

Dominique Parennin, S.J. (1665-1741), Pierre Nicolas d'Incarville, S.J. (1706-1757), Jean-Joseph-Marie Amiot, S.J. (1718-1793), and Pierre-Martial Cibot, S.J. (1727-1780) who collected seeds and specimens in Beijing, as well as the Parisian naturalists who received them.[37] Bianca Maria Rinaldi's *The Chinese Garden in Good Taste* delves into Jesuits' explorations of Chinese flora and garden art in the 17th and 18th centuries, and how they shaped the European intellectual and cultural history of the time.[38] Lianming Wang has two articles dealing with the garden of the Church of the Saviour (also known as *Beitang* 北堂, the Northern Church) in Beijing as a space of Sino-French botanical exchange facilitated by d'Incarville and Cibot.[39] Di Lu explores Cibot on a more specific note by investigating his study of fungus in the *Mémoires concernant les Chinois* (1776-1791).[40] These studies primarily concentrate on botanical exchanges during the mid-18th century but often overlook the content of natural history found in earlier French Jesuit works. In the mid-18th century, the sphere of exchange was confined between Beijing and Paris as the Jesuits in China had limited opportunities to travel beyond the capital. Consequently, these scholarly works do not explore the role of travel and the open-air nature of French Jesuit natural history, as seen in the pre-1721 China mission.

On a global scale, French Jesuits actively produced global knowledge of natural history within the French Empire by exchanging information with local peoples and harvesting crops and fruits themselves.[41] A notable highlight in scholarly literature is Christopher M. Parsons's work on the discovery of American ginseng near Montreal by the Jesuits in New France. The discovery, sparked by Pierre Jartoux's study on ginseng in Manchuria, in turn, catalyzed the

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[37] See Marie-Pierre Genest, "Les plantes chinoises en France au XVIIIe siècle: médiation et transmission," *Journal d'agriculture traditionnelle et de botanique appliquée* 39, no. 1 (1997): 27-47.
[38] See Bianca Maria Rinaldi, *The Chinese Garden in Good Taste: Jesuits and Europe's Knowledge of Chinese Flora and Art of the Garden in the 17th and 18th Centuries* (Munich: Meidenbauer, 2006).
[39] See Lianming Wang, "From La Flèche to Beijing: The Transcultural Moment of Jesuit Garden Spaces," in *EurAsian Matters: China, Europe, and the Transcultural Object, 1600-1800*, ed. Anna Grasskamp and Monica Juneja (Cham, Switzerland: Springer, 2018), 101-124; Lianming Wang, "The Last Gift from Beijing: Jesuit Botanists and the European Quest for Chinese Plants," *Sulla Via del Catai* 22 (May 2020): 127-149.
[40] See Di Lu, "Rediscovering a Jesuit Legacy of Natural History: Pierre-Martial Cibot and Sino-European Exchange of Fungus Knowledge in the Late 18th and 19th Centuries," *Journal of Modern European History* 20, no. 1 (February 2022): 84-110.
[41] For the Jesuit natural history within the French context, see Christopher M. Parsons, *A Not-So-New World: Empire and Environment in French Colonial North America* (Philadelphia: University of Pennsylvania Press, 2018).

Compagnie des Indes ginseng trade between North America and China, traversing the route from La Rochelle to Guangzhou—a trade route established following the mission of the *mathématiciens du roi*.[42] The case underscores the order's role as a global scientific enterprise closely intertwined with the mercantile interests of the French Empire. While the French Jesuits in North America, the Caribbean, and India rode the waves of French colonial forces, those in China operated in a distinct political environment, grappling with limited support from France. An analysis of Jesuit natural history in China offers insights into their knowledge production under a different dynamic—in a mission beyond the reach of direct French influence.

[42] See Christopher M. Parsons, "The Natural History of Colonial Science: Joseph-François Lafitau's Discovery of Ginseng and Its Afterlives," *William and Mary Quarterly* 73, no. 1 (2016): 37-72.

CHAPTER 1. Endeavor of Curiosity:
Louis Le Comte & Flora of China

March 3rd, 1685, the ship *Oyseau* sailed away from the port of Brest of France, with six Jesuit mathematicians onboard. The ship passed the Cape of Good Hope, sailed across the Indian Ocean, and then made a year-long stop at Siam where the group parted. Guy Tachard, S.J. (1651-1712) stayed at Siam, while the other five, Jean de Fontaney, S.J. (1643-1710), Jean-François Gerbillon, Louis Le Comte, Joachim Bouvet, S.J. (1656-1730), and Claude de Visdelou, S.J. (1656-1737), made their way to China on July 23rd, 1687.[43] Their journey marked the commencement of a new stage in the Jesuit mission in China backed by French interests overseas. Among the five, Le Comte was the first to return to France. In 1696, he published *Nouveaux mémoires sur l'état présent de la Chine* in two volumes. This remarkable work extensively covers the natural history of China, reflecting Le Comte's pursuit of curiosities during surveying missions commissioned by the French state and his championing of the French scientific cause in China, particularly in the face of opposition from the Portuguese. Le Comte's exploration of the natural history of China in the *Nouveaux mémoires* was a product of geopolitics, specifically tied to French imperial ambitions in Asia and the rivalry between France and Portugal in the region.

Mathématiciens du roi

As self-evident in the name *mathématiciens du roi*, the French Jesuits sent to China were inextricably intertwined with the French state and monarchy. Under the governance of Jean-Baptiste Colbert (1619-1683), the chief minister of Louis XIV, France entered an age of bureaucracy. Seeing the correlation between power and state archives, Colbert envisioned the mastery of information, both domestically and abroad, as the cornerstone of state governance.[44]

[43] Landry-Deron, "Les Mathématiciens envoyés en Chine par Louis XIV en 1685," 462.
[44] See Jacob Soll, *The Information Master: Jean-Baptiste Colbert's Secret State Intelligence System*. (Ann Arbor, MI: University of Michigan Press, 2009).

His vision of state management significantly shaped the objective of the initial French Jesuit mission to China, transferring it into a scientific endeavor rather than a purely diplomatic or religious mission. Colbert saw supporting Jesuit missions as an opportunity to expand his world of archives and pursue knowledge required by the French state to further its interests abroad. Patronized by the French state, the French Jesuit mission to China was beyond a choice of individual endeavor. It was subjected to the plans of institutions of Colbert's administration, in particular the *Académie royale des sciences*.

Supporting scientific endeavors was one facet of Colbert's broader strategy for state centralization. In 1666, he directed the establishment of the *Académie royale des sciences*, aiming to put the world of Parisian intellectuals under his control.[45] Colbert remained open-minded about scientific discoveries and their usefulness in his world of information. He archived the documents of the *Académie* in the *Bibliothèque du roi*, the knowledge center of his administration, to centralize scientific outcomes and seek potential financial interests from the scientific discoveries overseas.[46] Colbert's conviction that mastering information was pivotal for effective state governance significantly influenced his view of French overseas activities. According to Colbert's plan, the Jesuits were required to first seek knowledge of science, craftsmanship, and technology in China. Fontaney, leader of the *mathématiciens du roi*, once recalled Colbert's words: "I hope that they will take this opportunity to make many observations on the places that we do not know, when they are not busy with the spread of the gospel, for the perfection of science and art."[47]

When planning the first mission to China, the collection of astronomical and geographical information was of the utmost importance to Colbert. He placed great value on

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[45] Ibid., 99-101.
[46] Ibid., 109.
[47] Jean de Fontaney, "Lettre du Père de Fontaney, missionnaire de la Compagnie de Jésus à la Chine, au r. Père de La Chaize de la même Compagnie, confesseur du roy. À Tcheou-Chan port de la Chine, dans la province de Tche-kiam, à 18 lieues de Nimpo, le 15 février 1703," in *Lettres édifiantes et eurieuses, écrites des missions étrangères par quelques missionnaires de la Compagnie de Jésus*, vol. 7, ed. Charles Le Gobien (Paris: Le Clerc, 1707), 66. « …, je souhaiterois qu'ils se servissent de l'occasion, & que dans le temps où ils ne sont pas si occupez à la prédication de l'Evangile, ils fissent sur les lieux quantité d'observations, qui nous manquent pour la perfection des Sciences & des Arts. »

these areas of study and recognized their potential to enhance French interests. Geographical data constituted one of the foremost pillars of Colbert's information empire. In 1667, Colbert commissioned scholars in the *Académie* to establish the *Observatoire de Paris* to support his collection of data for mapmaking and hydrography which was essential to his ambitions of building French sea power.[48] Following Colbert's vision, the Jesuit mission to China should correspond to the objectives of the *Académie* by collecting information, thus contributing to furthering French interests in participating in maritime trade in Asia. As Le Comte remembered, when preparing for the mission, "Mr. Colbert not only gained acceptance from His Majesty but also ordered the preparation of the necessary instruments for a considerable number of observers, all of whom were to go to China."[49]

Colbert's web of institutions was composed of the Jesuits, the *Académie royale des sciences*, and the *Compagnie des Indes orientales*, a quasi-state company founded in 1664. All interconnected and worked together to advance French overseas endeavors in areas including trade, science, and religion. The *Compagnie*'s ships offered French Jesuit missionaries a lift to India and China via its trading route in the Indian Ocean. French Jesuits, during their voyages, committed to gathering astronomical and geographical data to be processed by the *Académie*. This would enhance the French notion of cartography and hydrography and, in turn, benefit the *Compagnie*'s maritime trade. The Jesuits and the *Académie* operated closely. The director of the *Observatoire de Paris*, Giovanni Domenico Cassini (1625-1712), personally recommended Fontaney, a mathematics professor at *Louis-le-Grand*, to be the first member of the *mathématiciens du roi* to China. Before their departure, the *mathématiciens* were invited by the *Académie* to hone the skills needed for conducting astronomical observations and geographical measurements.[50] Colbert made the Jesuits, the *Académie*, and the *Compagnie* mutually supportive institutions. The collaboration between the three would eventually benefit the French

[48] Soll, *The Information Master*, 99.
[49] Le Comte, *Nouveaux mémoires*, 1:3. « Monsieur Colbert non-seulement le fit agréer à Sa Majesté, mais encore il donna ordre qu'on préparast les instrumens necessaires pour un nombre considérable d'observateurs, qui devoient tous se rendre à la Chine, … »
[50] Landry-Deron, "Les Mathématiciens envoyés en Chine par Louis XIV en 1685," 431-433.

state. On the other hand, sending Jesuits as observers was a choice of expedience for Colbert as the *mathématiciens du roi* were already trained scientists before their departure. This decision would save a considerable amount of money compared to sending a separate team of observers at additional expense.[51]

Even though Colbert did not live to see his plan come to fruition, the institutions he had created continued to carry out his vision under the direction of Louvois (1641-1691), who served as the new chief minister following Colbert's death in 1683.[52] The *mathématiciens du roi* finally departed in 1685, with their primary objective being the measurements of astronomical and geographical data. As they arrived in China at the port city of Ningbo in 1688, they immediately measured the city's latitude.[53] They were then called to Beijing by the Kangxi Emperor. While in Beijing, they measured the city's latitude several times, often from the rooftop of their residence.[54] In April 1688, the group separated. Bouvet and Gerbillon remained in Beijing staying by the emperor's side, while Le Comte, Visdelou, and Fontaney traveled to Jiangzhou, a small town in the southwest of Shanxi Province.[55] While at Jiangzhou, the Jesuits still measured the town's location, despite the town's apparent insignificance in commercial and political importance.[56] Later that year, Fontaney headed toward Nanjing crossing the Yellow River, separating from Le Comte and Visdelou who stayed in Jiangzhou.[57]

The separation of the five was presumably a consequence of the rivalry between France and Portugal in Asia. Upon the arrival of the French Jesuits in Beijing, an increasing tension developed between Fontaney and Tomás Pereira, S.J. (1645-1708), the Portuguese Jesuit senior who was considered a promising candidate for the position of vice-provincial superior of the China mission following Ferdinand Verbiest's death in 1688. Pereira feared that Fontaney, a

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[51] Catherine Jami, *The Emperor's New Mathematics: Western Learning and Imperial Authority during the Kangxi Reign (1662-1722)* (Oxford; New York: Oxford University Press, 2012), 103.
[52] Landry-Deron, "Les Mathématiciens envoyés en Chine par Louis XIV en 1685," 431.
[53] Fontaney, "Lettre du Père de Fontaney," 104.
[54] Ibid., 146.
[55] Jiangzhou is present-day Xinjiang County in the municipality of Yuncheng, Shanxi province.
[56] Fontaney, "Lettre du Père de Fontaney," 152.
[57] Ibid., 153-154.

senior Jesuit and the leader of the French group, might undermine his authority.[58] Moreover, Pereira understood the potential threats posed by the French Jesuits in undermining the commercial and religious interests of the Portuguese Crown in Asia. Following the establishment of the *Compagnie des Indes orientales*, France entered the Indian Ocean trade, sparking a rivalry with Portugal which had already established commercial activities centered in Macao and Goa. The *mathématiciens du roi*'s mission exacerbated the rivalry, posing a threat to the *Padroado* enterprise—the Portuguese Crown's monopoly over missionary activities and ecclesiastical revenues in Asia.[59] Entering China under the guise of mathematicians rather than missionaries, the French Jesuits bypassed the Portuguese *Padroado*'s monopoly on patronizing the missions to China.[60] By functioning as the agents of the French king, they answered only to the authority of the French Crown instead of the Portuguese one and thus undermined the Portuguese *Padroado* of the missions in Asia.

Alert to these threats against himself and the Portuguese *Padroado*, Pereira took hostile measures against the French *mathématiciens du roi*. He intentionally sabotaged their mission by downplaying their proficiency in science in front of the emperor and posting restrictions on their use of scientific instruments, such as poles of altitude, outside of their residence in Beijing.[61] These obstacles rendered it infeasible for the *mathématiciens* to fulfill the duties the *Académie royale des sciences* had entrusted them. The tension was ultimately resolved through a compromise between Fontaney and Pereira. Under Pereira's influence, Kangxi chose to keep only two of the five French Jesuits: Bouvet and Gerbillon.[62] Pereira solidified his position by moving Fontaney out of Beijing. Fontaney, along with Le Comte and Visdelou, took this opportunity to evade Pereira's influence at the court which had hindered the French scientific mission in China.

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[58] Jami, *The Emperor's New Mathematics*, 112-113.
[59] Saraiva and Jami, eds., *The Jesuits, the Padroado, and East Asian Science (1552-1773)*, ix.
[60] Andrew C. Ross, *A Vision Betrayed: The Jesuits in Japan and China, 1542-1742* (Maryknoll, NY: Orbis Books, 1994), 188.
[61] Saraiva and Jami, eds., *The Jesuits, the Padroado, and East Asian science (1552-1773)*, 197-198.
[62] Ibid., 198.

Le Comte's Journey into the Natural World of China

Among the three *mathématiciens du roi* who traveled outside of Beijing, Louis Le Comte produced the most in-depth and detailed descriptions of the natural history of China, which can be found in his two-volume *Nouveaux mémoires sur l'état présent de la Chine*. The year-and-a-half-long stay in Jiangzhou between 1688 and 1690 gave him time to work on botany in Shanxi and the nearby province, Shaanxi. In the *Nouveaux mémoires*, Le Comte listed a wide variety of crops he encountered in the two provinces of north-central China: wheat, barley, various millet, tobacco, and peas.[63] He then paid special attention to two kinds of fruits he found unique in the region. First, a yellow melon, which might have been a cultivar of *Cucumis melo*: "Some very small ones, yellow inside, and with a sweet taste, are eaten with the skin, just as we sometimes eat apples here. I have only seen them in Shaanxi."[64] Second, a certain type of persimmon that Le Comte claimed to be firmer, bigger, more nutritious, and easier to preserve than persimmons in southern China: "There are, like apples, several species of them. Those from the southern lands are very sweet in taste and melt into water. In Shanxi and Shaanxi, this fruit is firmer, larger, better nourished, and easier to preserve."[65]

Le Comte's botanical endeavor was, to a certain extent, an incidental outcome of the *mathématiciens du roi*'s duty of astronomical observations in north-central China. According to Le Comte, the specific reason for their visit to Jiangzhou, a relatively inconspicuous town, was Fontaney's belief that they would have the opportunity to observe a complete solar eclipse there.[66] Instead of traveling at will, Le Comte needed to follow the astronomical trip, an initiative made by the team leader Fontaney who faithfully carried on the tasks given by the *Académie royale des sciences*. Botanical research was a side project for Le Comte taking advantage of the astronomical trip to Jiangzhou. Consequently, Le Comte's botanical work was largely confined

[63] Le Comte, *Nouveaux mémoires*, 1:209.
[64] Ibid., 1:211. « … ; les uns fort petits, jaunes au-dedans, & d'un goust sucré, qu'on mange avec la peau, comme nous mangeons ici quelquefois les pommes. Je n'en ay vû que dans le Chensi. »
[65] Ibid., 1:213. « … ; il y en a, comme des pommes, de plusieurs especes : ceux des terres méridionales sont d'un goust fort sucré & se fondent en eau. Dans le Chansi & le Chensi, ce fruit est plus ferme, plus gros, mieux nourri, & plus aisé à conserver. »
[66] Ibid., 2:458-459.

to the two provinces on whose border Jiangzhou is located. Despite Le Comte's intention to provide a comprehensive overview of China in the *Nouveaux mémoires*, his botanical account for northern China encompassed no other provinces than Shanxi and Shaanxi. Le Comte's work on botany was restricted by the institutional power that governed the French mission, including the scientific agenda of the *Académie* and the state interests of France, which prioritized their primary duties of geography and astronomy.

Le Comte's stay in Jiangzhou was soon interrupted because of the political rivalry between France and Portugal. In 1690, a French painter who was supposed to deliver money and equipment to Le Comte was imprisoned by the Portuguese in Macao. Left with little money, Le Comte and his companion Visdelou had no choice but to rejoin Fontaney in Nanjing. Before returning to France in 1691, Le Comte was active in the southeastern provinces of Jiangnan, Jiangxi, Fujian, and Guangdong. He assisted Fontaney in measuring major cities in the region and produced a hydrographic map from Nanjing to Guangzhou.[67] As expected, Le Comte's botanical works in this period concentrated on southeast China. In contrast to a variety of crops found in northern China, Le Comte specified that the major crop in southern China was rice. He then mentioned an abundance of fruit in the region: *létchi* (*lizhi* 荔枝; lychee), *lon yen* (*longyan* 龍眼; longan), *séze* (*shizi* 柿子; persimmon), orange, lemon, citrus, grapefruit, a particular tree that produces wax, a type of pepper, a type of onion, and *pétçi* (*biqi* 荸荠; Chinese water chestnut).[68] In this list, the pepper and the onion are identified by Emil Bretschneider as respectively *huajiao* 花椒 (Chinese or Sichuan peppercorn) and *louzicong* 樓子蔥 (tree onion).[69] Le Comte also made a note of *co* (*ge* 葛; kudzu), a textile plant he encountered in Fujian, and *outom-chu* (*wutongshu* 梧桐樹; Chinese parasol tree), a common ornamental tree in southern China.[70] From the account given by Le Comte, it is obvious that his later botanical work

[67] Fontaney, "Lettre du Père de Fontaney," 213.
[68] Le Comte, *Nouveaux mémoires*, 1:212-224.
[69] Bretschneider, *Early European Researches into the Flora of China*, 26-27. Bretschneider notes that *huajiao* 花椒 in Chinese refers to several species under the genus *Zanthoxylum*. The specific species that Le Comte encountered is unknown.
[70] Le Comte, *Nouveaux mémoires*, 1:301-302, 335-336. See also Bretschneider, *Early European Researches into the Flora of China*, 28.

concentrated on southeast China as his activity was circumscribed in the region between 1690 and 1691. The geographical limitation of Le Comte's botany was also evident in Le Comte's reflection on tea. Le Comte spent pages on tea regarding its medical use and cultivation, yet despite a variety of types of tea in China, he provided descriptions only for those from Shaanxi, Jiangnan, and Fujian.[71] This aligns with the spatial limitation of Le Comte's travel. In conformity with the *Académie royale des sciences*' efforts in astronomical and geographical observations, Le Comte first traveled to Jiangzhou with Fontaney for astronomical observations and then assisted Fontaney in surveying cities in the southeast. The natural history research of Le Comte emerged as a byproduct of these geographical measurements. On the other hand, Le Comte's travel was profoundly affected by the geopolitical context of the French-Portuguese rivalry. The Portuguese hostility to the French Jesuits in China altered the course of Le Comte's travel and thereby shaped the geographical scope of his botanical work. Le Comte's botanical work thus cannot be seen in isolation from the French cartographic ambition in Asia and its rivalry against the Portuguese monopoly in the region.

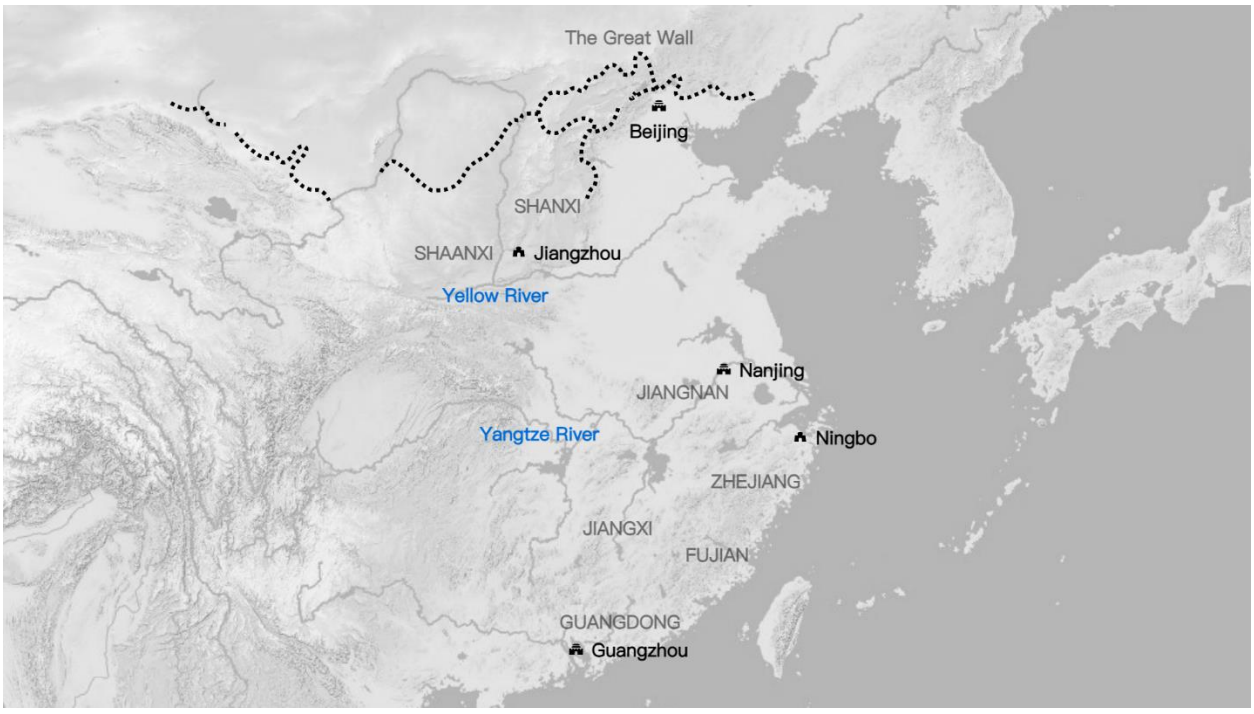

Image 1.1 Map of Louis Le Comte's journeys in China, 1687-1691

[71] Le Comte, *Nouveaux mémoires*, 1:457-468.

In comparison to geography and astronomy, the natural history of China received little attention from the *Académie royale des sciences* until the 1700s. In the first volume of the *Observations… par les pères jésuites* (1688) edited by Thomas Gouye, S.J. (1650-1725), the Jesuit correspondent at the *Académie,* there are only a few passages on animals of Siam by Joachim Bouvet, which assume a subsidiary role to the contents of geography. The following volume (1692) contains no natural history at all.[72] From the perspective of the *Académie,* the major outcome of the first French Jesuit mission in China was the geographical and astronomical data that were useful in enhancing voyages and navigation and benefiting French maritime trade in Asia. In 1699, the *Académie*'s annual memoir included a report consisting of the longitudes and latitudes of major Chinese cities provided by the *mathématiciens du roi* and an astronomical observation on Mercury passing the Sun by Fontaney.[73] The *Académie* celebrated the *mathématiciens*' successful fulfillment of their observation tasks. The study of botany by Le Comte was in the grip of the Jesuit scientific mission that prioritized geography and astronomy. His natural history work, being a side project of surveying tasks, was overlooked by scholars in the *Académie* as it is now by many historians who study the Jesuits in China.

Botany in Nouveaux mémoires sur l'état présent de la Chine

The natural history of China was a recurring theme in Louis Le Comte's *Nouveaux mémoires sur l'état présent de la Chine*. The work marked a monumental milestone of French Jesuit literature on China, shifting from an academic style seen in the *Observations… par les pères jésuites* to a more casual and anecdotal genre characteristic of travel journals. Released six years prior to the first volume of the *Lettres édifiantes et curieuses* (1702), Le Comte's work has a typical Jesuit style, characterized by a focus on overseas curious matters. Its letter format and focus on curiosities, in the eyes of many modern historians, serve as a prelude for the *Lettres*

[72] Florence C. Hsia, "Some Observations on the Decline of the French Jesuit Scientific Mission in China," *Revue de Synthèse* 120, no. 2-3 (June 27, 1999): 316.
[73] Académie royale des sciences, *Histoire de l'Académie royale des sciences, année 1699, avec les mémoires de mathématique & de physique, pour la même année, tirez des registres de cette Académie*, 3rd ed. (Paris: Gabriel Martin, Jean-Baptiste Coignard fils., and H. Louis Guerin, 1732), 82-85.

édifiantes et curieuses.[74] In the *Nouveaux mémoires*, Le Comte dedicated a substantial part of his study to botany as a matter of curiosity, even if natural history was not a major focus of the *mathématiciens du roi*'s mission. Astronomy and geography, however, were not a central focus of Le Comte. He omitted many details about astronomical observations and cartographical practices and directed readers to the works of Thomas Gouye for more scientific details.[75] Le Comte aimed to provide general insights into China, as his intended readers were not the scientists of the *Académie royale des sciences* but a broader non-academic audience. The first volume comprises eight chapters: the missionaries' journey from Siam to Beijing; the audience with the Chinese emperor; cities, buildings, and notable monuments in China; climates, lands, canals, rivers, and fruits in China; characteristics of Chinese people; their magnificence; their languages, books, and morality; and their wisdom, encompassing science, technology, and medicine. The second volume has six chapters: Chinese politics and government; Chinese religions; the progress of Christianity in China; the Jesuits' method of preaching and the fervor of the new converts; the emperor's tolerance toward Christianity; and the observations made by Le Comte, encompassing astronomy and the natural history of the Indies.[76]

Not being a trained botanist, Le Comte did not delve into specialized studies of Chinese plants. Instead, he offered botanical descriptions with an anecdotal nature. Le Comte's account of Chinese plants fits well into his "curious" writing style, hinting at the allure of knowledge not yet familiar to France. In his description of kudzu (*Pueraria montana var. lobata*), for example, Le Comte emphasized the root's uniqueness as a special material for cloth fabrication:

> It is a kind of creeping shrub, whose leaves are much larger than those of ivy. They are round, soft, green on the inside, whitish, and cottony on the outside. The small stem, which forms the body of this ivy, becomes extremely long. People let it grow and creep in

[74] Florence C. Hsia, *Sojourners in a Strange Land: Jesuits and Their Scientific Missions in Late Imperial China* (Chicago: University of Chicago Press, 2009), 130; Sarah Barthélemy, "Français et jésuite. Les Lettres édifiantes et curieuses de Chine, entreprise éditoriale de la mission jésuite française (1702-1783)," *Revue d'histoire ecclésiastique* 114, no. 1/2 (2019): 230; Marie-Julie Maitre, "The Edifying and Curious Letters: Jesuit China and French Philosophy," in *The Chinese Chameleon Revisited: From the Jesuits to Zhang Yimou*, ed. Zheng Yangwen (Newcastle upon Tyne: Cambridge Scholars Publishing, 2013), 44-45.
[75] Hsia, *Sojourners in a Strange Land*, 131.
[76] Pierre-Henri Durand, "Lire ou relire le Père Le Comte," *Études chinoises* 11, no. 1 (Spring 1992): 158-159.

> fields. Some are as big as a little finger. It is flexible and cottony like its leaves. When it begins to dry, it is cut. People make sheaves of it rot in the water, like hemp. The first layer is always removed, but with the second, which is much finer and is divided by hand into very small strands without being beaten or spun, people make this beautiful linen of which I speak.[77]

The description appears in the chapter dedicated to the characteristics of the Chinese. Le Comte included a description of this unique and wondrous plant due to its exceptional nature. Referring to the clothes made of kudzu, Le Comte used words like "highly esteemed" and "beautiful" and described the clothes as "transparent, quite fine, so fresh and light that it feels like wearing nothing."[78] He spoke highly of the grassroot for its distinct features compared to other common plant-based fabrics, such as cotton. Moreover, the plant was praised not just for its superior quality as a textile but also for its geographic specificity. It can only be found in Fujian Province and nowhere else according to Le Comte.[79] Le Comte's narrative accentuated the curiosity surrounding Chinese flora by highlighting its distinctiveness and attractiveness.

Le Comte used similar rhetoric describing the Chinese parasol tree (*Firmiana simplex*) as a great ornamental plant in the chapter on the magnificence of Chinese dwellings dedicated to the Duchess of Bouillon (1649-1714): "As this tree is beautiful and the way it bears fruit is somewhat extraordinary, I thought, Madam, that you would not mind seeing the engraving I have made."[80] Le Comte added a sketch of the tree, following the textual description:

> Its leaves are long and wide, measuring eight to nine inches, attached to a one-foot-long stem. It is extremely bushy and loaded with bouquets so dense that the sunlight cannot

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[77] Le Comte, *Nouveaux mémoires*, 1:301-302. « C'est une espéce d'arbrisseau rampant, dont les feuilles sont beaucoup plus grandes que celles du Lierre ; elles sont rondes, molles, vertes par le dedans, blanchastres & cottonnées par le dehors. Le petit baston, qui fait le corps de ce Lierre, devient extrêmement long; on le laisse croistre & ramper dans les champs. Il y en a de gros comme le petit doigt, qui est pliant & cottonné comme ses feuilles. Quand il commence à sécher, on le coupe ; l'on en fait pourrir les gerbes dans l'eau, comme le Chanvre ; & on en tire toûjours la premiere peau, qu'on rejette ; mais de la seconde, qui est beaucoup plus fine, & qu'on divise à la main en de tres-petits filets, sans la battre & sans la filer, on en fait cette belle toile dont je parle : … »

[78] Ibid., 1:301-302. « …plus estimée, » « …belle, » « …transparente, assez fine, mais si fraische & si legere qu'il semble qu'on ne porte rien. »

[79] Ibid., 1:301.

[80] Ibid., 1:336. « Comme cet arbre est beau, & que la maniere, dont il porte son fruit a quelque chose d'extraordinaire, j'ay crû, MADAME, que vous ne seriez pas marrie d'en voir le dessin que j'ay fait graver. »

> pierce them. Although the tree is very large, the fruit is extremely small and develops in the manner I am going to talk about. Around August or the end of July, small clusters of leaves different from the others form at the tips of the branches. They are whiter, softer, and narrower, resembling flowers. On the edge of each of these leaves, three or four small grains appear, like green peas, containing a white substance with a rather pleasant taste similar to that of an immature hazelnut.[81]

The *Nouveaux mémoires* is not a picture album and contains only a very limited number of illustrations. The sketch of a Chinese parasol tree (Image 1.2) is the sole drawing of a plant within the book. Le Comte chose to showcase an illustration of this plant for his European readers, possibly due to its exquisite appearance and artistic value—a captivating element of nature for garden decoration. Visual representation was one of the major media for transforming the ideas and imaginations of Chinese gardens to Europe. In early modern times, porcelains, textiles, and lacquer wares produced in China flowed into Europe following active Eurasia trade. The decorative images on these luxurious goods depicting scenes of Chinese architecture and landscapes became the first European impression of Chinese gardens.[82] Presenting a visual allure of features of Chinese gardens might have been the reason Le Comte decided to include the image. Although Le Comte spoke highly of the ornamental plants in Chinese gardens, he was not very fond of Chinese gardens' irregular layout which he found too modest. Le Comte proposed his idea of modifying Chinese gardens which involved arranging ornamental trees and orange trees neatly to create shaded pathways amid the greenery, envisioning this as "the most beautiful thing in the world."[83] The drawing of the Chinese parasol tree, with emphasis on its large leaves and dense canopy, perhaps served to convey the effect of his design.

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[81] Ibid., 1:335-336. « Les feüilles en sont longues & larges de huit à neuf pouces, attachées à une queüe d'un pied de long ; il est extremement touffu, & chargé de bouquets si pressez, que les rayons du Soleil ne sçauroient les percer ; le fruit, qui en est extremement petit, quoi-que l'arbre soit des plus grands, vient de la maniere que je vais dire. Vers le mois d'Aoust, ou à la fin de Juillet, il se forme sur la pointe des branches de petits bouquets de feüilles differentes des autres ; elles sont plus blanches, plus molles, moins larges, & tiennent lieu de fleurs ; sur le bord de chacune de ces feüilles naissent trois ou quatre petits grains, comme des pois verds, qui renferment une substance blanche, d'un goust assez agreable, & semblable à celuy d'une noisette, qui n'est pas encore meure. »

[82] Bianca Maria Rinaldi, ed., *Ideas of Chinese Gardens: Western Accounts, 1300-1860* (Philadelphia: University of Pennsylvania Press, 2016), 6-7.

[83] Le Comte, *Nouveaux mémoires*, 1:335. « … la plus belle chose du monde ; … »

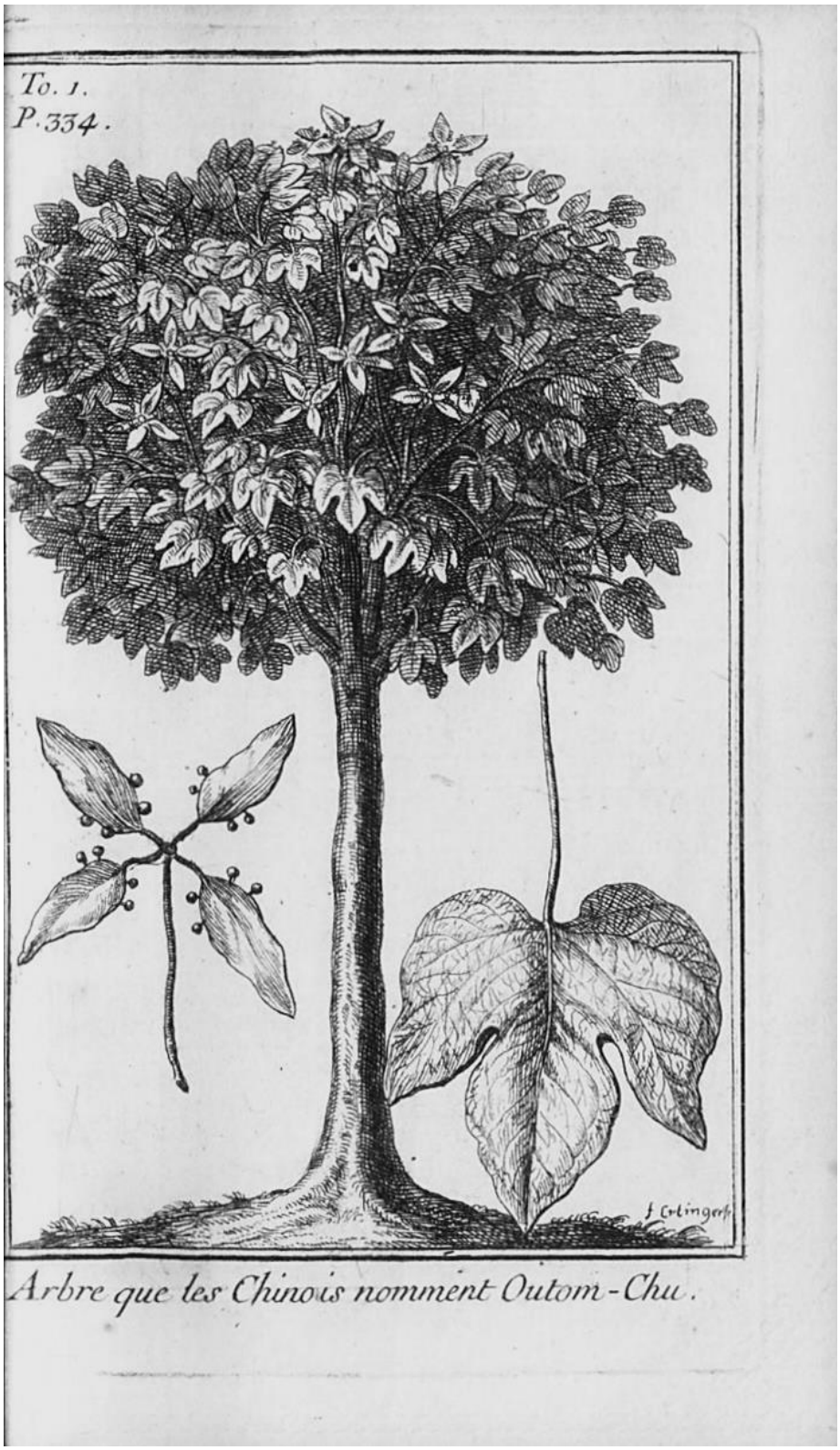

Image 1.2 Chinese parasol tree in Louis Le Comte's *Nouveaux mémoires*, 1696[84]

[84] Ibid, 1:334.

The *Nouveaux mémoires* features a chapter dedicated to Louis Verjus, Count of Crécy (1629-1709), focusing on specific Chinese fruits. Le Comte classified them into two categories: those that were familiar in Europe and those that were not. When discussing the species that were familiar in Europe, Le Comte mentioned pears, apples, peaches, apricots, figs, grapes, pomegranates, walnuts, and chestnuts.[85] He only briefly introduced these fruits, as they were already common in Europe and did not warrant much attention from the standpoint of curiosity. Le Comte hinted at the existence of numerous other fruits and plants unknown to the Europeans. The words he penned to describe fantastic and exotic fruits in China had a notably anecdotal and curious style, reflecting the early modern European fascination with far-off foreign lands: "I would further add, Sir, to acquaint you with the fertility of this empire, that there is no place in the world so abundant in roots and vegetables. … I would not finish if I were to give details here. I will only tell you that besides the species we have in Europe, there are many others that we do not know, and they are valued more than ours."[86] Le Comte concentrated his attention more on the fruits that were unknown to the Europeans. He particularly referred to fruits like the yellow melon from north-central China, as well as longan and lychee from south China, which he described: "I do not know of any fruit in Europe that comes close to it."[87] In addition, he mentioned the tree onion that "does not sprout from seeds like those in Europe" and the water chestnut which he called "a great wonder."[88] Once again, Le Comte spoke highly of the unfamiliar species he encountered in China, expressing a passion for the novelty of nature that he sought to convey to his readers.

Moreover, Le Comte consciously distinguished species in China from those in South and Southeast Asia. Fruits and spices from the East Indies were no strangers to the French nobles in the 17th century. Before the establishment of the *Compagnie des Indes orientales*,

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[85] Ibid., 1:210.
[86] Ibid., 1:221. « J'ajoûteray encore, MONSIEUR, pour vous faire connoistre la fertilité de cet Empire, qu'il n'y a pas de lieu au monde si abondant en racines & en legumes ; … Je serois infini si j'en voulois faire icy le détail. Je vous diray seulement qu'outre les especes que nous avons en Europe, il y en a encore beaucoup d'autres que nous ne connoissons pas, & qu'on y estime plus que les nostres. »
[87] Ibid., 1:212. « … ; je ne sçay aucun fruit en Europe qui en approche. »
[88] Ibid., 1:222. « … ; il ne vient point de graine comme ceux d'Europe. » « …une chose beaucoup plus merveilleuse. »

Paris had already emerged as a major center of consumption for tropical goods and spices sourced from the East Indies. In 1664, the foundation of the *Compagnie* pioneered a maritime route spanning the Indian Ocean, facilitating the transportation of a diverse range of commodities from the region to France.[89] Le Comte unveiled novel types of foreign and exotic merchandise by contrasting species found in China with those found in the East Indies. This serves as a rhetorical device to attract readers' attention while delineating the cause of the China mission apart from the India mission based in Pondicherry. For example, Le Comte introduced the oranges (*Citrus* × *sinensis* or *Citrus reticulata*) from southern China, which he distinguished from the fruits from the East Indies:

> I am not speaking to you, Sir, about pineapples, guavas, coconuts, and some other fruits which are supplied by the Indies, and which are already known in France through our *Relations*. I cannot help but mention their oranges, known in France as Chinese oranges. … Those, that are highly valued and sent as rare treats to the Indies, are not larger than a billiard ball. Their skin is yellowish-red, thin, smooth, and extremely soft. The larger ones seem much better to me, especially those from Guangzhou, which are very pleasing to the taste and very good for health.[90]

Le Comte noted that an orange plant from China was transplanted to Lisbon and sold throughout Europe by the Portuguese, yet he remarked: "They have only one species, whereas in China there are several kinds."[91] Le Comte emphasized the diversity of Chinese oranges compared to the Portuguese variety, maintaining the necessity of exploring the natural world of China. In late-17th century Europe, the market share of the transplanted ones was gradually being replaced by sweet oranges imported directly from China, owing to the belief that the variety from China was

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[89] Ina Baghdiantz-McCabe, *Orientalism in Early Modern France: Eurasian Trade* (Oxford: Berg Publishers, 2008), 103.

[90] Le Comte, *Nouveaux mémoires*, 1:214-216. « Je ne vous parle point, MONSIEUR, des Ananas, des Goïaves, des Cocos, & de quelques autres fruits que les Indes leur ont fournis, & qui sont déja connus en France par nos Relations. Mais je ne puis m'empêcher de vous dire un mot de leurs oranges, qu'on nomme en France, oranges de la Chine, … Celles qu'on estime le plus & qu'on envoye par rareté dans les Indes, ne sont pas plus grosses qu'une boule de Billart, la peau en est d'un jaune tirant sur le rouge, fine, unie, & extrêmement douce : cependant les grosses me paroissent beaucoup meilleures ; sur-tout celles de Canton sont tres-agreables au goust, & tres-bonnes pour la santé. »

[91] Ibid., 1:215. « … ; mais ils n'en ont que d'une espece, quoy-qu'il y en ait à la Chine de plusieurs sortes. »

better.[92] This, to some extent, attested to Le Comte's foresight.

Furthermore, Le Comte maintained the uniqueness of several pepper plants (genus *Zanthoxylum*) from China, which bear peppercorns that he found different from black pepper (*Piper nigrum*) from India: "Among the extraordinary trees of China, I must not ignore those that bear pepper, not a pepper like the one we use in Europe, which is supplied only by the Indies, but another kind of grains that have roughly the same properties. … However, its dried peel, although less pleasant and pungent than our regular pepper, is still quite useful in stews."[93] Spices were among the primary commodities sought by the French from the East. Black pepper from the Malabar Coast whetted Parisians' appetite for exotic flavors. By the end of the 17th century, black pepper had already been incorporated into the knowledge system and dietary habits of the French upper class. Around the early 18th century, it constituted the major bulk of the *Compagnie des Indes orientales*'s spice trade from Asia, with an estimated 500,000 pounds required by the *Compagnie* annually for its European market.[94] Le Comte hinted at a new sentiment of exotism by presenting pepper in China and its distinct taste. His narrative of Chinese fruits and spices implied that France was already familiar with many species from India, whereas the natural world of China was a novel realm of knowledge. Furthermore, rather than lumping China and India as both "the Orient" in a vague sense, Le Comte maintained the distinction between plants of China and India, denoting two different geographic entities and bodies of knowledge. This also aligned with the Ignatian Constitutions of seeking religious edification from nature. Such an argument hence advocated for the necessity of the Jesuit mission in China as a cause to cast off ignorance toward nature as God's creation.

Le Comte's passion for nature, however, did not conceal his non-specialized background in botany. Errors in his botanical descriptions are noteworthy. For example, Le Comte made note

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[92] Joseph Needham, Lu Gwei-Djen, and Huang Hsing-Tsung, *Science and Civilization in China*, vol. 6, *Biology and Biological Technology*, pt. 1, *Botany* (Cambridge: Cambridge University Press), 367.

[93] Le Comte, *Nouveaux mémoires*, 1:220. « Parmi les arbres extraordinaires de la Chine, je ne dois pas omettre ceux qui portent le poivre; non pas un poivre semblable à celuy dont nous usons en Europe, & que les Indes seules nous fournissent, mais une autre espece de grains qui ont à-peu-prés les mesmes proprietez. … ; mais son écorce dessechée quoy-que moins agreable & moins piquante que nostre poivre ordinaire, ne laisse pas d'estre d'un assez bon usage dans les ragousts. »

[94] Catherine Manning, *Fortunes à faire: The French in Asian trade, 1719-48* (London: Routledge, 1996), 156.

of a type of tree that contains wax, the Chinese ash (*Fraxinus chinensis*). He spoke remarkably of its unique feature of producing wax, as he put it: "It is quite surprising, and as there is nothing like it in the world, one initially imagines it to be a paradox."[95] The tree in the eyes of Le Comte counted toward a piece of wonder and a matter of curiosity, yet his description of it is false. Le Comte claimed wax is produced from its fruits: "What is truly remarkable is that the white flesh covering the kernel possesses all the qualities of tallow—color, smell, and consistency are perfectly alike. Consequently, candles are made from it after melting it down, only adding a little oil to make the paste softer and smoother."[96] The wax from the Chinese ash is not generated from its fruits but rather from an insect (*Ceroplastes sinensis*) that resides on the tree. Several decades prior to Le Comte's account, the Italian missionary Martin Martini, S.J. (1614-1661) already documented white wax produced from the secretion of a certain insect in his famous *Novus Atlas Sinensis* (1655). The Portuguese missionary Gabriel de Magalhaes, S.J. (1607-1677) gave a similar account of white wax produced by an insect.[97] The mistake he made regarding the Chinese white wax might have stemmed from his amateurish approach to botany. In the early modern period, the boundary between professional and amateur botany was blurred. Missionaries and merchants, for curiosity and for profit, were active in introducing a diverse array of botanical knowledge to Europe, yet these individuals were not trained botanists.

Le Comte's natural history work differed from his tasks in geography and astronomy, which were tied to the research goals of the *Académie royale des sciences*. The *mathématiciens du roi* was not trained in botany by the *Académie*, nor was Le Comte's natural history work further verified by the scientists of the *Académie*. As seen in the case of white wax, it becomes evident that some of Le Comte's botanical accounts hold limited scientific significance and instead serve as part of the tales of intriguing wonders he encountered in China.

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[95] Le Comte, *Nouveaux mémoires*, 1:217-218. « La feule proposition surprend ; & comme il n'y a rien de semblable au monde, on s'imagine d'abord que c'est un paradoxe : … »

[96] Ibid., 1:218-219. « Mais ce qu'il y a d'admirable, c'est que cette chair blanche qui couvre le noyau, a toutes les qualitez du suif ; la couleur, l'odeur, la consistance, tout en est parfaitement semblable ; aussi en fait-on des chandeles, aprés l'avoir fonduë; on y mesle seulement un peu d'huile, pour en rendre la paste plus molle & plus douce. »

[97] Bretschneider, *Early European Researches into the Flora of China*, 18, 26.

Beyond Curiosity: Defending the French Jesuit Mission in China

Le Comte underscored the significance of studying natural history in satisfying curiosity, employing it as a persuasive tool to advance the endeavors of the French Jesuits in China. Observing nature held a pivotal role in shaping Le Comte's comprehension of Chinese plants. In the *Nouveaux mémoires,* Le Comte consciously suggested that a variety of misconceptions or myths about the natural world of China could be settled by verifying them personally. He shared a rumor regarding the Chinese water chestnut: "It has the property of softening copper in the mouth and, so to speak, making it edible when they are mixed together."[98] This assertion came from the book of Martin Martini who might have been influenced by some Chinese sources.[99] For example, in *Bencao Gangmu* 本草綱目 (1578), the famous *Compendium of Materia Medica* by the Chinese herbalist Li Shizhen (1518-1593), there is a mention of water chestnut softening copper.[100] Le Comte, while traveling in the city of Hangzhou in Jiangnan Province where he found water chestnuts were widely consumed, suddenly had the idea to verify this statement by chowing the root and a piece of copper together and, of course, failed to soften the copper. He then repeated the same practices while leaving Hangzhou for Jiaxing in Zhejiang Province and, unsurprisingly, failed again. Le Comte then commented: "It is indeed true that one must be aware of extraordinary things more than once before believing them if one does not want to be deceived."[101] The anecdote assured the lesson that natural history enthusiasts should actively participate in botanical practices firsthand, even repeatedly, to avoid being misled by rumors. Such discourse advocated the necessity of experiencing foreign lands to pursue scientific truth and thereby justified the China mission.

The same kind of discourse can also be found in Le Comte's discussion of ginseng (*Panax ginseng*). He believed the sojourn to China benefitted his understanding of the cultural

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[98] Le Comte, *Nouveaux mémoires,* 1:223. « On assure qu'il a la proprieté d'amolir le cuivre dans la bouche, & de le rendre, si j'ose ainsi dire, *comestible*, quand on les mesle ensemble. »
[99] Bretschneider, *Early European Researches into the Flora of China*, 27.
[100] Li Shizhen 李時珍, *Bencao Gangmu* 本草綱目 [Compendium of Materia Medica (1578)] (Beijing: Zhongyi guji chubanshe 中醫古籍出版社, 1994), 810. "烏芋善毀銅，合銅錢嚼之，則錢化，可見其為消堅削積之物。"
[101] Le Comte, *Nouveaux mémoires*, 1:224. « … ; tant il est vray qu'il faut écouter les choses extraordinaires plus d'une fois, avant que de les croire, si l'on ne veut pas y estre trompé. »

significance of the plant. Le Comte offered a brief discussion of the meaning of ginseng (*renshen* 人參) in Chinese, revealing the Chinese perception of the plant: "*Gin* means man, and *Seng* signifies plant or herb. That is to say man-herb or an herb resembling a man. Those who have given a different interpretation to these words until now are excusable because they were not familiar with the power of Chinese characters, which alone contain the true meaning of the terms."[102] Le Comte wrote in response to a variety of European misinterpretations of the meaning of ginseng in the Chinese language. An example of misconception can be seen in Guy Tachard's *Voyage de Siam* (1686) in which Tachard talked about ginseng roots exported from China to Siam. "In Chinese," Tachard wrote, "*Gin* means a man, and *Seng* signifies either to kill or to heal, depending on how it is pronounced. This is because this root when taken appropriately or inappropriately, causes effects that are completely opposite."[103] The explanation exposed Tachard's ignorance of Chinese. The character 參 does not carry any of the meanings that Tachard mentioned.[104] Le Comte's explanation, while not entirely correct, is closer to the character's true meaning: The character does not refer to plants in a general sense but instead denotes a category of plants used in Chinese herbology. Tachard's mistake, as noted by Le Comte, stemmed from his unfamiliarity with Chinese writings. For Le Comte, understanding Chinese culture was essential for comprehending Chinese materia medica, and the mission to China was deemed necessary to bridge the gap in understanding Chinese culture.

Le Comte's account of ginseng was not solely based on his own experience. Rather, a large proportion of it came from the existing knowledge system of herbology in China. In the

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[102] Ibid., 1:468. « *Gin* veut dire homme, & *Sem* plante ou Simple ; comme qui diroit Simple humain, Simple qui ressemble à l'homme. Ceux qui jusqu'ici ont donné une autre interprétation à ces mots, sont excusables ; parce qu'ils ne connoissoient pas la force des caractéres Chinois, qui seuls renferment la veritable signification des termes. »

[103] Guy Tachard, *Voyage de Siam des pères jésuites, envoyés par le roy, aux Indes & à la Chine. Avec leurs observations astronomiques, & leurs remarques de physique, de géographie, d'hydrographie, & d'histoire* (Paris: Arnould Seneuze and Daniel Horthemels, 1686), 371. « Car *Gin* en Chinois veut dire un homme, & *Seng* signifie tantôt tuer & tantôt guérir, selon qu'on le prononce différemment ; parce que cette racine prise bien ou mal à propos, cause des effets tout à fait contraires. »

[104] The character 參 (simplified 参) has multiple pronunciations, each carrying distinct meanings: When pronounced as "cān," it means to consult, to inspect, or to participate; "shēn," refers to two things: name of a materia medica or a specific celestial body; "cēn," which is commonly seen in the word "cēn cī," means irregularities or unevenness; "càn," refers to the name of a drum tune; "sǎn," means disordered. See *Kangxi zidian* 康熙字典 [Kangxi Dictionary (1716)] (Shanghai: Hanyu dacidian chubanshe 漢語大詞典出版社, 2005), 95.

Nouveaux mémoires, Le Comte specified how to make ginseng into a remedy: "Dry it over the fire on paper, or soak it in wine until it is thoroughly saturated and penetrated. Then cut it into small pieces with teeth (not with a knife, as the iron diminishes its potency), and after calcining it, put the powder in a bowl, with warm water or wine."[105] The part here was drawn directly from *Bencao Ganmu*.[106] The French version of *Bencao Ganmu* was already available by the end of the 17th century. The translation was, in fact, made by Jean de Visdelou, one of the *mathématiciens du roi*.[107] The excerpt of Visdelou's translation, together with the work and translations on Chinese herbology, was later compiled into the third volume of Du Halde's *Description… de la Chine*. Le Comte may have also consulted *Bencao Ganmu* for his conclusion of ginseng's medical function: It purifies the blood, comforts the stomach, strengthens pulses, and increases heat and moisture in the human body. The concept of heat and dampness in the body was a principle in traditional Chinese medicine, which Le Comte might have adapted to the European idea of humorism.[108] Le Comte's discussion demonstrates a hybrid nature, suggesting the necessity of incorporating the Chinese understanding of the plant. For him, exploring curiosities entailed not only documenting an unknown world of nature but also engaging with different knowledge systems. Based on the discussion in the previous part, Le Comte's approach to Chinese botany was from a European standpoint, as he took European knowledge of the natural world as a reference, emphasizing those that were not part of or had not yet been domesticated by Europe. When discussing these plants, Le Comte reached a point where he found his previous knowledge insufficient for understanding ginseng. He sought botanical insight from the Chinese

[105] Le Comte, *Nouveaux mémoires*, 1:471. « … faites-la secher au feu dans un papier, ou mettez-la tremper dans du vin, jusqu'à ce qu'elle en soit imbuë & pénétrée . Coupez-la ensuite par petites pieces avec les dents (& non pas avec un couteau, le fer en diminue la vertu) & aprés l'a voir calcinée vous en prendrez la poudre en bol, dans l'eau chaude ou dans du vin, … »

[106] Li Shizhen 李時珍, *Bencao Gangmu* 本草綱目 [Compendium of Materia Medica (1578)], 305. "凡生用宜咀，熟用宜隔紙焙之，或醇酒潤透咀焙熟用，並忌鐵器。" For Visdelou's translation, see "Ginseng" in Du Halde, *Description… de la Chine*, 3:460-474. For more on Li Shizhen and *Bencao Gangmu*, see Carla Nappi, *The Monkey and the Inkpot: Natural History and Its Transformations in Early Modern China* (Cambridge, MA: Harvard University Press, 2009).

[107] Le Comte, *Nouveaux mémoires*, 1:456.

[108] Ibid.,470. Le Comte misread this, as *Bencao Gangmu* notes that ginseng reduces heat and dampness in the human body. The Europeans perceive a similar concept in humorism, yet humorism suggests a balance of heat, coldness, moisture, and dryness, whereas, in Chinese medicine, dampness is considered a source of disease. The different approaches to the concept of moisture might be the reason for Le Comte's misread.

knowledge system in which ginseng was incorporated, believing that understanding the Chinese approach to materia medica would further his goal of collecting curiosities, as he wrote: "I do not doubt that what he (Visdelou) will give us on this (the translation of *Bencao Gangmu*) will enrich our botany and satisfy all the curious."[109]

Le Comte's support for the French Jesuits' quest for curiosities in China is also evident in his introduction of tea, the nature of which he insisted on closely investigating to gain a better understanding. Le Comte delved into the debate regarding the quality of tea that was prevalent in 17th-century Europe: "Some argue that it possesses admirable qualities, while others claim it to be a mere imagination and a stubbornness of the Europeans who always esteem novelties and give value to everything they are unfamiliar with."[110] Tea became known to Europe in the 16th century. In the early 17th century, tea was introduced to Europe in significant quantities, credited to Dutch merchants engaged in trade with Japan, China, and Siam. The popularity of tea then slowly expanded from the Netherlands to encompass all of Western Europe, while at the same time, renowned Dutch physicians including Jacob de Bondt (1592-1631), Nicolaes Tulp (1593-1674), and Willem Piso (1611-1678) began to prescribe tea and endorsed the plant's medical benefits via publications. In particular, Tulp's work gained widespread acclaim throughout Europe and even led to an impetus to the Dutch East India Company's tea trade.[111] From the Netherlands, discussions of the medical use of tea circulated in Europe. Le Comte's comments on tea in the *Nouveaux mémoires* may reflect upon the contemporary discussions regarding its medical benefit and skepticism around them.

Le Comte hesitated to jump to a conclusion about whether tea has certain good qualities. He insisted on the importance of research to bring a better understanding of the plant and its variants. Le Comte said explicitly: "I believe that it is necessary to talk about it moderately, both

[109] Ibid., 1:456. « … ; & je ne doute point que ce qu'il nous donnera là-dessus n'enrichisse notre botanique, & ne contente tous les curieux. »
[110] Ibid., 1:457. « Les uns soûtiennent qu'il en a d'admirables ; d'autres, que c'est une imagination, & un pur entestement des Européens, qui estiment toûjours les nouveautez, & qui donnent du prix à tout ce qu'ils ne connoissent pas. »
[111] See George van Driem, *The Tale of Tea: A Comprehensive History of Tea from Prehistoric Times to the Present Day* (Leiden: Brill, 2019), 321-335.

for its benefits and its drawbacks. … To use it effectively, it is important to understand it, as there are several varieties of tea."[112] Le Comte's account continued, encompassing various types of tea: first, a notably inexpensive, poor-quality tea he encountered in Shaanxi, described as "coarse, rough, and unpleasant;" second, two types of tea suitable for treating acute illnesses, one bearing a resemblance to moss rather than tree leaves, and the other characterized by long and thick leaves; third, the most prevalent tea in China, which he described as "of good quality, featuring a reddish hue water, and possessing a mild yet slightly bitter taste."[113] Lastly, He specified two types of high-quality tea from southeast China:

> The first one is called *thé soumlo*, named after the place where it is harvested. It has somewhat long leaves, providing clear and green water when it is fresh, and a pleasant taste; it smells, people say in France, a little of violet, but this smell is not natural to it; the Chinese have often assured me that good tea should have no smell. This is the tea usually presented during visits, but it is extremely corrosive. It should not be consumed on an empty stomach, and prolonged consumption leads to discomfort. … The second is called *thé voüi*. Its leaves are small and dark, giving the water a yellow color. It has a delicate taste, and even the weakest stomach can tolerate it at any time. In winter, it should be consumed moderately, but in summer, one can never drink enough of it. It is particularly remarkable after sweating, such as after a journey, a race, or any other intense exercise. It is also given to the sick, and those who take care of their health drink no other kind.[114]

Both types of tea originated in southeast China. *Thé Soumlo* (Songluo tea 松蘿茶) was named

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[112] Le Comte, *Nouveaux mémoires*, 1:459-460. « Ainsi je croy qu'il faut en parler moderément & pour le bien & pour le mal. … Pour s'en servir utilement, il est bon de le connoistre, car il en est de plus d'une sorte. »

[113] Ibid., 1:460-461. « …grossier, aspre & desagreable. » « …est bon, l'eau en est rougeastre, le goust fade & un peu amer ; … »

[114] Ibid., 1:461-462. « La premiere se nomme le *Thé soumlo* ; c'est le nom du lieu où on le cueille. Les feüilles en sont un peu longues, l'eau claire & verte quand il est frais, le goût agreable ; il sent, dit-on en France, un peu la violette, mais cette odeur ne luy est point naturelle ; & les Chinois m'ont souvent assuré que le bon *Thé* ne devoit avoir aucune odeur, c'est celuy qu'on presente ordinairement dans les visites ; mais il est extrémement corrosif. On ne doit pas en prendre à jeun, & à la longue on s'en trouveroit incommodé. … La deuxiéme espece se nomme le *Thé voüi*. Les feüilles, qui en sont petites & noirâtres, donnent à l'eau une couleur jaune. Le goust en est délicat, & l'estomach le plus foible s'en accommode en tout temps. En hyver, il faut en user moderément ; mais en été, on n'en sçauroit trop boire. Il est sur-tout admirable dans la sueur, aprés un voyage, une course, ou quelqu'autre exercice violent. On en donne aussi aux malades, & ceux qui ont quelque soin de leur santé n'en boivent point d'autre. »

after the Songluo Mountains of Jiangnan Province where the tea was cultivated, while *thé voüi* (Wuyi tea 武夷茶) derived its name from the Wuyi Mountains of Fujian Province. As Le Comte argued above, the French either lavishly praised tea or approached its usage with skepticism, and both reactions stemmed from a lack of knowledge about this beverage. His work, as one of the outcomes of the French mission to China, sorted out different types of tea, a process deemed crucial by Le Comte for a comprehensive understanding of tea's nature. Moreover, Le Comte enhanced his understanding of the distinctions among various types of tea and their roles as materia medica by incorporating words from local Chinese individuals, underscoring the importance of comprehending the essence of tea through insights provided by local informants.

Le Comte also referenced *Bencao Gangmu* in his discussion of the qualities of different types of tea: "The best grows in stony soils. The one planted in light soils comes in second. The lowest quality is found in yellow soils."[115] Traveling from the north-central plateau to the southeast coast, Le Comte encountered diverse tea plants cultivated in varying environments. The content from *Bencao Gangmu* encapsulates Le Comte's observation that poor-quality tea originated from the loess soil of Shaanxi, while higher-quality tea came from mountainous regions in Jiangnan and Fujian. Drawing from Chinese sources formed another cornerstone of Le Comte's understanding of tea, alongside his personal experiences and interactions with locals. Le Comte recognized China not only as a realm of natural marvels but also as a repository of intricate knowledge, and his travels therein enriched his understanding. His discourse on tea contributed to the European discourse on the subject. His journey to China facilitated the exchange of knowledge, demystified obscure information, and fostered a deeper understanding of China's botanical landscape.

Why did Le Comte persist in justifying the cause of the French Jesuits in China? Le Comte returned to France in 1691 after a relatively short three-year sojourn in China. The primary purpose of his return to France was to seek help and support. Despite the French royal

[115] Ibid. « Le meilleur vient dans les terroirs pierreux. Celuy qu'on plante dans les terres legeres tient le second rang. Le moindre de tous se trouve dans les terres jaunes ; … » See Li Shizhen 李時珍, *Bencao Gangmu* 本草綱目 [Compendium of Materia Medica (1578)], 795. "其上者生爛石，中者生礫壤，下者生黃土。" For Visdelou's translation, see "Thé" in Du Halde, *Description… de la Chine*, 3:474-480.

patronage, the *mathématiciens du roi* still encountered financial difficulties during their mission as geopolitics in Asia was far beyond the grasp of the French king. Due to the thwarting of the Portuguese and the lack of financial support, Fontaney, Visdelou, and Le Comte soon found themselves caught in poverty. They decided to send Le Comte back to France.[116] In light of the challenges faced by the *mathématiciens* in China, the *Nouveaux mémoires* served not only as a Jesuit report on curiosities but also shed light on Le Comte's intention of calling for support and defending the cause of French Jesuits. Using the discourse of curiosity, Le Comte presented botanical knowledge as a cultural refinement that demonstrates one's curious and studious image. He thus spoke highly about various aspects of China, emphasizing their novelty, and hoped to capture the attention of French aristocrats.

Le Comte explicitly articulated the necessity for patronage by directing his book toward prominent figures in France.[117] In the opening, Le Comte explained that his book was dedicated to King Louis XIV, the great patron of French Jesuit missions overseas.[118] Then in a total of fourteen chapters across the two-volume, Le Comte addressed fourteen prominent figures of France ranging from lay aristocrats to high clergy, among which included recipients such as François de la Chaise (1624-1709), the King's confessor, and Colbert's nephew, Colbert de Torcy (1665-1746), the Secretary of State for Foreign Affairs.[119] The composition of Le Comte's *Nouveaux mémoires* hence went beyond the goal of edification. The encyclopedic and anecdotal nature of his account served Le Comte's purpose of attracting aristocrats' attention. As Florance Hsia suggests, Le Comte highlighted the relevance of his subject matter to his esteemed correspondents' specific interests and put complex matters into casual expressions. For instance, Le Comte introduced his voyage while omitting dull and intricate nautical terminologies to suit the literary taste of Comte de Pontchartrain (1643-1727). His account of his experience in Beijing was directed toward the Duchesse of Nemours (1625-1707), who had a keen interest in

[116] Durand, "Lire ou relire le Père Le Comte," 158.
[117] John Parker, *Windows into China: The Jesuits and Their Books, 1580-1730* (Boston: Trustees of the Public Library of the City of Boston, 1978), 31.
[118] Le Comte, "Au roy," in *Nouveaux mémoires*.
[119] Durand, "Lire ou relire le Père Le Comte," 158.

the farthest corners of the world.[120] Le Comte addressed Louis Verjus in the chapter on plants and fruits. He first expressed gratitude toward the support from Louis Verjus and his house.[121] Then he offered his work to repay the count's kindness: "After having satisfied your natural tenderness, is it not time, Sir, to give something to your curiosity?"[122] The role of botany in the *Nouveaux mémoires* hence was not a serious science but a matter of curiosity and edification to attract the attention of the French aristocracy. Le Comte tailored his writings to the preferences of his chosen audience, the nobles, subtly introducing them to novel and exotic experiences. His carefully crafted writings were a vivid portrayal of wonders and news from distant lands, naturally evoking a sense of allure, mystery, and exoticism that catered to the refined palate of the French aristocracy.

In summarizing Le Comte's work, it bears more resemblance to travel narratives than to rigorous natural historical research. Natural history was not his core responsibility. In addition to his work in preaching Christianity, Le Comte primarily assisted Fontaney in conducting geographical and astronomical observations. On the other hand, conducting a comprehensive study of natural history was not an easy task for Jesuit missionaries. Le Comte's natural history account was stymied by inadequate financial support and the geopolitical tension between France and Portugal in Asia. The difficulties he encountered in China served as the impetus for his *Nouveaux mémoires*, which aimed to justify and advocate for their cause through the influence of Jesuit literature in Paris. The natural history of China, together with other news of an anecdotal nature, upheld the legitimacy of the first Jesuit mission in China as an adventure to explore uncharted territories, thereby shedding light on knowledge unknown. Le Comte emphasized what he considered wonders of nature: exquisite textiles, ornate beauties of gardens, exotic fruits, and remarkable natural remedies. By unfolding his *Nouveaux mémoires* emphasizing the acquisition of new knowledge through travel and interaction with local informants, Le Comte

[120] Hsia, *Sojourners in a Strange Land*, 131-132.
[121] Louis Verjus once served as ambassador of Louis XIV to other European countries. His brother Antoine Verjus (1632-1706) was the director of the French Jesuit mission to the East.
[122] Le Comte, *Nouveaux mémoires*, 1:200. « Mais aprés avoir satisfait à vostre tendresse naturelle, n'est-il pas temps, MONSIEUR, de donner quelque chose à votre curiosité ? »

advocated for the necessity of the Jesuit mission in China as a way of achieving edification. As he elaborated in the opening of the *Nouveaux mémoires*:

> One who undertakes to paint the manners of peoples, and to represent the arts, sciences, and religions of the new world, cannot successfully touch upon so many different subjects without a great breadth of knowledge, and without having, in some way, a universal mind. However, all of this is not enough if he has not also been a witness to most of the events he recounts; if he has not learned the customs and language of the inhabitants; if he has not taken care to engage in commerce with honest people; and if he has not even interacted with individuals of distinguished quality.[123]

[123] "Avertissment," in Le Comte, *Nouveaux mémoires*. « …, celuy qui entreprend de peindre les mœurs des peuples, & de réprésenter les Arts, les Sciences, les Religions du nouveau Monde, ne peut toucher avec succés tant de differentes matieres, sans une grande étenduë de connoissance, & sans avoir en quelque sorte un esprit universel. Tout cela mesme ne suffit pas, s'il n'a de plus esté témoin de la plûpart des événemens qu'il raconte ; s'il ne s'est instruit des coûtumes & de la Langue des Habitans ; s'il n'a eu soin de lier commerce avec les honnestes gens ; & s'il n'a mesme pratiqué les personnes d'une qualité distinguée. »

CHAPTER 2. Power and Natural History Knowledge: Jean-François Gerbillon's Eight Trips to Tartary

While Louis Le Comte's journey faced setbacks due to financial difficulties, leading to his return to France only three years after arriving in China, Jean-François Gerbillon and Joachim Bouvet had a more successful stay. The Kangxi Emperor allowed Gerbillon and Bouvet to stay in the imperial court in Beijing, a decisive call that would alter the inauspicious beginning of the French Jesuit mission in China. The two carefully harvested connections within the imperial court, particularly with the emperor himself, for the apparent goal of fostering conversion. On the other hand, they hoped to alter the power imbalance between France and Portugal in the China mission by aligning with the highest authority of the Qing Empire. European science, ranging from mapping techniques to medicines, became the primary means for the French Jesuits to maintain their position at the Qing court. Their power position, in turn, ensured their access to new knowledge about China.

Mathématiciens du roi at the Qing Court

The French Jesuit mission found itself in an unstable position when it arrived in China. Upon their arrival in Beijing in February 1688, the *mathématiciens du roi* received the news that Ferdinand Verbiest, the then vice-provincial of the Jesuits in China who summoned them and took them under his protection, had just passed away a few days before.[124] Verbiest was the key figure for the French Jesuit mission. He was put in charge of the Board of Astronomy (*Qintianjian* 欽天監) in 1669 and, in the following years, served as the Kangxi Emperor's tutor of science together with Tomás Pereira and the Italian missionary Philippe-Marie Grimaldi, S.J. (1639-1712).[125] Verbiest's dual identity as a government official and the emperor's tutor made him a key mediator between the Qing government and the newly arrived French Jesuits. In July 1687, the *mathématiciens* arrived at the port of Ningbo instead of taking the Macao-Guangzhou

[124] Fontaney, "Lettre du Père de Fontaney," 125.
[125] Ross, *A Vision Betrayed*, 174-175.

route, in an attempt to avoid Portuguese authority over the China mission. This violated the policy that foreigners could only enter the Qing Empire via the port of Guangzhou. The *mathématiciens*' illegal entry alerted local officials who reported to the Ministry of Rites (*Libu* 禮部) asking for further instructions.[126] In anticipation of the arrival of the French Jesuits, Verbiest pleaded with the emperor and mediated with the Ministry of Rites to secure permission for their stay in China. The Ministry of Rites then issued a decree instructing local officials to bring the five French Jesuits and their instruments to Beijing.[127]

Losing Verbiest's support, the French Jesuits' situation in Beijing became precarious. As narrated in the previous chapter, Jean de Fontaney, Claude de Visdelou, and Louis Le Comte were ousted from Beijing by Pereira, the Portuguese Jesuit who succeeded Verbiest in the role of vice-provincial. Gerbillon and Bouvet, who remained in Beijing, had limited access to the emperor as Pereira showed less enthusiasm in facilitating access for his French colleagues and potential counterparts.[128]

The situation changed in 1689 following the signing of the Treaty of Nerchinsk between the Qing Empire and Russia. The two empires clashed in the Amur River valley due to their respective territorial ambitions. In an attempt to seek a diplomatic resolution, Kangxi dispatched a delegation headed by two Qing princes Songgotu (1636–1703) and Tong Guogang (?–1690) to negotiate with the Russian ambassador Fyodor Golovin (1650-1706).[129] The interpreter of the Qing delegation was Pereira, who, according to Kangxi's orders, was required to select another European member to assist him. Pereira ultimately picked Gerbillon despite his earlier concerns about the French Jesuits.[130] This choice was likely driven by necessity, as Pereira lacked expertise in land surveying, a skill necessary in negotiating borders. The journey provided the French Jesuits with a chance to broaden their influence at the court. Impressed by Gerbillon's

[126] Litian Swen, *Jesuit Mission and Submission: Qing Rulership and the Fate of Christianity in China, 1644-1735* (Leiden: Brill, 2021), 101.
[127] Jami, *The Emperor's New Mathematics*, 109-112.
[128] Ibid., 141.
[129] Helena Jaskov, "The Negotiated Geography of the Treaty of Nerchinsk (1689) and the Role of the Jesuits," *Late Imperial China* 40, no. 2 (2019): 51-53.
[130] Jami, *The Emperor's New Mathematics*, 141-142.

exceptional performance during the negotiation, Songgotu took Gerbillon under his protection and promptly recommended the missionary to the emperor.[131] Kangxi, at the end of 1689, invited Gerbillon and Bouvet to join the ranks of his tutors, alongside Pereira and the Belgian Jesuit Antoine Thomas, S.J. (1644-1709).[132] Within two years, Gerbillon and Bouvet went from being unknown newcomers to becoming favorites by the emperor's side.[133] Their contributions to diplomacy and imperial education accumulated the trust of the royal family members and the emperor himself. This eventually led to Kangxi's permission to preach Christianity in China, known as the Edict of Toleration to the Europeans. Under Songgotu's mediation and Kangxi's consent, the Ministry of Rites ruled in 1692: "All the Catholic churches in various locations should be preserved as they were. Those who come to offer incense and worship are still permitted to move about as usual without any need for prohibition. When the decree is issued, this should apply to all provinces."[134]

During the 1690s, the French Jesuits in Beijing gained the upper hand vis-à-vis their Portuguese counterparts. Bouvet and Gerbillon cultivated a direct rapport with Kangxi by providing daily tutelage in mathematics in Manchu, the emperor's native language, which Gerbillon had mastered during his trip to Nerchinsk.[135] Pereira, however, lacked expertise in astronomy and possessed limited knowledge of Manchu.[136] This might have resulted in the marginalization of his role in tutelage. Furthermore, the introduction of cinchona by the French Jesuits played a significant role in further solidifying their imperial favor. At the end of 1692, Kangxi suffered from intermittent fever for which his imperial physician found no effective cure.

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[131] Landry-Deron, "Les Mathématiciens envoyés en Chine par Louis XIV en 1685," 446.
[132] Jami, *The Emperor's New Mathematics*, 142-143.
[133] Kangxi offered Gerbillon, Bouvet, Pereira, and Thomas rewards for their services on multiple occasions, see Paul Huang 黃伯祿, *Zhengjiao fengbao* 正教奉褒 [Veneration of the True Teachings (1884)] in *Zhongguo Tianzhujiao shiji huibian* 中國天主教史籍匯編 [Compilation of Historical Records on Catholicism in China], ed. Chen Fang-Cung 陳方中 (Taipei: Fu Jen Catholic University Press 輔仁大學出版社, 2003), 546-550.
[134] *Xichao dingan* 熙朝定案 [Imperial Decree of Our Glorious Dynasty (1846)], in *Tianzhujiao dongchuan wenxian xubian* 天主教東傳文獻續編 [Documents on the transmission of Roman Catholicism to the East], ed. Wu Xiangxiang 吳相湘 (Taipei: Taiwan xuesheng shuju 台灣學生書局, 1965), 3: 1789–1790. "相應將各處天主堂俱照舊存留，凡進香供奉之人，仍許照常行走，不必禁止。俟命下之日，通行直隸各省可也。"
[135] Jami, *The Emperor's New Mathematics*, 156-157.
[136] Ibid., 116, 157-158.

Meanwhile, Fontaney and Visdelou returned to Beijing from Guangzhou, bringing a pound of cinchona received from their colleague Charles François Dolu, S.J. (1655-1740) in Pondicherry. The French Jesuits introduced this remarkable remedy to the emperor and successfully cured his fever.[137] This impressive feat earned them even greater esteem and influence at the court. In the summer of 1693, Kangxi summoned four French Jesuit *mathématiciens* Bouvet, Gerbillon, Visdelou, and Fontaney (Le Comte had already returned to France in 1691) to his palace, and offered them a house in the Imperial City (*Huangcheng* 皇城) as a reward. The house was later built into the Church of the Saviour under imperial financial support.[138] The church became the closest Jesuit residence to the heart of Beijing, seemingly incarnating the French Jesuits' status at the Qing court.

The shifting dynamics of power facilitated the progress of the *mathématiciens du roi*'s scientific mission in China. The influence and status held by the French Jesuits provided them with an advantageous position in acquiring new knowledge. From 1691 to 1697, acknowledging Gerbillon's expertise in land surveying, Kangxi extended five invitations to him to join the imperial tours and campaigns.[139] In 1698, at the behest of Kangxi, Gerbillon embarked on a survey mission with Antoine Thomas and an Imperial Commissioner (*Qinchai dachen* 钦差大臣) to consolidate Khalkha Mongolia, the region newly incorporated into the Qing territory.[140] Gerbillon's travels were recorded in his *Voyages en Tartarie du Père Gerbillon*, a diary-style account later published in the fourth volume of Jean-Baptiste du Halde's *Description… de la Chine* (1735).[141] The diary covers a foreign missionary's perspective on some of the decisive moments during Kangxi's reign, including the negotiation of the Treaty of Nerchinsk, the

[137] For more detailed accounts, see Fontaney, "Lettre du Père de Fontaney," 219-232; Joachim Bouvet, *Portrait historique de l'Empereur de la Chine, presenté au roy* (Paris: Estienne Michallet, 1697), 160-161.
[138] Pierre-Marie-Alphonse Favier-Duperron 樊國梁, *Yanjing kaijiao lue* 燕京開教略 [Catholic Missions in Beijing (1905)], in *Zhongguo Tianzhujiao shiji huibian* 中國天主教史籍匯編 [Compilation of Historical Records on Catholicism in China], ed. Chen Fang-Cung 陳方中 (Taipei: Fu Jen Catholic University Press 輔仁大學出版社, 2003), 373.
[139] Paul Huang 黃伯祿, *Zhengjiao fengbao* 正教奉褒 [Veneration of the True Teachings (1884)], 549-554.
[140] Ibid., 554.
[141] Du Halde, *Description… de la Chine*, 4:87-422. The term Tartary is a vague European concept of the vast land from Turkey to Siberia where various nomadic groups dwell. Mark C. Elliott, "The Limits of Tartary: Manchuria in Imperial and National Geographies," *The Journal of Asian Studies* 59, no. 3 (August 2000): 624-626.

submission of Khalkha tribes to the Qing Empire, and Kangxi's triumph over the Dzungar Mongols. Gerbillon also provided vivid descriptions of the knowledge gained during his journeys, encompassing ethnographic insights into the Mongols, astronomical observations, geographical measurements, local landscapes, and details of natural history.

The subject of priority, without a doubt, was cartography. For Kangxi, producing a map of the region was essential to his administration and control over the northern frontier of his empire. Khalkha Mongolia—modern-day Mongolia—was a focal point of the Qing frontier policy due to its strategic location during Kangxi's military campaign against Galdan Khan (1644-1697) of the Dzungars from the Altai Mountains. Gerbillon's knowledge of mapmaking, coupled with French instruments and methods of measurement, earned him high regard from the emperor, leading to his selection as part of the imperial entourage during various tours.[142] For Gerbillon, the imperial favor provided an opportunity for him to fulfill Verbiest's plan of using science as a lure to promote Christianity in China. On the other hand, Gerbillon's surveying missions in Mongolia allowed him to fulfill the requirement of collecting geographical data assigned to the *mathématiciens du roi* by the *Académie royale des sciences*. The Jesuits also had a personal stake in surveying Mongolia and negotiating with Russia: They hoped to develop an overland trade route between Moscow and Beijing, which promised a safer communication line with Europe compared to overseas routes.[143]

Surveying missions afforded Gerbillon remarkable opportunities to delve into the natural history of Mongolia as a parallel pursuit alongside his cartographic endeavor. While conducting the surveying tasks commissioned by the emperor, Gerbillon bore witness to the expansive landscapes and rich natural history of the Qing's northern frontier. All of these experiences were meticulously recorded in his diary-style travel journal. Gerbillon's exploration of natural history was intimately intertwined with his surveying practices, exemplifying a Jesuit's approach to natural history as an open-air science. Similar to Le Comte's natural historical works, Gerbillon's

[142] Mario Cams, *Companions in Geography: East-West Collaboration in the Mapping of Qing China (c.1685-1735)* (Leiden: Brill, 2017), 62-65.
[143] Ibid., 50.

encounters with newfound knowledge occurred spontaneously during his surveying tasks in outdoor settings, yet he possessed an advantage that Le Comte did not have. Owing to his increasing influence, Gerbillon enjoyed unwavering support from the emperor, having access to various destinations free from interference by his Portuguese counterparts. While Kangxi primarily employed Gerbillon for his expertise in land surveying and mapmaking, he permitted Gerbillon to work on natural history as a side project along the way.

Delegation to the Russian Far East, 1688-1689

Gerbillon's foray into Tartary commenced with two trips in 1688 and 1689, during which he fulfilled the roles of interpreter and cartographer for the Qing delegation to the Russian Far East. In May 1688, the delegation set out from Beijing, heading to Selenginsk, a Russian town south of Lake Baikal, where they intended to meet the Russian delegation. When they reached Mongolia, the delegation was forced to turn back to Beijing due to a sudden attack on the region by the Dzungar Mongols. In June 1689, the delegation set out again to Nerchinsk, a Russian fortress on the bank of the Amur River, where they finally met with the Russian delegation.[144] At Nerchinsk, Gerbillon carried out his duty of surveying. He mentioned several times in his diary that he had measured the latitude of the fortress using a semi-circle equipment provided by Louis-Auguste de Bourbon (1670-1736), the Duke of Maine.[145] He also collected geographical information of Selenginsk possibly from his Russian counterparts.[146] The information amassed by Gerbillon was promptly sent to Paris in late 1689 by Antoine Thomas. Thomas Gouye, the Jesuit correspondent at the *Académie royale des sciences*, published the data in the second volume of his *Observations… par les pères jésuites* (1692), underscoring the *Académie*'s interest in geological information from the Russian Far East in search of a possible overland trade route from Europe to China.[147]

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[144] Yves de Thomaz de Bossière, *Jean-François Gerbillon, S.J. (1654-1707): Mathématicien de Louis XIV, premier Supérieur général de la Mission française de Chine* (Leuven: Ferdinand Verbiest Foundation, K.U. Leuven, 1994), 31-33.
[145] Du Halde, *Description… de la Chine*, 4:186-187.
[146] Cams, *Companions in Geography*, 50.
[147] Thomas Gouye, *Observations physiques et mathématiques pour servir à l'histoire naturelle & à la perfection de*

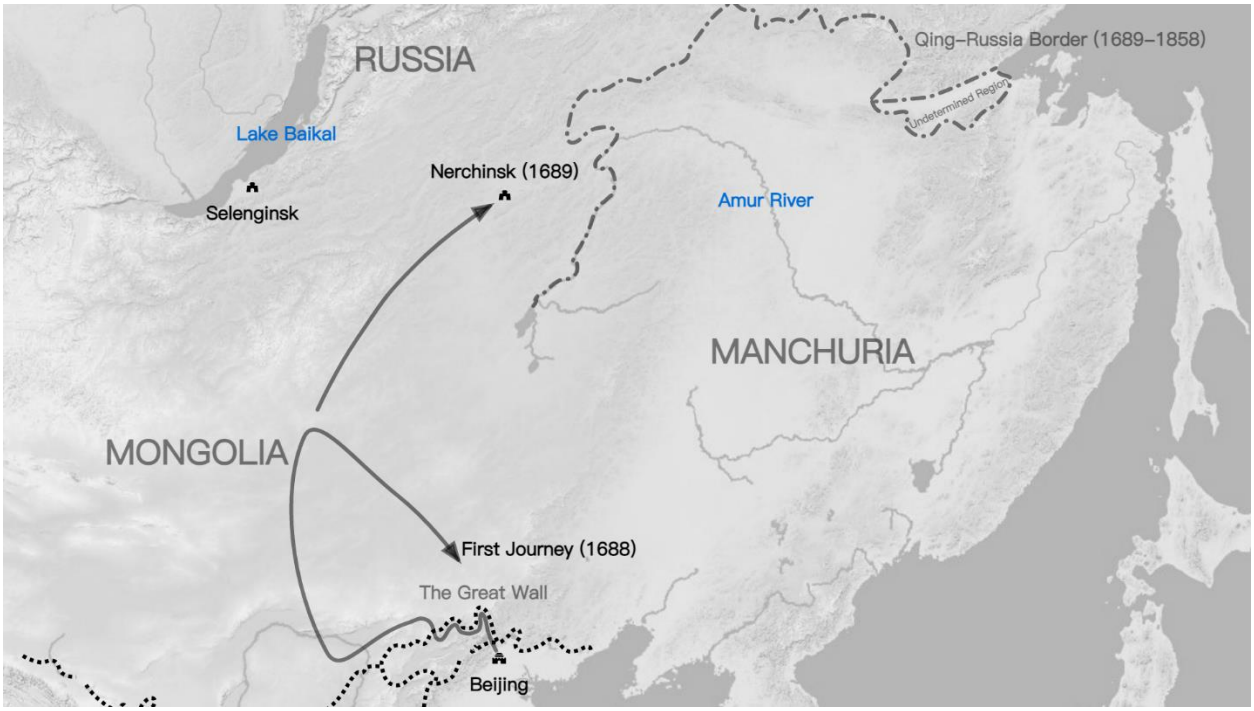

Image 2.1 Map of Jean-François Gerbillon's journeys, 1688-1689

Even though Gerbillon was chosen as a member of the Qing delegation because of his expertise in surveying and mapmaking, he compiled a comprehensive record of the landscape, climate, and natural history of Mongolia and the Russian Far East, presenting a typical Jesuit-style travel account on the local curiosities. The journeys of the Qing delegation exposed Gerbillon to open-air spaces where he encountered zoological knowledge. In 1688, when the delegation marched outside of the Great Wall and entered the heart of Mongolia, Gerbillon noticed the landscape around them changed from agricultural land to vast grassland: "We did not see a single tree on the path, nor a piece of cultivated land. There were only meadows or pastures full of good grazing."[148] The travelers' sources of sustenance also changed when entering the Mongolian grassland. Rather than relying on crops supplied by local Chinese farmers, the delegation, predominantly composed of Manchu officials, frequently engaged in nomadic practices such as hunting, fishing, and herding.

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l'astronomie & de la géographie, envoyées de Indes et de la Chine à l'Académie royale des sciences à Paris, par les pères jésuites, avec les réflexions de messieurs de l'Académie, & les notes du P. Goüye, de la Compagnie de Jésus. (Paris: Imprimerie royale, 1692), 71-72.

[148] Du Halde, *Description… de la Chine*, 4:97. « …, & nous ne vîmes pas un arbre dans le chemin, ni un morceau de terre cultivée : ce ne sont que des pelouses, ou des prairies pleines de bons pâturages. »

These nomadic activities formed occasions for knowledge exchanges during which Gerbillon learned about a variety of games and their features. For instance, when marching through the heartland of Mongolia, he noticed a herd of "yellow goats." Initially, Gerbillon came across the dead bodies of the animals and, based on his initial observation, considered them to bear some resemblance to gazelles.[149] Gazelles cannot be found in the wilds of Europe, yet they were not unfamiliar to the French in the 17th century. In 1668, under Louis XIV's instruction, the *Ménagerie royale* in Versailles was completed, housing exotic animals from around the world. Concurrently, the *Académie royale des sciences*, under the direction of the French naturalist and architect Claude Perrault (1613-1688), began anatomical studies on the animal corpses from the *Ménagerie*.[150] The results of anatomy by Perrault, published under the title *Mémoires pour servir à l'histoire naturelle des animaux* (1676), indexed a illustrated report on the dissection of five gazelles from North Africa.[151] Gerbillon's preexisting knowledge of gazelles might well have stemmed from Perrault's works had he not encountered real gazelles in the *Ménagerie*.

In the following days of the journey, Gerbillon closely observed the hunting of "yellow goats" by several Manchurian hunters and noted certain characteristics of the animal that revised his initial assumption:

> I have seen several yellow goats and I believe it is a unique animal of these lands, as it is neither gazelle, deer, nor roe deer. The males have horns that are hardly more than a foot long and about an inch in diameter at the base, with knots at intervals along the horns. These goats are the size of our deer and have fur that is somewhat similar, but their legs are taller and slenderer, allowing them to run extremely fast and for a long time without tiring. No dog or greyhound can keep up with them.[152]

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[149] Ibid., 4:100, 110-111.
[150] Peter Sahlins, *1668: The Year of the Animal in France* (New York: Zone Books, 2017), 12-13.
[151] Claude Perrault, *Mémoires pour servir à l'histoire naturelle des animaux* (Paris: Imprimerie royale, 1676), 41-46.
[152] Du Halde, *Description… de la Chine*, 4:133. « …, j'ai vû plusieurs de ces chevres jaunes, & je crois que c'est un animal particulier de ces contrées ; car ce n'est ni gazelle, ni dain, ni chevreüil ; les mâles ont des cornes qui n'ont guéres plus d'un pied de longueur, & environ un pouce de diamettre à la racine ; ces cornes ont des nœuds de distance en distance. Ces chevres sont de la grosseur de nos dains, & ont le poil à peu près semblables, mais elles ont les jambes plus elevees & plus déliées : aussi courent-elles extrêmement vîte & fort long-tems sans se lasser ; il n'y a ni chien, ni lévrier qui puisse les suivre : … »

The term "yellow goat" (*huangyang* 黃羊) is a colloquial name in Mandarin Chinese for the Mongolian gazelle (*Procapra gutturosa*)—a species that belongs to the tribe *Antelopinae* as gazelles but is of a different genus.[153] Gerbillon's conclusion is generally consistent with the taxonomy of the species developed in later times. His preliminary observation pointed out the similarity between the Mongolian gazelle and the African gazelle, indicating their close relationship. In his subsequent account, he provided a more detailed observation that highlighted the differences between the two, suggesting his understanding that the two gazelles are not of the same kind. Gerbillon reached this conclusion not through the examination of deceased gazelle bodies, but rather by observing the animals' behavior while actively participating in hunting activities alongside Manchurian hunters. His comprehension of the animal's characteristics was enriched through a dynamic scenario. The experience of hunting created a way of engaging zoological knowledge that cannot be acquired in an indoor environment. In contrast to the study of natural history in static environments like laboratories or academia, hunting and traveling in open-air spaces provide a dynamic approach to the circulation of zoological knowledge.

Hunting practices created occasions for knowledge exchange between Gerbillon and Manchu hunters. As a member of the delegation, although he rarely practiced himself, Gerbillon witnessed the impressive hunting and fishing skills demonstrated by the Manchu officials of the delegation. For example, he described how Songgotu hunted swans and wild geese during their second journey to Nerchinsk.[154] Besides observing animals during hunting activities, Gerbillon acquired knowledge about animals from the hunting experts accompanying him. In describing the two wild birds that Songgotu hunted, Gerbillon wrote: "Both types of birds had no feathers on their wings, hence they could not fly. It is said that these birds molt their feathers during this season."[155] His description of the physical features of the two birds was evidently based on his

[153] The gazelle genus is *Gazella* whereas the Mongolian gazelle is classified under the genus *Procapra*. See John Edward Gray, "Synopsis of the Species of Antelopes and Strepsiceros, with Descriptions of Some New Species," *The Annals and Magazine of Natural History, including Zoology, Botany, and Geology*, 2nd ser., 8, no.44, (1851): 130-134.
[154] Du Halde, *Description… de la Chine*, 4:166.
[155] Ibid. « … ; les uns & les autres n'avoient aucune plume à leurs aîles, par conséquent ne pouvoient voler. On dit que ces oyseaux mettent bas leurs plumes en cette saison. »

own observations. However, the account of the birds' seasonal habits could not be directly observed on the spot but was derived from the years of hunting experiences by his fellow travelers. This knowledge was likely passed down by experienced Manchu hunters among Gerbillon's companions, possibly even by Songgotu himself.

As the Qing was a multi-ethnic empire, the Manchus were not the only group of informants of Gerbillon. Traveling from Beijing to Mongolia, Gerbillon encountered many different ethnic groups. When describing plants or animals unknown to Europe, it was common to record these species' local names. Gerbillon's sources for species' names came from more than one local language. The Chinese names of local species were frequently featured in his account. As mentioned above, Gerbillon picked up the term "yellow goat" which was the Chinese name of the Mongolian gazelle. In the 1689 trip to Nerchinsk, Gerbillon saw a partridge-like bird with dark flesh. He wrote: "The Chinese call them *cha ki*, meaning sand chickens, apparently because they thrive in sandy areas with grass."[156] The term *cha ki* (*shaji* 沙雞) in Chinese refers to sandgrouse. The type that Gerbillon encountered was Pallas's sandgrouse (*Syrraptes paradoxus*).[157] When introducing the species, Gerbillon noted its Chinese name, highlighting that his source of knowledge was either the Chinese officials or the Chinese-speaking Manchu officials accompanying him.

Local Mongolians also contributed to Gerbillon's understanding of zoology. Mongolian terms appear in Gerbillon's diary, revealing the Mongolian origin of his source of information. During his 1689 trip to Nerchinsk, Gerbillon came across an animal the Mongols called *tchiktey*, i.e., the dziggetai or the Mongolian wild ass (*Equus hemionus hemionus*): "We killed numerous hares and a small wild mule, known in the Mongolian language as *tchiktey*. … These types of mules reproduce on their own. Their fur is ash gray, and their hooves and feet are just like those

[156] Ibid., 4:130. « … ; les Chinois les appellent *Cha ki*, c'est-à-dire poules de sable, apparemment parce qu'elles se plaisent dans les sables où il y a des herbes; … »
[157] Robert Swinhoe, a British diplomat and naturalist in China during the mid-19th century, identified the bird "sha-chee" as *Syrraptes paradoxus*. Robert Swinhoe, "Notes on Ornithology Taken between Takoo and Peking, in the Neighbourhood of the Peiho River, Province of Chelee, North China, from August to December, 1860," *The Ibis* 3, no.12 (1861): 341.

of regular mules."[158] During the same trip, Gerbillon recorded an otter-like animal called *tarbiki* and its features and seasonal habits. This term could have been another transcription of the Mongolian-originated word "tarbagan," referring to the tarbagan marmot (*Marmota sibirica*): "We also saw certain animals that the Mongols called *tarbiki*. They make holes in the ground where they take cover. They only eat grass and do not come out of their holes in winter. They live on the grass they have gathered there during the summer. Their fur is roughly the color of wolves, but smaller and softer. They are otherwise the size and shape of otters. It is said that their flesh is very delicate to eat."[159] The physical appearances of animals can be easily described based on one's observations. However, Gerbillon's knowledge about animals' reproductive behaviors or their seasonal habits could not have been acquired through simple observations but relied on extensive nomadic herding and hunting experiences. He likely acquired this knowledge from local Mongolian herdsmen. As Gerbillon did not speak the Mongolian language himself, he must have learned about the terms from Mongolian-speaking individuals. The Mongolians, the Chinese, and the Manchus all served as Gerbillon's sources of information on zoology. He benefited from a wealth of informants from diverse cultural backgrounds due to his extensive travels across the vast Qing territory.

Gerbillon's sources of botanical information were equally diverse and drawn from multiple cultural backgrounds. In addition to the zoological insights garnered from local nomadic groups, the botanical descriptions in his diary were significantly influenced by the knowledge and expertise of individuals from local communities. For example, Gerbillon mentioned the fruit the Manchus called *oulana*: "It is similar to sour cherries, but pulpier, and aids digestion remarkably well."[160] *Oulana* (standard romanization *ulana*) in Manchu refers to *Prunus humilis*,

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[158] Du Halde, *Description… de la Chine*, 4:173. « … on tua quantité de liévres & une petite mule sauvage, que les *Mongous* appellent en leur langue *Tchiktey* : ... ces sortes de mules multiplient par elles-mêmes ; son poil étoit d'un gris cendré, ses ongles, ses pieds étoient tout d'une venuë comme celles des mules. »

[159] Ibid., 4:176. « … : nous vîmes aussi certains animaux que les *Mongous* appellent *Tarbiki* ; ils font des trous en terre dans lesquels ils se retirent ; ils ne vivent que d'herbes, & ne sortent point de leurs trous l'Hyver, ils y vivent de l'herbe qu'ils y ont amassée pendant l'Eté : leur poil est à peu près de la couleur de celui des loups, mais moins grand & plus doux ; ils sont au reste de la grosseur & de la figure des loutres. On dit que leur chair est fort délicate à manger : ... »

[160] Ibid., 4:139. « … ; il est presque semblable à nos cérises aigres, à la réserve qu'il est un peu plus pâteux, & il aide admirablement bien à la digestion : … »

a type of bush cherry native to northern China.[161] While traversing the Mongolian Plateau in September 1688, Pereira began to experience discomfort and a loss of appetite. Recognizing his condition, Tong Guogang, the leader of the delegation, arranged for a basket of the cherry acquired from the local people to be delivered to Pereira. Upon consuming some of the fruit, Pereira's condition quickly improved. The following day, Gerbillon sampled the fruit and found it to have a delightful taste.[162] This episode highlights the agency of people from several ethnicities—each of whom contributed to the circulation of knowledge. Gerbillon's journey across a vast geographical expanse brought together informants with varying cultural backgrounds, including the Manchus and the Mongolians. The Manchu officials of the delegation offered insights into the medicinal properties of the fruit as a remedy for illness, while local Mongolians played a crucial role in gathering and providing the fruit to them.

The Chinese also provided botanical knowledge to Gerbillon. During the delegation's second journey in 1689, Gerbillon came across a type of tree when approaching Nerchinsk. He wrote: "I have not seen anything similar in Europe. They only grow to a moderate height, and the Chinese call them *hoa chu*. They bear a resemblance to our aspen wood and they have white bark, which the Chinese use to make knife sheaths and similar items."[163] *Hoa chu* (*huashu* 桦樹) in Mandarin Chinese means birch. The particular species that Gerbillon came across might have been the Asian white birch (*Betula platyphylla*). Gerbillon's sources regarding the birch were likely from Chinese individuals: he recorded its Chinese name and how the plant was used in the Chinese cultural context.

Gerbillon's account underscored a hybridity of knowledge that emerged from an open-air environment. His understanding of the flora and fauna in Mongolia was not solely derived from his own discoveries. It was enriched by the contributions of local informants from diverse cultural backgrounds. During his journey, Gerbillon engaged with three different groups of

[161] Bretschneider, *Early European Researches into the Flora of China*, 31.
[162] Du Halde, *Description… de la Chine*, 4:140.
[163] Ibid., 4:178. « … ; je n'en ai point vû de semblables en Europe ; ils ne croissent que jusqu'à une médiocre hauteur, les Chinois les appellent *Hoa chu*, ils ressemblent assez à notre bois de tremble, & ont comme lui l'écorce blanche, dont les Chinois se servent pour faire des gaines de couteaux, & d'autres ouvrages semblables. »

people: the Manchus, the Mongolians, and the Chinese. Their experiences, combined with Gerbillon's firsthand observations of various species' physical features, shaped his understanding of natural history. For Gerbillon, his trips to Selenginsk and Nerchinsk went beyond diplomatic missions. He was selected to accompany the delegation on their journey across Mongolia to the Russian Far East due to his expertise in cartography. These trips provided a unique setting for the exploration of nature. The trips placed Gerbillon in open-air settings, allowing him to actively participate in practices such as herding, hunting, fishing, and gathering where he engaged in knowledge exchange with local informants. In these dynamic contexts, knowledge flowed and merged, resulting in a hybrid form of natural history descriptions in his diary.

Imperial Expeditions to Mongolia, 1691-1698

Upon his return from Nerchinsk, Gerbillon spent a year in Beijing. There, he and Bouvet provided tutelage in geometry to the Kangxi Emperor, during which they presented numerous measurement instruments manufactured in Paris.[164] Recognizing Gerbillon's mapmaking expertise, Kangxi selected Gerbillon to accompany him on five expeditions between 1691 and 1697. The expeditions served various purposes, including recreational, diplomatic, and military affairs. In May 1691, the emperor requested Gerbillon and Bouvet to accompany him on a journey to Dolon Nor at the southern edge of the Mongolian grassland. There, Gerbillon witnessed the emperor accepting the allegiance of the Khalkha Khans.[165] The event marked the annexation of Outer Mongolia into the Qing Empire and the incorporation of the Khalkha Mongols into the Qing banner system. In the summer of 1692, Gerbillon, Pereira, and the Portuguese physician Isidoro Lucci, S.J. (1661-1719) accompanied Kangxi to Rehe (modern-day Chengde) where they met the Khalkha leaders and conducted hunting activities.[166] In the following years, Gerbillon and Antoine Thomas joined three imperial expeditions to Mongolia to assist Kangxi in solidifying control over the Khalkha tribes there. In the spring of 1696,

[164] Jami, *The Emperor's New Mathematics*, 141-144.
[165] Bossière, *Jean-François Gerbillon, S.J. (1654-1707)*, 46-49.
[166] Ibid., 52-54.

Gerbillon, Thomas, and Pereira joined the imperial army led by Kangxi to Outer Mongolia where they drove away Galdan Khan who constantly threatened the Qing's northern frontier.[167] In the autumn of 1696, Gerbillon accompanied Kangxi's army to Guihua (modern-day Hohhot), and then in early 1697, Gerbillon set out again with the imperial army, marching alongside the Great Wall to Ningxia to secure defenses against Galdan.[168] The war ended with Galdan's death in 1697, which marked Kangxi's final triumph over Galdan and the consolidation of his rule over Outer Mongolia. In an attempt to consolidate this victory, Kangxi commissioned Gerbillon and Thomas to survey the region in 1698.[169]

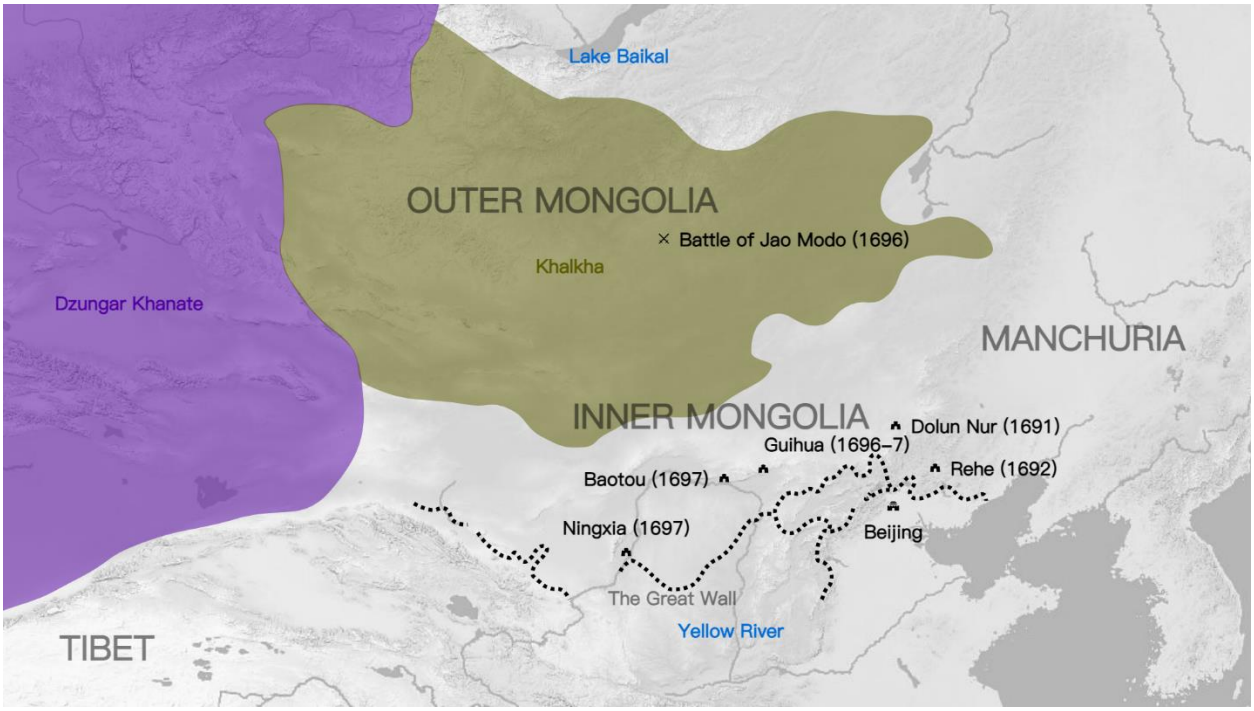

Image 2.2 Map of Jean-François Gerbillon's journeys, 1691-1698

Among the four Jesuits (Pereira, Thomas, Bouvet, and Gerbillon) who served at the court, Gerbillon was the only one selected to accompany Kangxi on every expedition to the Qing's northern frontier. Due to his fluency in Manchu and his expertise in cartography, Gerbillon became the most intimate foreign courtier to Kangxi. In the last two decades of the 17th century,

[167] Paul Huang 黃伯祿, Zhengjiao fengbao 正教奉褒 [Veneration of the True Teachings (1884)], 554. The battle took place in Jao Modo, near modern-day Zuunmod, Mongolia.
[168] Ibid.
[169] Bossière, *Jean-François Gerbillon, S.J. (1654-1707)*, 84.

through a series of diplomatic and military initiatives, Kangxi resolved the border dispute with the Russians and asserted control over Outer Mongolia. To establish effective governance in these frontier regions, Kangxi initiated several surveying projects. The responsibility for this crucial task fell on the shoulders of Gerbillon, whom the emperor trusted the most. Gerbillon's diary captured numerous occasions when the emperor asked about geographical measurements. Upon Gerbillon's return from Nerchinsk, Kangxi summoned him and asked about the height of the pole of the Russian fort.[170] During the 1691 journey, Gerbillon demonstrated the use of his semicircle equipment to the emperor, measuring locations at the Gubeikou Gate of the Great Wall and Dolon Nor.[171] More often he used measuring poles to determine the location, which he employed during the trips to Guihua and Ningxia.[172] In late 1698, Gerbillon and Thomas presented the emperor with a preliminary survey of Mongolia.[173] The survey concluded Gerbillon's eight trips to Chinese Tartary and marked a prelude to a bigger Jesuit cartographic project sponsored by Kangxi in the early 18th century.

Gerbillon's vital role in Kangxi's expeditions allowed him to continue exploring the Qing Empire's northern frontier. These expeditions expanded Gerbillon's scope of travel and continued to create space for knowledge production: Gerbillon was able to encounter new species and acquire knowledge about them from local informants in northern China. Furthermore, as a member of the emperor's entourage, Gerbillon was granted certain privileges, which also facilitated his access to new knowledge about natural history. While the imperial army traversed Qing territory, the provisioning of the army was overseen by provincial officials who frequently presented special local products as a tribute to the emperor. Given his proximity to the emperor, Gerbillon had the opportunity to enjoy some exquisite cuisines prepared with local specialties. In the 1697 expedition to Ningxia, Gerbillon marched westward with the imperial army passing Baotou, a garrison city on the Yellow River. There, he encountered a fish called *chi hoa ly yu* (*chiwei liyu* 赤尾鯉魚; meaning red-tailed carp):

[170] Du Halde, *Description… de la Chine*, 4:244.
[171] Ibid., 4:254, 263.
[172] Cams, *Companions in Geography*, 67-69.
[173] Ibid., 72.

> Baotou is primarily known for the fish called *chi hoa ly yu*, a type of carp with delicate and fatty flesh. It is caught in the Yellow River within a span of about 15 to 20 leagues upstream and downstream of Baotou. Locals attribute the delicacy of this fish to a type of herb or moss that grows on the rocks along the Yellow River's course. The carp are fond of this moss, which fattens them and imparts their flesh with such delicacy that it is preferred over that of other fish, both from the sea and the river. Every year during winter, this fish is sent to Beijing for the Emperor and the court's dignitaries, to whom the province's officials present it as a gift.[174]

The fish, better known as the Yellow River carp (*Huanghe liyu* 黃河鯉魚), is the variety of *Cyprinus rubrofuscus* that inhabits the Yellow River. During his trip to Baotou, Gerbillon collected information about the fish from the local people, learning how its habitat and food sources might have influenced its characteristics. Moreover, as a member of Kangxi's entourage, he had the opportunity to savor the fine taste of this tributary gift. Compared to Gerbillon's earlier trips with the delegation to Russia, during which hunting was a crucial means of securing food, in the following trips, hunting practices ceased. (Except on some occasions Kangxi and his officials would hunt for pleasure) When traveling with the emperor, Gerbillon enjoyed financial security, with transportation and supplies provided by the designed government officials.[175] His position, in proximity to the emperor and reliant on the imperial favor of his skills, provided him with an advantageous avenue to acquire knowledge. As an imperial-commissioned surveyor, Gerbillon was able to obtain valuable local natural products from the areas he visited, leveraging his privileged position to facilitate access to new knowledge. This is also evident in his participation in the royal hunt in 1692.

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[174] Du Halde, *Description… de la Chine*, 4:361-362. « *Pao te tcheou* est principalement le lieu d'où sort le poisson nommé *Chi hoa ly yu* ; c'est une espéce de carpe, dont la chair est fort delicate & fort grasse : elle se pêche dans le *Hoang ho*, dans l'étenduë de quinze ou vingt lieuës, au-dessus & au-dessous de *Pao te tcheou*. Les gens du pays attribuent la délicatesse de ce poisson à une espèce d'herbe, ou de mousse, qui croît dans les rochers, le long desquels coule le *Hoang ho*. Les carpes sont friandes de cette mousse, qui les engraisse, & rend leur chair si délicate, qu'on la préfere à celle des autres poissons, soit de mer, soit de riviere. On en porte tous les ans à Peking durant l'Hyver pour l'Empereur, & pour les Grands de la cour, ausquels les mandarins de la province en font présent. »
[175] Paul Huang 黃伯祿, *Zhengjiao fengbao* 正教奉褒 [Veneration of the True Teachings (1884)], 549.

Royal Hunt, 1692

In September 1692, Gerbillon was invited to accompany the Kangxi Emperor to the imperial resort in Rehe located approximately 200 kilometers northeast of Beijing.[176] This invitation, however, was not based on Kangxi's practical need for European science but rather his hospitality to the missionary. Compared to his geopolitical interest in Mongolia, Kangxi had no need for renewing cartographic information about Rehe. The region was a traditional Manchu hunting ground and a part of Manchuria where the dynastic rulers of the Qing Empire came from. Despite being located outside the Great Wall, the region was far from the empire's frontiers. Kangxi's invitation to Gerbillon did not stem from practical needs, as there was no mention of any surveying or cartographical activities during this trip in Gerbillon's account.[177] Furthermore, apart from Gerbillon, Kangxi did not include mathematicians such as Bouvet or Thomas in this trip, as he had done during the expeditions into Mongolia. Instead, he extended an invitation to Isidoro Lucci, a professionally trained Portuguese Jesuit physician who had recently arrived in Beijing from Macao. The Jesuit physician became part of Kangxi's medical retinue, which consisted of imperial physicians, surgeons, Lama physicians, and shamans.[178] The presence of medical experts was indispensable in case of any accidents, injuries, or illnesses among the royal family members. Gerbillon, nevertheless, was not a trained physician. His role in the royal hunt was not that of a physician like Lucci.

Gerbillon's presence in the royal hunt of 1692 indicates that he succeeded Verbiest's role as the closest missionary courtier next to Kangxi, showcasing his ascending power position at the imperial court in the 1690s. According to Litian Swen, Kangxi elevated his Jesuit courtiers beyond the typical emperor-subject dynamic, transforming it into the Manchu-style master-slave relationship. In the Manchu context, being a *booi* (household slave) did not signify losing freedom but rather entailed being embraced as a member of the master's family circle. The

[176] This is chronologically the fourth trip of Gerbillon.
[177] Cams, *Companions in Geography*, 65.
[178] Beatriz Puente-Ballesteros, "Isidoro Lucci S.J. (1661-1719) and João Baptista Lima (1659-1733) at the Qing Court: The Physician, the Barber-surgeon, and the Padroado's Interests in China," *Archivum Historicum Societatis Iesu* 82 (2013): 182-183.

identity of *booi* served as a crucial link for family relations besides blood and marriage, facilitating the transmission of trust and loyalty.[179] Gerbillon, while providing the emperor scientific services, was accepted as a *booi* of the imperial family. Hunting played a pivotal role in the Manchus' nomadic traditions and retained its significance in dynastic and ritual contexts following the establishment of the Qing Empire. Every year, members of the royal family journeyed to Rehe to receive training in hunting following the Manchu ethos of martial valor.[180] Gerbillon's participation in the 1692 royal hunt demonstrated, to some degree, his embracement into Kangxi's household and Manchu traditions. During the hunt, Kangxi, in front of a crowd of princes and courtiers, praised Gerbillon "for not sparing [his] efforts, for following [the emperor] everywhere, and for never being found at the back of the travelers."[181] Kangxi's decision to invite Gerbillon to participate in the royal hunt was not a choice of expediency but rather a friendly gesture. Throughout years of service as a tutor and surveyor, Gerbillon was entrusted by the emperor and thereby his company was appreciated.

As hinted above, the social status of a *booi* was not necessarily low. Instead, it depended on the master's status.[182] Being the emperor's *booi* meant high social status and a position of certain power. Such a position bestowed upon Gerbillon a certain privilege to be close to Kangxi and thus enabled him to have access to new knowledge. Because of the imperial favor, Gerbillon was able to be present at royal hunts from which he had opportunities to observe a variety of games. Kangxi supported Gerbillon's interests in zoology and allowed him to examine the animals captured during hunts. In Gerbillon's diary, there is an account of a time when he closely observed a bear that had been killed by Kangxi. As he approached the bear, he was unaware that he had failed to maintain a safe distance from the emperor. Gerbillon was warned by the chief eunuch, who pointed out that he was being rude by coming dangerously close to the emperor.

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[179] Swen, *Jesuit Mission and Submission*, 7-9, 15-17.
[180] Mark C. Elliott and Ning Chia, "The Qing Hunt at Mulan," in *New Qing Imperial History: The Making of Inner Asian Empire at Qing Chengde*, ed. James A. Millward (London: Routledge, 2004), 79-80.
[181] Du Halde, *Description… de la Chine*, 4:292. « … : quelques jours auparavant il avoit fait mon éloge en présence de ses courtisans, sur ce que je n'épargnois pas ma peine, que je le suivois partout, & qu'on ne me trouvait jamais à la queuë des voyageurs. »
[182] Swen, *Jesuit Mission and Submission*, 7-9.

Kangxi, however, allowed Gerbillon to continue his observation and advised him not to feel compelled to move away.[183] Kangxi remained open-minded to Gerbillon's personal interests. He was supportive of Gerbillon's research in natural history and showed a gracious gesture to the missionary's unintentional offense. This sign of imperial favor denoted Gerbillon's influential position at the court, making it convenient for him to access new knowledge.

Royal hunts provided excellent opportunities for Gerbillon to encounter animals unknown to the Europeans before, making him the first European to document these species. A year before the 1692 hunt, as the royal carriage departed from Beijing to Dolon Nor, Gerbillon and Kangxi hunted together along the way. Upon reaching the Chaohe River located north of Beijing, Gerbillon observed a bird that resembled a large chicken: "The Chinese called it *ho ki*, meaning fire chicken, perhaps because around the two eyes, the bird has an oval of small feathers of a very bright fiery color. The rest of the body is ash-colored. It is a little larger than a pheasant and has a body and head similar to a turkey."[184] Although the word *ho ki* (*huoji* 火雞) in modern Mandarin Chinese usually refers to the American turkey, the bird that Gerbillon talked about was certainly not a turkey as the bird was impossible to find in the wilds of northeast China in the mid-Qing period. The bird in his account might be the blue-eared pheasant (*Crossoptilon auritum*) or its close relative the brown-eared pheasant (*Crossoptilon mantchuricum*). Both are endemic to northern China.[185]

In the summer of 1692, when the royal carriage left Beijing for Rehe, Gerbillon came across a wolf-like animal called *choulon* or *chelason*: "[The animal] had the size of the largest wolf and highly esteemed fur. Its fur is long, soft, and firm, selling for as much as fifteen to

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[183] Du Halde, *Description… de la Chine*, 4:294.

[184] Ibid, 4:261. « Les Chinois l'appellent *Ho ki*, qui signifie poule de feu, peut-être parce qu'autour des deux yeux, cet oiseau a une ovale de petites plumes d'une couleur de feu très-vive ; tout le reste du corps est de couleur de cendre ; il est un peu plus gros qu'un faisan, & a le corps & la tête assez semblable aux poules d'Inde ; … »

[185] Dudley E. Saurin, "Notice on the Pheasants found in the Neighbourhood of Pekin," in *Proceedings of the Scientific Meeting of the Zoological Society of London* (1866), 437. Saurin specified that the bird "ho-chi" was *Crossoptilon auritum*, but he was unaware that *Crossoptilon auritum* and *Crossoptilon mantchuricum* were two distinct species. See also Robert Swinhoe, "On a Bird supposed to be the Female of Crossoptilon Auritum, Pallas, From Northern China," in *Proceedings of the Scientific Meeting of the Zoological Society of London* (1862), 286-287. Swinhoe noted that a specimen he received from China, presumed to be a female *Crossoptilon auritum*, was actually a new distinct species. He named this species *Crossoptilon mantchuricum*, after Manchuria from where his specimen originated.

twenty ecus each in Beijing. … I believe this animal is a lynx."[186] Gerbillon's assumption is not wrong. The animal that he spoke of might have been the Eurasian lynx (*Felis lynx*) as both the terms *choulon* (*sheli* 猞猁) and *chelason* (*shelisun* 猞猁狲) in Mandarin Chinese refer to the kind.[187] Gerbillon's access to the pheasant and the lynx certainly depended on his standing in relation to Kangxi, which afforded him the chance to inspect the emperor's hunting trophies.

More importantly, Gerbillon's knowledge of animals in Manchuria was developed based on the result of interactions among ethnic groups within the Qing Empire. Predating the Qing period, the Chinese who lived in the south of the Great Wall had very limited knowledge regarding the animals in Manchuria and Mongolia: The word for lynx in Chinese did not exist before 1644. The words *sheli* / *shelisun* might have come from the Manchu word *silum* or the Mongolian term *silügüsü*.[188] The founding of the Qing Empire brought together multiple knowledge systems that had many aspects that did not overlap. The Manchu ruling class deliberately sought to bridge the knowledge gap between themselves and their Chinese subjects, resulting in, for example, the first Manchu–Chinese dictionary, *Da Qing quanshu* 大清全書 (1683).[189] The need for consolidating a multiethnic empire led to the process of knowledge integration among different ethnic groups, creating the knowledge landscape that Gerbillon encountered. In addition to the knowledge of nature, Manchu practices also intertwined with Chinese traditions. The Manchu preference for fur, which included sable, lynx, leopard, tiger, wolf, badger, raccoon, goat, and deer, was embraced within courtly circles. The Qing court bestowed fur as gifts upon deserving Manchu and Chinese individuals, symbolizing imperial favor toward meritorious officials and filial respect toward elders.[190] Wearing fur became a new fashion among Chinese elites during the mid-Qing period. The practice of fur usage was also

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[186] Du Halde, *Description… de la Chine*, 4:295. « …de la grandeur des plus grands loups, & dont la peau est une des fourrures les plus estimées : fon poil est grand, doux & ferme. Ces peaux le vendent à Peking jusqu'à quinze & vingt écus la piéce. … ; je crois que c'est un loup cervier. »

[187] In the main text of Gerbillon's diary, Gerbillon only suggested the animal called *choulon*, but in the appendix Jean-Baptiste du Halde explained that *choulon* is also known as *chelason.* See "Explication des mots tartares et chinois, " in Du Halde, *Description… de la Chine*, 4:518.

[188] Jonathan Schlesinger, *A World Trimmed with Fur: Wild Things, Pristine Places, and the Natural Fringes of Qing Rule* (Stanford, CA: Stanford University Press, 2020), 35.

[189] Ibid, 33-35.

[190] Ibid., 36-39.

extended to the Jesuits at the Qing court. Gerbillon was once rewarded by Kangxi with a set of fur clothes.[191] Gerbillon's experience with Manchurian fur was intertwined with the integration of Chinese and Manchu practices promoted by early Qing rulers. His knowledge of lynx and its fur did not arise solely within a Chinese or a Manchu context, but rather within the context of the interaction of the two. The Manchu, while upholding Chinese traditions, promoted their own cultural identity, leading to hybrid knowledge and practices. What the French Jesuits encountered was a complex hybridity of knowledge that entailed multiple cultural traditions and practices, all developed within the framework of the Qing Empire.

The Manchus' favor for fur came from their hunting tradition. Gerbillon frequently exchanged opinions on the matter of hunting practices with Kangxi. In his diary, Gerbillon mentioned several times that Kangxi asked him about his opinion of hunting and whether such hunts took place in Europe.[192] On the one hand, Kangxi saw Gerbillon as a valuable informant of scientific knowledge. On the other hand, through these conversations, Gerbillon picked up new knowledge regarding hunting practices and some knowledge related to zoology. On the occasions of royal hunts, Gerbillon was no longer Kangxi's tutor. Instead, Kangxi became the one who delivered knowledge. Knowledge flows and circulates under circumstances travelers exchange information with local informants. Gerbillon, being an intimate and privileged courtier of Kangxi, made the emperor his informant of knowledge.

Kangxi also supported Gerbillon's wish to conduct anatomical examinations of animals. The royal hunt of 1692 offered a chance for the French missionary to obtain animal specimens. After a day of hunting tigers, Gerbillon wrote: "On the same day, His Majesty, upon learning that we wished to conduct the dissection of one of the tigers from this country, which are larger and quite different from those seen in Europe, sent one to us."[193] Gerbillon's anatomy of the tiger echoed the French Jesuits' continuous interest in tigers of Asia. While the *mathématiciens du roi* were in Siam, Bouvet once reported to the *Académie royale des sciences* on his examination of a

[191] Paul Huang 黃伯祿, *Zhengjiao fengbao* 正教奉褒 [Veneration of the True Teachings (1884)], 548.
[192] Du Halde, *Description… de la Chine*, 4:261, 282.
[193] Ibid., 4:248. « Ce même jour Sa Majesté ayant sçû que nous désirions faire l'Anatomie d'un des Tigres de ce pays-ci, qui sont plus grands, & fort différents de ceux que l'on voit en Europe, il nous en envoya un, … »

corpse of a tiger but did not mention any anatomic practices.[194] The 1692 royal hunt provided an opportunity for the French Jesuits to conduct the anatomy of a tiger as they had hoped. The bodies of large carnivore animals like tigers were not easy to acquire, except on occasions like royal hunts when the fierce animal was viewed as a trophy of the emperor. Here too, personal relations with the emperor were crucial to Jesuit zoology.

The results of Gerbillon's dissection of the tiger were sent to Thomas Gouye at the *Académie royale des sciences*. In 1699, Gouye presented the results to the *Académie*, acknowledging Kangxi's agency in the formation of Jesuit natural history: "The striped tiger that the Jesuits in China dissected, and which had been killed in a hunt by the emperor, along with four others, weighed only 265 pounds. It was not among the largest. One of the others weighed 400 pounds."[195] The case of the tiger's dissection exemplifies the paradigm of Kapil Raj regarding knowledge circulation: It did not appear as a pure science that floated freely along the Jesuit network, but a form of knowledge construction that involved the agencies of both Jesuit missionaries and the emperor.[196] The emperor played an important role in providing Gerbillon access to resources for natural history research. His willingness to satisfy Gerbillon's demand sheds light on a mutually beneficial relationship of scientific learning. The French Jesuits in China provided scientific services to the emperor, while their dependency on the imperial favor allowed them to access new knowledge at will.

Comparing the natural history works of Gerbillon and Le Comte, both were side products of land surveying projects. Both works were geographically confined to specific regions where the missionaries were assigned to conduct surveys. Le Comte's research was initially confined to north-central China and later to the southeast coastal provinces, while Gerbillon's account

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[194] Thomas Gouye, *Observations physiques et mathématiques pour servir à l'histoire naturelle & à la perfection de l'astronomie & de la géographie, envoyées de Siam à l'Académie royale des sciences à Paris, par les pères jésuites français qui vont à la Chine en qualité de mathématiciens du roy, avec les réflexions de messieurs de l'Académie, & quelques notes du P. Goüye, de la Compagnie de Jésus.* (Paris, la Veuve d'Edme Martin, Jean Boudot, and Estienne Martin, 1688), 57-60.

[195] Académie royale des sciences, *Histoire de Académie royale sciences, année 1699*, 51. « Le Tigre rayé que les Jesuites de la Chine dissequerent, & qui avoit été tué à la Chasse par l'Empereur, avec quatre autres, ne pesoit que 265. liv. Aussi n'étoit-il pas des plus grands. Un des autres pesoit 400. liv. Celui qui fut dissequé avoit un tiers de l'estomac plein de vers, & l'on ne pouvoit pas dire qu'il fût corrompu. »

[196] Raj, "Beyond Postcolonialism… and Postpositivism," 343.

focused exclusively on Mongolia and Manchuria. Nevertheless, Gerbillon provided more first-hand knowledge than Le Comte. Gerbillon was the first to introduce many species in China to the Europeans, whereas most of the species in Le Comte's account had already been reported by earlier Jesuit missionaries.[197] Le Comte's *Nouveaux Mémoires* is far from a pioneering work on natural history in China like Gerbillon's diary. The distinction between Gerbillon's and Le Comte's works can be attributed to the changing power dynamics within the Jesuits in China. Under pressure from the Portuguese and facing financial constraints, Le Comte was ultimately compelled to leave China in 1691. In contrast, Gerbillon, operating in Beijing and cultivating a closer relationship with the emperor, seized eight opportunities to explore Tartary. He was able to interact extensively with the emperor, Qing officials, and various local individuals. Traveling as an imperial agent allowed Gerbillon to engage natural history in China in a dynamic format through various occasions of knowledge exchange. The emperor, officials, hunters, herdsmen, and many local Manchurian, Mongolian, and Chinese individuals all contributed to Gerbillon's knowledge of the natural history of China. The local understanding of animals and plants, combined with Gerbillon's observations, formed the basis of his eventual account of natural history. Compared to Le Comte's encyclopedic-style writings aimed at securing patronage, Gerbillon's work embodies a more hybrid form of knowledge, reflecting a diverse array of his sources and his easy access to them due to a relatively successful missionary career.

[197] Most of the fruits and plants mentioned in Le Comte's *Nouveaux mémoires* were already known in Europe before his writing. For example, lychee was first mentioned by Juan González de Mendoza (1585); longan, persimmon, and tea by Álvaro Semedo (1643); *biqi* root (*Eleocharis dulcis*), *ge* (*Pueraria thunbergiana*), and the Chinese white wax by Martino Martini (1655). See Bretschneider, *Early European Researches into the Flora of China*, 1-26.

CHAPTER 3. Beyond the Kangxi Atlas:
Jesuit Natural History in the Qing Frontiers

Motivated by Kangxi's 1692 Edict of Toleration, seen as a symbolic victory for Christianity in China, more Jesuits joined the mission to China. In 1693, Joachim Bouvet sailed back to France. In 1698, he led a group of eleven newly recruited Jesuit missionaries to China, traveling aboard the merchant ship *Amphitrite*. They arrived at the port of Guangzhou in 1699. In the same year, *Amphitrite* traveled back to France with Bouvet's colleague Jean de Fontaney aboard. Fontaney recruited a dozen more French missionaries to accompany him on a return journey to China the following year, aboard the same ship.[198] The two voyages of *Amphitrite* greatly enriched the number of French Jesuits in China. By 1701, over twenty French Jesuits were preaching in China, among whom was a group of experts in surveying and mapmaking whom the Kangxi Emperor would employ for the decade-long imperial cartographical project—the Kangxi Atlas—between 1708 and 1718. The making of the Kangxi Atlas transcended the subject of cartography itself. The undertaking empowered the French Jesuits in China, granting them access to every corner of the Qing Empire and thus enriching their acquisition of new knowledge. The Jesuit mapmakers journeyed across cities and wilderness, expanding the geographical scope of their natural history research like never before. They made significant contributions to the natural history of the Qing Empire's frontier regions, covering regions from Manchuria in the north to Taiwan in the south.

The 1700s

The new wave of French Jesuits to China embarked on their journey with optimism, yet disturbing news from Europe approached at the same time. The long-standing dispute over Chinese rites, which had been shelved for many years, resurfaced once again. In 1693, Charles Maigrot (1652-1730), a missionary of the *Missions étrangères de Paris* operating in Fujian

[198] Landry-Deron, "Les Mathématiciens envoyés en Chine par Louis XIV en 1685," 448.

Province, issued a declaration challenging the Jesuits' Riccian doctrine that permitted Chinese Catholic converts to participate in traditional Chinese rites, notably honoring ancestors and Confucius.[199] A year later, Maigrot's declaration reached France and evoked drastic debates in Paris. Opponents of the Jesuits, such as dogmatic Jansenists and Gallicanists, seized this opportunity to attack the order.[200] Subsequently, *the Collège de Sorbonne* condemned and censored Jesuit publications that advocated Chinese rites, including Louis Le Comte's *Nouveaux mémoires sur l'état présent de la Chine*.[201] In 1704, Rome officially responded to the controversy. Pope Clement XI (1649-1721) issued a papal decree forbidding Chinese Catholic converts to perform traditional rituals. In the following year, the papal legate Charles-Thomas Maillard de Tournon (1668-1710) arrived in China, bringing the controversy before the Kangxi Emperor. During his meeting with the emperor, de Tournon made a misstep by inviting Maigrot, whose misinterpretation of Chinese rites irked the emperor, to be present. After this disastrous meeting, Kangxi ordered that all European missionaries in China needed to be licensed. One had to agree to follow the Riccian doctrine to obtain a missionary license.[202]

Did Kangxi's insistence on licensing missionaries signify the waning of the Jesuits' influence in China? Understanding the situation of the Jesuits in China is crucial for interpreting their travels, surveys, and knowledge production during this era. A number of scholars contend that the controversy surrounding Chinese rites signaled the prelude to the Jesuits' marginalization, eventually leading to the prohibition of preaching Christianity in 1721.[203] That means, that even though Kangxi had not yet banned Christianity in China in the early 1700s, de Tournon's visit and the subsequent issuance of missionary licenses marked the weakening of the Jesuits' position in China. Following this reasoning, all Jesuit scientific activities in China during this period,

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[199] Matteo Ricci did not think Chinese traditions contradicted Christianity. He sees the Confucian practice of revering heavenly divinity *Tian* in accord with Christian monotheism. See Ross, *A Vision Betrayed*, 142-154.
[200] Ibid., 190-191. Jansenism and Gallicanism were two popular religious movements whose beliefs were contrary to those of the Jesuits. Jansenists believed in predestination and downplayed free will and rationality; Gallicans supported the authority of the French Monarch within the French church over Papal supremacy.
[201] Pierre-Henri Durand, "Lire ou relire le Père Le Comte," 158.
[202] Ross, *A Vision Betrayed*, 194-195.
[203] R. Po-chia Hsia, "Imperial China and the Jesuit Mission," in *Jesuit Mapmaking in China: D'Anville's Nouvelle Atlas de la Chine (1737)*, ed. Roberto M. Ribeiro and John W. O'Malley (Philadelphia: Saint Joseph's University Press, 2014), 43-45; Jami, *The Emperor's New Mathematics*, 239-240; Cams, *Companions in Geography*, 97.

including the making of the Kangxi Atlas between 1708 and 1718, were under the looming threat of religious persecution. As Mario Cams asserts, the cartographic project was a last resort to safeguard the emperor's faith in Christianity.[204]

Litian Swen, on the contrary, argues that the Chinese rites controversy did not necessarily lead to Kangxi's shift toward an anti-Christian policy. Kangxi's intention was not to restrict the preaching of Christianity in China but rather to ensure that missionaries followed Matteo Ricci's established tradition, as it had been for the past hundred years. As discussed in the previous chapter, Kangxi embraced the Jesuits within the context of the Manchurian style of master and *booi* relationship by including them in his household and offering essential support and protection. In return, the Jesuits provided the services that the emperor required. Ferdinand Verbiest's service in the Board of Astronomy and tutelage sessions by Joachim Bouvet, Jean-François Gerbillon, Antoine Thomas, and Tomás Pereira could be characterized by this relationship. The licenses therefore served the purpose of regulating Jesuit activities under Kangxi's patronage and eliminating undesired individuals, such as Charles Maigrot whom Kangxi believed lacked an understanding of Chinese culture, from his household. All the licenses for European missionaries were issued by the Imperial Household Department (*Neiwufu* 內務府), the institution that oversaw the internal affairs of the imperial family.[205] The licenses did not stymie the Jesuit activities in China but institutionalized their relationship with Kangxi and formalized the fact that the Jesuits were under the emperor's protection and supervision.[206]

Setting aside Kangxi's personal attitude toward Christianity, the Jesuits' status as scientists employed by the emperor was not affected by the quarrel over religion. The issue of missionary licenses did not limit their scientific or religious endeavors. These licenses bestowed specific privileges upon the Jesuits, serving as a legal document that provided them with an imperial endorsement.[207] As Jesuits traveled across the Qing Empire, they could present their licenses whenever they encountered difficulties with local governments. As Kangxi proclaimed

[204] Cams, *Companions in Geography*, 97.
[205] Swen, *Jesuit Mission and Submission*, 134-135.
[206] Ibid., 16.
[207] Ibid., 137-138.

to the Jesuits in 1706: “I am thinking about you all and I want to give you licenses so that you have credentials. Local officials will know about your background, and the people will naturally welcome your teachings.”[208]

The issuing of licenses did not cause any obstacles to the Jesuits’ quest for natural history knowledge. In the early 1700s, the Jesuits continued to preach Christianity across China while gathering natural history information as curiosities during their travels. An exemplary instance is the letter written by Claude Jacquemin, S.J. (1669-1734) in 1712.[209] After obtaining his missionary license, Jacquemin preached and oversaw the construction of the first church on Chongming, an island situated at the mouth of the Yangtze River.[210] He delved into the island’s natural history, highlighting various types of fish endemic to the coastal regions of China, notably the *tcho-kia-yu* (*zhuojiayu* 着甲魚; Chinese sturgeon), the *poisson de farine* (*miantiaoyu* 麵條魚; Pacific sand lance), and the *poisson jaune* (*huangyu* 黃魚; yellow croaker).[211] In addition, Jacquemin discussed the flora on the island, which included fruits like persimmons, lemons, and watermelons, and crops such as wheat, barley, a type of rye-like wheat, rice, and cotton.[212] The letter is detailed in its descriptions of climate, landscape, natural produce, and local culture, focusing exclusively on a specific regional geographical unit. Such depth of concentration on natural history is even rare within the entire series of the *Lettres édifiantes et curieuses*.[213] The French Jesuits’ endeavors in the natural history of China persisted despite the licensing requirement, as they retained the freedom to travel and observe nature freely throughout the realm.

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[208] Paul Huang 黃伯祿, *Zhengjiao fengbao* 正教奉褒 [Veneration of the True Teachings (1884)], 557. “朕念你們，欲給爾等敕文，爾等得有憑據，地方官曉得你們來歷，百姓自然喜歡進教。”

[209] Claude Jacquemin, “Lettre du Père Jacquemin au Père procureur des missions de la Chine & des Indes. De l’île de Tsong-ming, dans la province de Nankin. Le 1er septembre 1712,” in *Lettres édifiantes et curieuses, écrites des missions étrangères par quelques missionnaires de la Compagnie de Jésus*, vol. 11, ed. Jean Baptist du Halde (Paris: Le Clerc, 1715), 234-302.

[210] Ibid., 259. Chongming Island was a part of Jiangnan Province during the Qing period and now belongs to the municipality of Shanghai.

[211] Ibid., 253-255. *Zhuojiayu* 着甲魚 is more commonly known as *zhonghuaxun* 中華鮕 in Chinese, a fish endemic to the Yangtze River.

[212] Ibid., 260-264.

[213] Hsia, “Some Observations on the Decline of the French Jesuit Scientific Mission in China,” 310-311.

Making the Kangxi Atlas

Between 1708 and 1718, the Kangxi Emperor entrusted the Jesuits in China with the task of surveying all of his empire. Under the context of this cartographical project, the licensing requirement served the purpose of formally ratifying the Jesuits' cartographical service to Kangxi. Before the 18th century, Kangxi's relationship with the Jesuits relied on an informal personal bond built upon years of collaboration. However, by 1708 when the imperial cartographic project started, two out of four Kangxi's tutors—Gerbillon and Pereira—had passed away. Thomas fell seriously ill and passed away the following year, leaving Bouvet the only one capable of providing service.[214] The emperor had to turn to the newly arrived Jesuits with whom he had not yet developed a personal bond. For him, the licenses served as a basis for formalizing the services of new Jesuit courtiers.

Kangxi understood the correlation between cartography and empire governance. The early years of Kangxi's reign witnessed a series of military campaigns aimed at consolidating the territories of the former Ming dynasty (1368-1644). These efforts included quelling internal rebellions in southern China led by former Ming lords (1673-1681) and conquering Taiwan from Ming loyalists (1683). In securing the northern frontier of the Qing Empire, two notable military triumphs against Russia (1685) and the Dzungar Khanate (1695) played a pivotal role. The former resolved the land dispute between the Qing Empire and Russia, culminating in the Treaty of Nerchinsk. The latter marked the decisive defeat of Galdan Khan of the Dzungar Mongols who had consistently posed threats to the Qing Empire's interests in Tibet and Mongolia.[215] With the expansion and consolidation of territory during Kangxi's reign, a greater need arose for precise geographical representation of the empire.

Cartographic collaboration between Kangxi and the Jesuits was advantageous for both. Kangxi leveraged the expertise of the Jesuits in China and tasked them with creating maps for his imperial pursuits. For the Jesuits, mapmaking was, first, in line with the objective of collecting

[214] Cams, *Companions in Geography*, 91.
[215] See Peter C. Perdue, *China Marches West: The Qing Conquest of Central Eurasia* (Cambridge, MA: Harvard University Press, 2005), 133-208.

geographical data for the *Académie royale des sciences*. Second, newly arrived Jesuits saw the cartographic project as an opportunity to bolster their relations with the emperor, just like Verbiest and Gerbillon once did by offering scientific services. Third, they were delighted to survey the Qing territory as the undertaking was convenient for their religious and scientific pursuits. Gerbillon expressed his satisfaction with the chance of traveling around China brought under the emperor's commission: "The missionaries charged by the emperor to draw the map took the opportunity, while carrying out his orders, to preach Jesus Christ in all the towns and villages they passed through. … It can be said that it was less a plan they were going to execute, than a mission they carried out during winter at the expense of His Majesty."[216] The cartographic project was patronized by the emperor.[217] The Jesuit mapmakers' travel expenses were entirely covered by the royal treasury. They did not need to raise funds. The imperial financial support allowed them to pursue scientific endeavors across a large geographic expanse without any monetary constraints.

The making of the Kangxi Atlas was preceded by a survey of the lands surrounding Beijing, which Kangxi initiated as a pilot project to assess the European mapmaking method. In 1705, following a flood that damaged the suburbs of Beijing caused by two rivers near the city, the emperor turned to the Jesuits to create a map of the area situated between the two rivers. This map aimed to aid him in devising plans for repairs and implementing future preventive measures. The task was given to Antoine Thomas, Joachim Bouvet, Jean-Baptiste Régis, and Dominique Parennin.[218] Kangxi's choice of persons comprised both old and new missionaries: Two of them, Thomas and Bouvet, had served at the court since the 1680s; the other two, Régis, and Parennin just arrived in China a few years ago. Such a choice reflects

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[216] Jean-François Gerbillon, "Lettre du Père Gerbillon. À Pékin en l'année 1705," in *Lettres édifiantes et curieuse, écrites des missions étrangères par quelques missionnaires de la Compagnie de Jésus*, vol. 10, ed. Jean Baptist du Halde (Paris: Le Clerc and Le Mercier, 1713), 417-419. « Les Missionnaires chargez par l'Empereur de dresser le plan dont je viens de parler, prirent occasion, en exécutant ses ordres, de prêcher Jesus Christ dans tous les Bourgs & Villages par où ils passerent. … : l'on peut dire que ce fut moins un plan qu'ils allerent tirer, qu'une Mission qu'ils firent en plein Hyver aux frais de Sa Majesté. »

[217] Theodore N. Foss, "A Western Interpretation of China: Jesuit Cartography," in *East Meets West: The Jesuits in China, 1582-1773*, ed. Charles E. Ronan and Bonnie B. C. Oh (Chicago: Loyola University Press, 1988), 210.

[218] Gerbillon, "Lettre du Père Gerbillon, " 414.

Kangxi's intention of promoting new talented Jesuits, substituting for his old European courtiers who would soon no longer be capable of service.

A new generation of missionaries assumed the leading role in the making of the Kangxi Atlas. Satisfied with the pilot cartographic work of 1705, Kangxi called Régis to direct the project. Régis summoned a team of surveyors including Joachim Bouvet, Pierre Jartoux, Joseph-Anne-Marie de Moyriac de Mailla, Pierre-Vincent de Tartre, S.J. (French, 1669-1724), Romain Hinderer, S.J. (German, 1668-1744), João Francisco Cardoso, S.J. (Portuguese, 1676-1723), Ehrenbert Xaver Fridelli, S.J. (Austrian, 1673-1743), and Guillaume Fabre Bonjour, Augustinian (French, ?-1714).[219] Many in this list arrived in China on board the merchant ship *Amphitrite*.[220] The mapmaking project started in 1708 with a survey of the Great Wall, followed by surveys of Manchuria and Mongolia in 1709. From 1710 to 1715, the project extended to the central and southern provinces, as well as the islands of the East China Sea. The project was finalized with a survey of Tibet between 1717 and 1718. Although the Jesuit mapmakers never personally entered Tibet, they trained two Tibetan monks to complete this final piece of the Kangxi Atlas.[221]

Jean-Baptise Régis & Natural History of Manchuria

The making of the Kangxi Atlas provided the Jesuits in China with unprecedented empowerment by granting them access to remote lands. This opportunity allowed them to acquire knowledge from the Qing frontier lands, regions seldom explored by their predecessors. Manchuria, being the ancestral homeland of the Qing royal family, was inaccessible to non-Manchurians as per Qing policies. This stemmed from the Qing rulers' belief that Manchuria should remain isolated from other groups to preserve the Manchu identity, as well as their aspiration to monopolize natural resources there such as fur, ginseng, and pearls.[222] Before 1709,

[219] Han Qi, "Cartography during the Times of Kangxi Emperor," in *Jesuit Mapmaking in China: D'Anville's Nouvelle Atlas de la Chine (1737)*, ed. Roberto M. Ribeiro and John W. O'Malley (Philadelphia: Saint Joseph's University Press, 2014), 60-61.
[220] Landry-Deron, "Les Mathématiciens envoyés en Chine par Louis XIV en 1685," 448.
[221] Foss, "A Western Interpretation of China," 225-231.
[222] Seonmin Kim, *Ginseng and Borderland: Territorial Boundaries and Political Relations Between Qing China and Chosŏn Korea, 1636-1912* (Oakland, CA: University of California Press, 2017), 2-4.

only a handful of Jesuits had ever visited Manchuria. In 1682, Verbiest accompanied the Kangxi Emperor on a routine tour to Liaodong of Manchuria to explain how to use mathematical instruments in the field.[223] In 1692, Gerbillon visited Rehe, the southmost city of Manchuria, upon the invitation by Kangxi to join a royal hunting party. He never entered the heartland of Manchuria. Manchuria remained largely unknown to the Europeans until 1709 when Jesuit missionaries entered its heartland as imperial-commissioned mapmakers. The survey of Manchuria went beyond cartography, providing the Jesuit mapmakers a chance to observe the region's natural environment. They encountered species unique to the northeastern frontier of the Qing Empire, a departure from their experiences in the central and coastal regions.

Jean-Baptise Régis, the chief cartographer of the Kangxi Atlas project, documented his journey in Manchuria in an unpublished manuscript titled *Nouvelle géographie de la Chine et de la Tartarie orientale.*[224] Régis's manuscript encompasses crucial insights into the geographic information of Manchuria, including the history, ethnography, geography, and natural history of the region, which were recorded during his survey of Manchuria with Jartoux and Fridelli in 1709.[225] The outcome of the survey extended beyond geographical information, encompassing a diverse array of knowledge about nature. Régis's contributions formed a substantial part of du Halde's understanding of Manchuria in composing the monumental *Description… de la Chine*. The fourth volume of this book is dedicated almost exclusively to the region known by the Europeans as Chinese Tartary. In addition to a portion extracted from Gerbillon's diary detailing voyages in Mongolia, du Halde included a significant excerpt from Régis's manuscript to compile a comprehensive description of Manchuria.[226] Following the *Description… de la Chine*'s release in 1735, du Halde provided the French audience with knowledge acquired at the Qing Empire's frontiers, along with a remade map of China by Parisian cartographer Jean-Baptiste Bourguignon d'Anville (1697-1782) based on the Kangxi Atlas.[227]

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[223] Du Halde, *Description… de la Chine*, 4:75.
[224] Jean-Baptise Régis, *Nouvelle géographie de la Chine et de la Tartarie orientale* (Bibliothèque nationale de France, Département des manuscrits, Français 17242, n.d.).
[225] Cams, *Companions in Geography*, 118.
[226] Du Halde, *Description… de la Chine*, 4:1-17.
[227] See Mario Cams, "The China Maps of Jean-Baptiste Bourguignon d'Anville: Origins and Supporting Networks,"

Régis's account of natural history developed hand-in-hand with the progress of surveying. The 1709 survey examined geographical information of the land from the Great Wall up to the Amur River valley. To ensure a safe journey into far remote regions, the Jesuit mapmakers depended on the support of local towns for food, supplies, horses, boats, and local guides. The mapmakers' journey followed the routes along major populous settlements of the region: They began at Shanhaiguan, the easternmost garrison of the Great Wall, then traveled along the coastline to Fengcheng (modern-day Dandong) at the Qing-Chosŏn Korea border's western end. Then, they passed through Hetu Ala, Mukden (modern-day Shenyang), and Ningguta, and finally reached Hunchun, the eastern end of the Qing-Chosŏn border. From there, they continued further north to the Amur River valley, home to the Nanai tribes.[228]

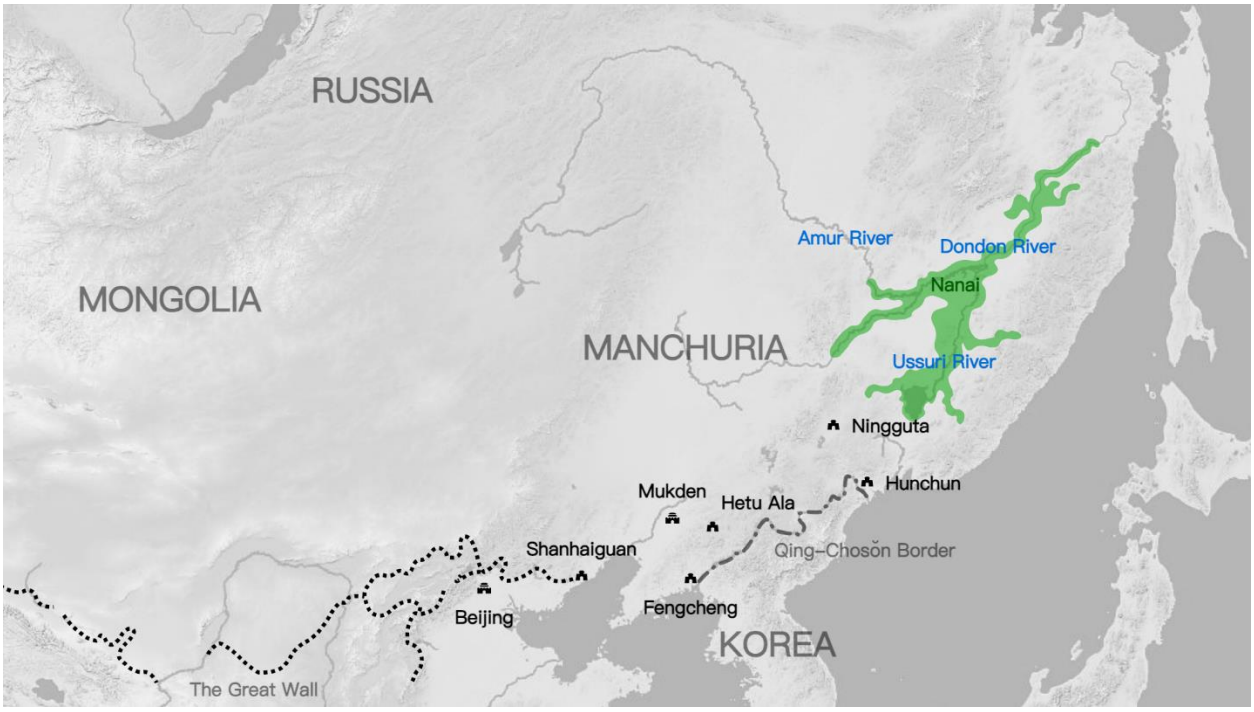

Image 3.1 Map of the Jesuit mapmakers' journey in Manchuria, 1709

Régis's account of natural history follows the same pattern, first focusing on the major urban settlements in southern Manchuria, then venturing into the wilderness of the north. His

Imago Mundi: The International Journal for the History of Cartography 66, no. 1 (2014): 51-69; Eleanor Coulter, "Geographies of Space and Time: Narrative Structures in the Maps of Jean-Baptiste Bourguignon d'Anville," PhD diss., McGill University, 2022, https://escholarship.mcgill.ca/concern/theses/sq87c059m.

[228] Cams, *Companions in Geography*, 111-112.

narrative began with the flora and fauna surrounding the towns they visited. Progressing from town to town, Régis documented the primary crops and fruits cultivated in the urban settlements of Manchuria. He concluded that the fertile lands of Manchuria were ideal for growing economic crops like wheat, millet, vegetables, and cotton, whereas rice cultivation was relatively scarce. According to Régis, the cultivation of crops in Manchuria not only sustained its local people but also a significant population of cattle and sheep, a rarity in Chinese provinces south of the Great Wall. In addition to crops, Régis's account highlighted a plethora of fruits cultivated within the region, including apples, pears, walnuts, chestnuts, and hazelnuts.[229]

The mapmakers embarked on long-distance travels, making frequent stops in cities and towns to replenish supplies. This allowed them to observe the surrounding environments of Manchurian towns. Régis paid particular attention to Ningguta, where he and his team of surveyors received supplies before venturing into the land of the Nanai people. Régis noted three types of grains that were cultivated in the villages around Ningguta:

> They have enough to sustain themselves, and they harvest a large quantity of millet and a type of grain that we do not have, called *mai se mi* by the local Chinese as if it were a cross between wheat and rice. Regardless of its name, it is good to eat and of great use in these cold regions. Perhaps it would thrive in certain parts of Europe where other grains cannot grow. Oats, which are almost non-existent elsewhere, are abundant here and are used to feed the horses. This is something new to our Tartar companions, who were raised in Beijing where horses are fed a type of black beans that are in high demand in all the northern provinces of the empire.[230]

Through the assistance of the local people, the Jesuit mapmakers gained grains to support their project. Among the grains, Régis noticed a type called *mai se mi* that was new to his knowledge.

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[229] Du Halde, *Description… de la Chine*, 4:5.

[230] Ibid., 4:6-7. « Ils ont de quoi vivre, & ils recuëillent sur-tout grande quantité de millet, & d'une espece de grain que nous n'avons pas, nommé par les Chinois du pays *Mai se mi*, comme s'il tenoit le milieu entre le froment & le ris ; mais quoiqu'il en soit du nom, il est bon à manger, & d'un grand usage dans ces pays froids ; peut-être viendroit-il dans certains Pays de l'Europe, où les autres bleds ne sçauroient t croître. L'avoine qu'on ne trouve presque point ailleurs, est ici en abondance, & sert à nourrir les chevaux, ce qui paraissoit nouveau à nos compagnons Tartares élevez à *Peking* où les chevaux sont nourris d'une espece de féves noires, dont le débit est grand dans toutes les Provinces Boréales de l'Empire. »

Mai se mi (mizimi 糜子米) is known in English as proso millet (*Panicum miliaceum*), a grain that is widely cultivated in northern Asia and a part of northeastern Europe. Moreover, Régis noticed a different type of forage for horses in Manchuria compared to that in Beijing and the north-central provinces. Oats, rather than beans, were the primary feed for livestock. The account reflects a certain knowledge of the regional diversity of crops within China that the Jesuits gained because of the cartographical project sponsored by Kangxi and local officials. Régis's account shows a more comprehensive understanding of the grains in Northern China compared to Le Comte, who only spent two years in north-central China. In the *Nouveaux mémoires*, Le Comte, despite attempting to convey an encyclopedic description of plants in China, concluded that in all the provinces of the north and west people cultivated "black and yellow beans, instead of oats, to feed horses."[231] Le Comte was unaware of oat cultivation in Manchuria as neither he nor the majority of the Jesuits in China ever visited Manchuria. Régis juxtaposed the same type of species found in Manchuria and the north-central provinces, demonstrating a more intricate understanding of regional diversity within China and an expanded geographical scope of natural history research compared to previous Jesuits.

Apart from documenting crops and fruits cultivated in urban settlements, Régis recorded wild flora when exploring the remote north of the Amur River Valley. According to Régis, near the end of the surveying of Manchuria, the team of Jesuit mapmakers under his lead left Hunchun, northward to villages of a people called *Ke tching ta tse* (*Heijen dazi* 黑斤鞑子).[232] The term was a derogatory name used by the Chinese to refer to the Nanai people (known as the Hezhe people in China) residing along the Amur River and its tributaries.[233] In September 1709, from a Nanai village on the Dondon River, a tributary of the Amur, the mapmakers entered a forest where they marked the northernmost point of the Kangxi Atlas.[234] Upon leaving the forest, the Jesuit mapmakers encountered enchanting river valleys adorned with luxuriant grass and

[231] Le Comte, *Nouveaux mémoires*, 1:209. « … des pois noirs & jaunes, dont on se sert au lieu d'avoine, pour engraisser les chevaux. »
[232] Du Halde, *Description… de la Chine*, 4:7.
[233] *Heijin* 黑斤 is a different transliteration for the term *Hezhe* 赫哲. Both terms are transcribed from the self-name of the Nanai people from the lower Amur region; *dazi* means barbarians in Mandarin Chinese.
[234] Du Halde, *Description… de la Chine*, 4:7.

dotted with diverse wildflowers, among them grew a particular type of yellow lily: "These lilies, in terms of their appearance and height, are not different from our white lilies, but they have a much sweeter fragrance. We were not surprised by this, as the roses we found in these valleys did not have the same scent as ours, and our transplanted tuberoses in Beijing have become less fragrant there."[235] Régis drew a comparison between the wildflowers in Manchurian forests and those cultivated in the gardens of Paris and Beijing, suggesting that the fragrance of flowers varies based on their growing environment. Transplanting a plant in other places would alter its characteristics. This understanding was derived from Régis's extensive exploration in the wild, rather than from static research in a single location such as cultivating plants in a garden. The Jesuit mapmakers, benefiting from travel opportunities provided by Kangxi's cartographical initiative, embarked on a botanical field trip. This journey exposed them to various geographical environments and shaped their understanding of how the environment might influence the growth of flowers.

Such a field trip in the wild also provided opportunities for knowledge exchange between the Jesuit mapmakers and local informants. Similar to the voyages of Gerbillon, during which he exchanged knowledge with the Mongolians, the Manchus, and the Chinese, the mapmakers interacted with local inhabitants of the Amur River valley—the Nanai people in their journey. From the Dondon River, the mapmakers headed south, making their way to the Ussuri River where dwelled a people whom the Chinese called *Yu pi ta se* (*Yupi dazi* 魚皮靼子).[236] The name, another derogatory term employed by the Chinese, alluded to the Nanai people residing along the Ussuri River.[237] The Nanai people were renowned for their adeptness in catching fish, as their way of life was greatly supported by the bountiful fish found in the river. They provided information that contributed to Régis's comprehension of aquatic animals in the region. Régis

[235] Ibid. « Ces lys, quant à la figure & à la hauteur, ne sont point différens de nos lys blancs, mais ils sont d'une odeur beaucoup plus douce. Nous n'en fûmes pas surpris, puisque les roses, que nous trouvions dans ces vallées, n'avoient pas l'odeur des nôtres, & que nos tubéreuses transplantées à *Peking* y sont devenuës moins odoriférantes. »
[236] Ibid., 4:10.
[237] Both *Heijin dazi* 黑斤靼子 and *Yupi dazi* 魚皮靼子 (meaning fish-skin barbarians, due to the fish-skin clothes the Nanai people wore) were negative terms used by the Chinese during the Qing Dynasty to call the Nanai or Hezhe people. Régis might mistakenly perceive them as denoting two distinct peoples.

noted that sturgeon was the main type of fish in the region, referring to the words of the Nanai people: "The sturgeon is the king of fish, without equal."[238] He then commented on a rare type of fish, which might have been the Chum salmon (*Oncorhynchus keta*): "After the sturgeon, they highly value a fish that we are not familiar with. It is indeed one of the best to eat. It is almost the length and shape of a small tuna but has a more beautiful color. Its flesh is entirely red, which distinguishes it from others. It is rare, and we were only able to see it once or twice."[239] Régis's knowledge of fish cannot be viewed in isolation from the agency of the Nanai people. They shared their fish-related knowledge with him. In formatting his account of the fish in the Ussuri River, Régis had to rely on the Nanai people's fishing expertise. His interaction with the Nanai people, furthermore, provided him with insights into their cultural practices. Régis contributed the first European account of the ethnography of the Nanai people, portraying how they skillfully fashioned clothing and textiles from fish skins.[240] The Nanai understanding of fish was unique, originating from their specific cultural traditions. Régis's case illustrates that as the Jesuit mapmakers undertook the surveying mission of Manchuria, their achievements exceeded the mere creation of maps. He picked up the knowledge produced in the Nanai cultural context, showcasing knowledge hybridity. A diverse array of knowledge emerged spontaneously with surveying practices, revealing the dynamics of open-air science that originated from, but extended far beyond, mapmaking.

Pierre Jartoux & Ginseng in Manchuria

Before the Jesuit mapmakers continued northward along the Amur River valley, they made their way to Hunchun, a city situated on the bank of the Tumen River, to measure the east end of the Qing-Chosŏn Korea border.[241] As argued by Seonmin Kim, ginseng-related concerns

[238] Du Halde, *Description… de la Chine*, 4:11. « Si on l'en croît, l'ésturgeon est le Roi des poissons, il n'y a rien qui l'égale; … »
[239] Ibid., 4:11-12. « Après l'ésturgeon ils estiment fort un poisson, que nous ne connoissons pas ; il est en effet un des meilleurs qu'on puisse manger ; il a presque la longueur & la forme d'un petit thon, mais il est d'une plus belle couleur ; sa chair est tout à fait rouge, c'est ce qui le distingue des autres ; il est rare, & nous n'en pûmes jamais voir qu'une ou deux fois. »
[240] Ibid., 4:10.
[241] Cams, *Companions in Geography*, 118-119.

influenced the Qing border policy in Manchuria. The Kangxi Emperor wanted to mark a clear border line with Chosŏn Korea, first, to safeguard the Manchu homeland, and second, to maintain control over local natural resources, notably by curbing ginseng poaching by Korean diggers.[242] The Jesuit survey of Manchuria was seen as a means to protect the Qing's stake in the region's natural resources. During the survey mission, the Jesuits were exposed to knowledge and practices of local ginseng digging, which shaped their understanding of the plant. At Hunchun, a local inhabitant brought the mapmakers four ginseng (*Panax ginseng*) roots he had gathered five or six leagues away from the city.[243] Jean-Baptise Régis and his colleague Pierre Jartoux presented parallel narratives on ginseng, covering aspects such as its physical appearance, the environmental conditions for its growth, the method of collecting ginseng roots, and the plant's medical application. Jartoux's report, published in the tenth volume of the *Lettres édifiantes et curieuses*, appears to be more detailed and consists of a clear drawing of the plant's root, stem, leaves, and fruits. In the opening of his letter, Jartoux acknowledged the connection between his natural history discovery and the survey of Manchuria: "The Tatar map we made according to the order of the Chinese emperor provides us with an opportunity to see the famous ginseng plant, which is highly valued in China and rarely known in Europe."[244] Jartoux's ginseng encounter stands as a testament to information collected during the mapmaking project while holding an impact that went well beyond cartography. When mapping Manchuria, Jartoux sent Europe the first complicated report on the ginseng root, which lifted the veil of this magic natural remedy that Europe had been curious about for a long time.

In the 17th century, pieces of information about the "magic" ginseng root from China became prevalent in Europe. Jartoux was not the first Jesuit to see and document ginseng, but he was likely the first to offer a comprehensive and accurate report of the plant. The Portuguese Jesuits in China had encountered ginseng long before Jartoux in the 17th century. The earliest

[242] Kim, *Ginseng and Borderland*, 15-16.
[243] Du Halde, *Description… de la Chine*, 4:9. One league equals roughly four kilometers.
[244] Jartoux, "Lettre du Père Jartoux," 159-160. « La Carte de Tartarie, que nous faisons par ordre de l'Empereur de la Chine, nous a procuré l'occasion de voir la fameuse Plante de *Gin-seng* si estimée à la Chine, & peu connuë en Europe. »

mention of ginseng was in Álvaro Semedo's *Relatione della grande monarchia della Cina* (1643). The medical use of ginseng was mentioned in Martino Martini's *Bellum Tartaricum* (1654), *Novus Atlas Sinensis* (1655) and Louis Le Comte's *Nouveaux mémoires sur l'état présent de la Chine* (1696).[245] Guy Tachard's *Voyage de Siam* (1686) also mentioned the availability of ginseng from northern China in Siam via trade.[246]

Nevertheless, plenty of inaccuracies permeated the Jesuit accounts of ginseng predating Jartoux. Since these Jesuits never personally visited Manchuria, they did not have the chance to witness ginseng growing in its natural habitat. Instead, they might have only encountered the ginseng roots that were transported from Manchuria to the south of the Great Wall. The lack of firsthand experience could have resulted in various misinterpretations about the plant. For instance, a misconception regarding ginseng's place of origin can be found in *Bellum Tartaricum*, in which Martini mistakenly thought ginseng was from the mountains around Beijing.[247] Jartoux's letter corrected Martini's remark on the plant's natural habitat: "It is not true that this plant grows in the province of Beijing, on the *Yongpin fou* mountains, as claimed by Father Martini based on some Chinese books. It could easily be mistaken because that is where it arrives when being brought from Tartary to China."[248] Martini saw ginseng in Beijing and mistook the plant as native to the region. He never traveled north of the Great Wall, resulting in limited geographical scope and missing key information in his natural history work. Jartoux cracked the myth of ginseng's origin and corrected Martini's mistake due to his travel experience to Manchuria where the plant actually grows. As Heasim Sul asserts, Jartoux was a significant figure in the global history of ginseng because he rediscovered ginseng from the standpoint of disenchantment, offering the first European account contradicting the previous notion that the

[245] Heasim Sul, *A Global History of Ginseng: Imperialism, Modernity, and Orientalism* (London: Routledge, 2022), 11; Bretschneider, *Early European Researches into the Flora of China*, 7, 18, 19, 28.
[246] Tachard, *Voyage de Siam*, 370-373.
[247] Sul, *A Global History of Ginseng*, 14.
[248] Jartoux, "Lettre du Père Jartoux," 182. « …il n'est pas vrai que cette plante croisse à la Chine, comme le dit le P. Martini sur le témoignage de quelques livres Chinois, qui l'ont fait croistre dans la Province de Peking, sur les montagnes d'*Yong-pin fou*. On a pû aisément s'y tromper, parce que c'est là qu'elle arrive quand on l'apporte de Tartarie à la Chine. » *Yongpin fou* (*Yongping fu* 永平府) was a prefecture of the Ming Dynasty. The region covered parts of today's Tangshan and Qinhuangdao, Hebei Province.

finest ginseng came from central China—a myth that had shaped ginseng's market values in Europe for centuries. Predating Jartoux, Manchurian ginseng was considered inferior to the "inner China" ginseng, a belief endorsed by Martini's work, but in reality, this "inner China" ginseng does not exist.[249]

Jartoux's work also dismantled the European notion that romanticized ginseng as a magical and exotic plant—evident in Guy Tachard's illustrations of Chinese plants. As one of the six *mathématiciens du roi* dispatched by Louis XIV, Tachard did not travel to China with his colleagues but stayed in Siam. There, he reported several plants imported from China, including ginseng roots. His account reflects the European understanding of ginseng before Jartoux, highlighting its resemblance to a human and its purported magical healing function of strengthening one's energy.[250] However, due to such a limited and oversimplified notion about ginseng, the depiction of the plant in Tachard's *Voyage de Siam* (Image 3.2) contains several inaccuracies. His representation of ginseng only displays its root, indicating that he likely lacked access to other parts of ginseng. The image depicts half of the plant's root above the soil and only the end of the root in the soil: He mistook the top half of the plant's root for its stem and recognized the lower half as the root. Additionally, the ginseng roots in the illustration appear unnaturally human-like in contrast to Jartoux's rendering, featuring arms and legs that give the impression of the plants walking on the earth. Tachard depicted the plant in a humanoid and dynamic format, possibly resonating with his perception of ginseng's resemblance to humans and as a source of energy. Finally, Tachard placed the ginseng in a tropical setting, neglecting to portray its natural habitat and presenting it as exotic as other tropical fruits. This is a misrepresentation of its true growth environment. Tachard's drawing thus appeared to be overly romanticized as he depicted ginseng as an unrealistic magic being from an exotic land. Such depiction, however, dominated the European perception of the plant until the publication of Jartoux's letter in the *Lettres édifiantes et curieuses*.

[249] Sul, *A Global History of Ginseng*, 14-17.
[250] Tachard, *Voyage de Siam*, 371.

Image 3.2 Chinese plants in Guy Tachard's *Voyage de Siam*, 1685[251]

[251] Tachard, *Voyage de Siam*, 372.

Jartoux rooted out several previous inaccuracies associated with ginseng. He noted that most ginseng roots did not have a human-like shape, after consulting with Manchu ginseng diggers: "Those who search for ginseng professionally assured me that they did not find it resembled humans more than other roots."[252] Jartoux's drawing of ginseng (Image 3.3) appears to be more realistic. Each element in his illustration is labeled with letters corresponding to explanations in his text: A indicates the actual size of the root; B, C, C, and D, the length and width of the stem; D and E, the stem's branch with fruit attached at the end; F, the leaves. The numbers of the branches are identified by the lowercase letter b, signifying their respective ages. Root A is in its seventh year, and H is in its fifteenth.[253] Jartoux's depiction of ginseng rose from a meticulous way of study through observation and recording data for further works, contrasting Tachard's drawing of ginseng based on a romanticized and mythical impression of the plant. Jartoux's unprecedented level of clarity in both his writing and drawing derived from his empirical approach benefited from on-site observations, as affirmed by Régis: "All of this will be better understood through the drawing made by Father Jartoux at the site."[254]

Jartoux also held an empirical approach toward the plant's medical usage: "For me, I am convinced that in the hands of the Europeans who understand pharmacy, it would be an excellent remedy, if they had enough to carry out the necessary tests, to examine its nature through the path of chemistry, and to apply it in the appropriate quantity, according to the nature of the ailment to which it may be beneficial."[255] He believed that ginseng, as a medical remedy, should be tested through experiments while implying that his account and drawing laid a foundation for further research into the medical use of ginseng, thus diminishing the mythical view of its magical healing power. Jartoux's empiricism, based on observations made during his trip to

[252] Jartoux, "Lettre du Père Jartoux," 182. « … & ceux qui la cherchent de profession, m'ont assuré qu'on n'en trouvoit pas plus qui eussent de la ressemblance avec l'homme, qu'on en trouve parmi les autres racines, … »
[253] Ibid., 172-178.
[254] Du Halde, *Description… de la Chine*, 4:9. « … : mais tout ceci se comprendra encore mieux par sa figure qui a été dessinée sur le lieu même par le Pere Jartoux. »
[255] Jartoux, "Lettre du Père Jartoux," 162, « Pour moy je suis persuadé qu'entre les mains des Européens qui entendent la Pharmacie, ce seroit un excellent remede, s'ils en avoient assez pour en faire les épreuves nécessaires, pour en examiner la nature par la voye de la Chymie, et pour l'appliquer dans la quantité convenable, suivant la nature du mal, auquel elle peut estre salutaire. »

Manchuria, corrected many previous misconceptions about ginseng, making his work foundational for the European understanding of the plant.

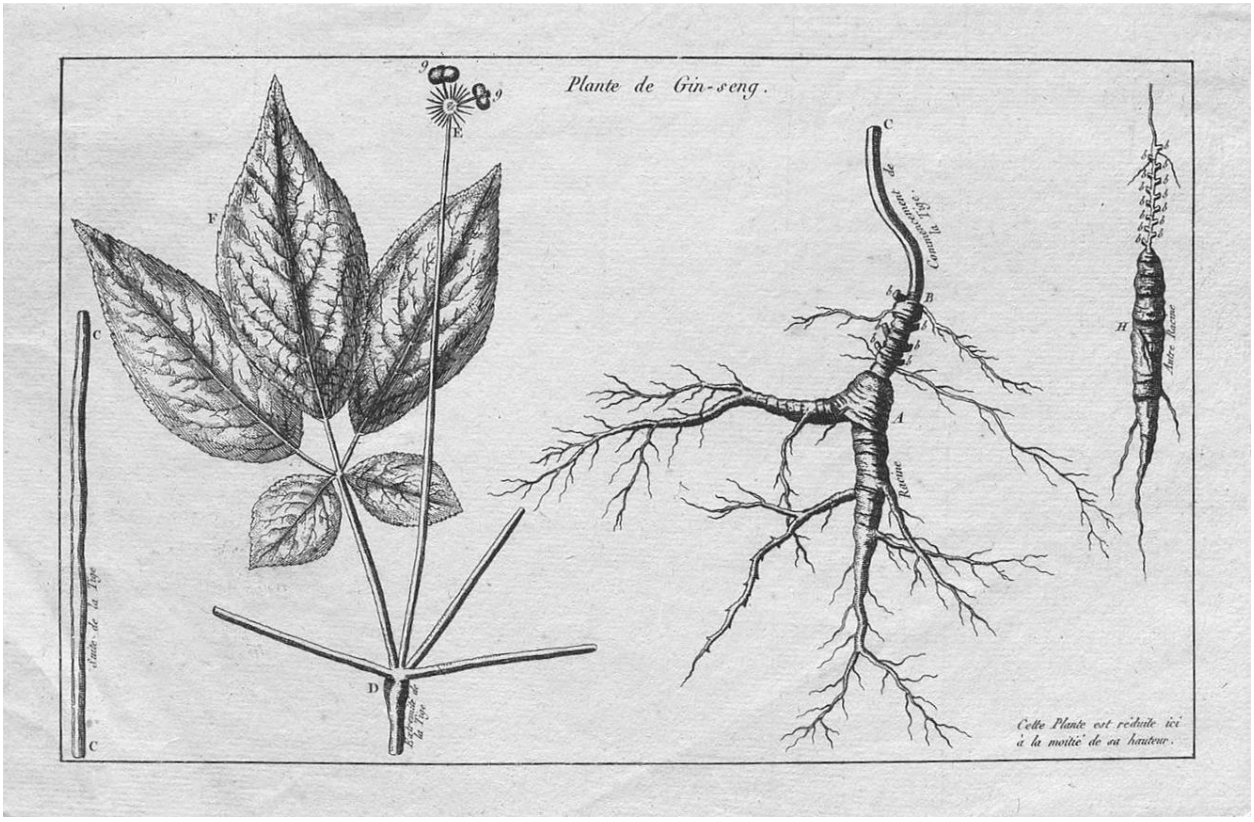

Image 3.3 Ginseng plant, reduced to half of its height here, drawn by Pierre Jartoux, in *Lettres édifiantes et curieuses*, vol. 10, 1711[256]

The botanical descriptions of ginseng by Jesuits predating Jartoux also contain many inaccuracies. Instead of encountering fresh ginseng plants, Jesuits before Jartoux may have only come across dried ginseng roots in pharmacies. Le Comte, for instance, described ginseng as having a yellow root, black stem, and purple flowers, and did not acknowledge the existence of its fruit.[257] The description of ginseng by Jartoux differs from that of Le Comte. Jartoux described the ginseng root as being white, the stem as dark red with a cluster of red fruits attached, and the flowers as white according to local people.[258] Régis also noted that the plant

[256] Jartoux, "Lettre du Père Jartoux, " 173.
[257] Le Comte, *Nouveaux mémoires*, 1:469.
[258] Jartoux, "Lettre du Père Jartoux, " 172-178. Jartoux said that he had never seen ginseng flowers personally.

can be distinguished from its cluster of round red fruits.[259] Fresh ginseng typically has a white root and a dark red stem, with flowers that start as white and produce red fruits when ripe. The colors of the plant can change after long-term storage, with the white root turning yellow and the stem changing from dark red to black. Jartoux noticed that its red fruit would appear darker red to black when dried out.[260] The purple flower that Le Comte saw might not have been a flower but the dried-out ginseng fruits. Le Comte's descriptions of ginseng were likely based on a dried ginseng root rather than a living ginseng plant.

In addition, Jartoux overturned Le Comte's description of the physical features of ginseng. Le Comte concluded that ginseng "is said that it only grows one stalk, that this stem produces only three branches, and that each carries the leaflets four by four or five by five."[261] Jartoux noted that the wild ginseng stem does not always have three compound leaves, but can vary with two, three, five, or even seven.[262] He added that "each branch always has five leaflets, just like the one I drew, unless the number has been reduced due to some accident."[263] *Panax ginseng* typically has three to six palmately compound leaves, each comprised of five (occasionally three to seven) leaflets. In the first year after sprouting, one leaf with three leaflets arises. In the following years, two or three compound leaves with usually five leaflets arise. The number of compound leaves might continue to increase, up to six or even more, as years pass.[264] If unusual cases are not considered, Jartoux's conclusions regarding the compound leaves and leaflets of ginseng are correct. His conclusion is more accurate than Le Comte's since he had access to the land where ginseng grows whereas Le Comte could only find ginseng from a local pharmacy in north-central provinces. Le Comte never saw a living ginseng plant but those transported from Manchuria to other places in China by merchants. Moreover, judging from Le Comte's description, it is also possible that he confused *Codonopsis lanceolata*, which normally has four

[259] Du Halde, *Description… de la Chine*, 4:8-9.
[260] Jartoux, "Lettre du Père Jartoux, " 177.
[261] Le Comte, *Nouveaux mémoires*, 1:469. « On dit qu'elle n'en pousse qu'une, que cette tige ne produit que trois branches, & que chaque branche porte les feüilles quatre à quatre, ou cinq à cinq. »
[262] Jartoux, "Lettre du Père Jartoux, " 181.
[263] Ibid. « Cependant chaque branche a toûjours cinq feüilles, de mesme que celle que j'ay dessinée, à moins que le nombre n'en ait été diminué par quelque accident. »
[264] William E. Court, *Ginseng: The Genus Panax* (Amsterdam: Harwood Academic, 2000), 16, 25-26.

leaves and purple flowers, with *Panax ginseng*.[265] The discrepancy in accuracy between Le Comte's records and Jartoux's implies how the geographical scope of travel could influence the outcome of natural history research. Due to the absence of travel experience, Le Comte lacked chances to observe living ginseng plants in Manchuria and exchange with local inhabitants, experiences that Jartoux had during the making of the Kangxi Atlas.

Besides a very detailed botanical analysis of ginseng, Jartoux examined the environment required for ginseng to grow. Taking advantage of his land surveying mission in Manchuria, Jartoux discovered a specific range of longitude where ginsengs are most abundant.[266] He noted: "Ginseng plants are located on the slopes of these mountains, in these dense forests, around canyon edges or rocks, under trees, among various herbaceous plants. It cannot be found in plains, valleys, swamps, at the bottom of gullies, or in places that are too open."[267] He then concluded that "all this makes me believe that if it is in another country in the world, it must be mainly in Canada. According to people living there, Canada's forests and mountains are very similar to these."[268] Jartoux's prediction was proven to be correct seven years later, suggesting the effectiveness of his empirical approach. In 1716, Joseph-François Lafitau, S.J. (1681-1746), inspired by Jartoux's work, discovered the American ginseng (*Panax quinquefolius*) in New France.[269] The study of ginseng is an exemplary case of how land surveying and natural history are interrelated in practices. Jartoux's access to Manchuria was crucial to his empirical study of ginseng through observation and categorization. Despite Europe's long-standing notion of the root and its healing effects, Jartoux filled the knowledge gap regarding its flowers, leaves, and the environment where the species grows. Information gathered during the cartographic practices transcends the subject itself, creating a lasting impact on botanical exchange globally.

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[265] *Codonopsis lanceolata* is known to the Chinese as *siyeshen* 四葉參, meaning "Four-leaves ginseng."
[266] Jartoux, "Lettre du Père Jartoux," 166.
[267] Ibid., 167. « C'est sur le penchant de ces montagnes & dans ces forests épaisses, sur le bord des ravines ou autour des rochers, aux pieds des arbres & au milieu de toute sorte d'herbes, que se trouve la plante de *Gin-seng*. On ne la trouve point dans les plaines, dans les vallées, dans les marescages, dans le fond des ravines, ni dans les lieux trop découverts. »
[268] Ibid, 167-168. « Tout cela me fait croire, que s'il s'en trouve en quelqu'autre Païs du monde, ce doit estre principalement en Canada, dont les forests & les montagnes, au rapport de ceux qui y ont demeuré, ressemblent assez à celles-cy. »
[269] See Parsons, "The Natural History of Colonial Science," 37.

Joseph-Anne-Marie de Moyriac de Mailla & Natural History of Taiwan

The making of the Kangxi Atlas enabled the French Jesuits in China to gain access to the Qing Empire's frontiers, creating chances for obtaining remote knowledge uneasy to acquire. This is evident through their survey of the island of Taiwan. Taiwan was incorporated into the Qing Empire (under the administration of Fujian Province) in 1683 following the ultimate defeat of the Ming Loyalists who occupied the island. When preparing for the conquest, The Kangxi Emperor instructed his ministers to create a map of the island, highlighting the crucial role of cartography in this decisive moment for the empire.[270] Kangxi desired a comprehensive map of the empire that would include Taiwan due to the island's strategic location and its symbolic significance in affirming Kangxi's rule over all the former Ming territories.

The Jesuit mapmakers' trip to Taiwan enriched the limited knowledge the Europeans had about the island. In 1714, after finishing surveying Fujian Province, Jean-Baptise Régis, Joseph-Anne-Marie de Moyriac de Mailla, Romain Hinderer, and four Qing officials, onboarded a battleship prepared by local officials and departed for Taiwan.[271] Throughout the mapmaking project, the mapmakers were always accompanied and assisted by officials selected by the Imperial Household Department. Before their arrival, local officials would be notified to make preparations, ensuring accommodation, food, horses, and local guides were ready.[272] The emperor would also send instructions to individual officials, requiring them to cooperate and assist the mapmakers. In 1713, a year before the mapmakers made their way to Taiwan, the governor of Jiangnan and Jiangxi received an instruction that read:

> Officials, their assistants (*baitangga*), and Westerners who traveled to Henan and Jiangnan to draw the map should not return. From there, they may continue drawing [the maps of] Zhejiang's Zhoushan and other regions, as well as Fujian's Taiwan and other regions. When crossing the seas, we urge you and your men to [first] carefully consider weather and timing. There is no need to hurry. Please pass these instructions on to them.[273]

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[270] Cams, *Companions in Geography*, 43-44.
[271] Mailla, "Lettre du Père de Mailla au Père Colonia," 7-8.
[272] Cams, *Companions in Geography*, 141.
[273] Ibid., 135. "往河南江南畫輿圖去的官拜唐阿西洋人不必回來，就從彼處往浙江周山等處福建臺灣等處畫

Kangxi consistently monitored the surveying progress and issued instructions to facilitate the smooth operation of the imperial cartographic project. Through close cooperation with local officials based on the Qing's centralized bureaucratic system, he oversaw the situation of the mapmakers and tried to mitigate potential risks for the traveling officials and thus ensured a safe and productive collection of information from the frontiers of his empire.

In his narrative, Mailla emphasized the assistance he and other mapmakers received from local officials to gain access to remote regions, attributing his success to the significant privilege of being an imperial surveyor: "The visit we made to all the places, big and small, cities, towns, villages, rivers, lakes, mountains, etc., of this empire, the assistance that each Mandarin was ordered to give us, and the care we took ourselves so that nothing would escape our research, convince us that Europe will have nothing more to wish for."[274]

Taking advantage of the surveying task, Mailla wrote a letter reporting his encounters in Taiwan, later published in the *Lettres édifiantes et curieuses*. The style of his writing was a typical Jesuit one with an emphasis on matters of curiosity. Mailla's account of the island encompassed a broad range of natural history subjects, highlighting a plethora of tropical fruits such as oranges, bananas, pineapples, guavas, papayas, coconuts, peaches, apricots, figs, grapes, chestnuts, pomegranates. Mailla also described a variety of crops, including fields of tobacco and sugarcane that shaped the landscape of Taiwan. Mailla's letter further delved into the island's variety of wildlife, observing herds of deer and monkeys and noting the infrequent sightings of bears, wild boars, wolves, tigers, and leopards in the mountainous areas. They, according to Mailla, were akin to those from the mainland.[275]

Within Mailla's long list of the rich natural produce in Taiwan, he paid special attention to a type of watermelon that grew on the island: "They cultivate a type of melon called watermelon. These melons are much larger than those in Europe, with an oblong or round shape.

去。但走海時著你等謹慎看好天色時節。行走不必急了，須要仔細。再下旨與他們伊等。"

[274] De Mailla, "Lettre du Père de Mailla au Père Colonia," 7. « … : la visite que nous avons faite de tous les lieux, grands & petits, Villes, Bourgs, villages, rivieres, lacs, montagnes, &c. de cet Empire ; les secours que chaque Mandarin avoit ordre de nous donner, & les soins que nous nous sommes donnez nous-mêmes pour que rien n'échapast à nos recherches, nous persuadent que l'Europe n'aura rien à souhaitter en ce genre. »

[275] Ibid., 26-28.

Their flesh is either white or red. They are filled with fresh, sweet water that greatly appeals to the taste of the Chinese. However, they are not comparable to those from Pernambuco, which I have eaten in the Bay of All Saints in South America."[276] Mailla contrasted the type of watermelon in Taiwan to those in Europe and South America, shedding light on a Jesuit's curiosity toward global natural history. Curiosity in early modern Europe involved extensive practices of collecting. Both abstract discursive and physical materials can be objects of collections as the virtue of curiosity has entitled value to collections. As Niel Kenny suggests, the nature of travel accounts often went beyond a narration of travel to a collection of wonders, exotic things, and anecdotal news.[277] Discursive materials from travels could also be put into a curiosity cabinet metaphorically. Mailla's description of one particular fruit and its variants from Asia, Europe, and Latin America embodies a discourse of collecting curiosities. He wove together the experience of a rich scope of his travels. Descriptions of natural history in his travel account transcended the discourse itself, accumulating into his rich experience and knowledge of a variety of species. This was an act of collection: Knowledge curiosities accumulated via his traveling, similar to the act of putting items into a curiosity cabinet. The scope of his traveling likewise enriched the scope of his collection of curiosities on a global scale.

Curiosities in Mailla's letter extend beyond themes of natural history. His ethnographical account of the indigenous people of Taiwan demonstrates a similar style of collecting global anecdotes across Asia and America: "The characters of the people who live there, as [the Chinese] describe for us, differ little from what we call the savages of America. They have portrayed them as less brutal than the Iroquois, much more chaste than the Indians, and of a gentle and peaceful nature."[278] Mailla's text contrasted the people he encountered in Taiwan with the indigenous people of New France, showcasing the global scope of the Jesuit knowledge network. His travel

[276] Ibid., 26-27. « Ils cultivent une sorte de melons qu'ils appellent melons d'eau ; ces melons sont beaucoup plus gros que ceux de l'Europe, d'une figure oblongue, quelquefois ronde : la chair en est blanche ou rouge : ils sont pleins d'une eau fraiche & sucrée qui est fort au goust des Chinois ; ils ne sont pas cependant comparables à ceux qui viennent de Fernambouc, & dont j'ai mangé à la Baye de tous les Saints, dans l'Amerique meridionale. »
[277] Kenny, *The Uses of Curiosity in Early Modern France and Germany*, 245-256.
[278] Mailla, "Lettre du Père de Mailla au Père Colonia," 20. « Le caractere qu'ils nous ont fait des peuples qui l'habitent ne differe gueres de ce qu'on dit des sauvages de l'Amerique. Ils nous les ont dépeints moins brutaux que les Iroquois, beaucoup plus chastes que les Indiens, d'un naturel doux & paisible ; … »

account also collected the biased attitude of the Chinese toward the indigenous Taiwanese and the French toward native Americans. We could draw a parallel between Mailla's discussion of the two peoples and the discovery of ginseng in Manchuria and New France by the French Jesuits. Both demonstrated how the French Jesuits collected information during the Qing cartographic project and connected it to the knowledge they had gathered in other parts of the world via their global network. In North America, the French Jesuits gathered knowledge by operating closely with the French colonial power there, while in China, they utilized the Qing imperial cartographic ambition to acquire new knowledge. The knowledge they gathered from different parts of the world converged in their letters as collections of curiosities.

As Steven J. Harris suggests, we should think that each object in a curiosity cabinet has an invisible line linking it to its place of origin that maps out networks of agencies that gathered those objects. So does every piece of knowledge gathered from across the world. Understanding nature depended not only on the natural objects themselves but also on the dissemination of knowledge associated with the movement of these natural objects through travel.[279] Mailla's travel, from which he gained an immense knowledge of the world between Asia and America, was not an individual achievement but benefited from networks built by global cooperations like the Jesuits and the *Compagnie des Indes orientales*. Mailla's travel in China, similarly, benefited the bureaucratic network of the Qing Empire which allowed local officials to quickly respond to the emperor's order and provide aid to him and his fellow mapmakers. The cartographic project extended the Jesuits' global knowledge network to every corner of China. Because of his involvement in the cartographic project, Mailla was able to travel to Taiwan and integrate knowledge collected from there with those the Jesuits had collected globally. With the support of the emperor and the assistance of local officials, he was able to visit remote lands that were difficult to reach, in a financially and politically convenient manner that their predecessors did not have. To put it in Mailla's own words: "We are luckier in this than our predecessors."[280]

[279] Harris, "Long-distance Corporations, Big Sciences, and the Geography of Knowledge," 272-276.
[280] Mailla, "Lettre du Père de Mailla au Père Colonia," 7. « Nous serons en cela plus heureux que nos prédecesseurs : … »

Where the Jesuit Mapmakers Stopped

The Kangxi Emperor further pushed his cartographic ambitions to Korea and Tibet, places within the Qing's sphere of influence but not under its direct control. While enjoying access to all of the Qing territory, the Jesuit mapmakers did not have access to places beyond the empire's direct control. They could only rely on local surveyors led by Imperial Commissioners to acquire geographical data. The spatial scope of the natural history works by the Jesuits in China did not extend beyond the border between the Qing Empire and its tributary states. Without traveling to Korea and Tibet personally, although the Jesuit mapmakers successfully acquired maps of the regions, they had very limited access to the natural history information of these regions.

Chosŏn Korea was a part of the tributary system of the Qing Empire but retained full sovereignty. Kangxi knew the Chosŏn ruler's reluctance concerning the presence of foreigners in the country. In particular, European missionaries would not have been allowed to enter Korea.[281] Instead of dispatching Jesuits, Kangxi sent a Manchu Commissioner three times between 1711 and 1713 to survey Korea, despite the reluctance of the Chosŏn court. In the last surveying expedition, a team of mapmakers, including a Chinese mathematician trained by the Jesuits at the Board of Astronomy, were sent to assist the Commissioner, employing European methods of cartography in mapping the Korean peninsula.[282] The mapmakers contributed to some understanding of the crops cultivated in the region. Nevertheless, their role as informants of natural history was insufficient. As Jean-Baptise Régis suggested, the mapmakers who surveyed Korea only reported to him the land of Korea produced "rice, wheat, millet, and other grains" without delving into any detailed information on species endemic to the region.[283]

In the 1710s, Tibet maintained quasi-independence while having intricate connections with the Qing court, but the region was not fully under the Qing administration until 1720. In 1717, two Tibetan lamas trained by Pierre Jartoux left Beijing for Tibet with an official from the

[281] Kim, *Ginseng and Borderland*, 65.
[282] Cams, *Companions in Geography*, 118-122.
[283] Du Halde, *Description… de la Chine*, 4:424. « … du ris, du bled, du millet, & d'autres grains. »

Lifanyuan, the Qing agency overseeing outlying affairs. They finished mapping the region in the following year.[284] Regarding the natural history of Tibet, the information was more obscure. Régis commented: "We know very little about the specific plants that Tibet provides or the benefits that can be derived from them for trade. This information could be obtained through the route via Bengal, as the path from there to Tibet has been known for several years."[285] The Jesuits were unable to travel to Korea and Tibet as these regions were not under the direct rule of the Qing Empire. Consequently, their status as imperial commissioned surveyors became obsolete, restricting their access to knowledge. While local mapmakers, who had been trained by the Jesuits, were proficient in conducting land surveys, they lacked the Jesuit tradition of curiosity, leading to a diminished focus on natural history. Recognizing natural history as a valuable byproduct of surveying, the Jesuits understood its development benefited from field trips during mapmaking expeditions. However, unable to visit Korea and Tibet, the Jesuit mapmakers missed opportunities to make observations and engage with local informants, thus lacking an essential understanding of the natural history of these regions.

The extent of travel by Jesuit mapmakers delineated the geographical scope of their works on the natural history of China. The cartographic project undertaken by Kangxi between 1708 and 1718 facilitated Jesuit access to all territories within Kangxi's rule, encountering spatial limits only at the Qing's borders with its tributary states. In contrast to Louis Le Comte's experiences, the Jesuit mapmakers' expedition continued smoothly without encountering financial or political obstacles, owing to their role as imperial surveyors. Moreover, unlike Le Comte, the Jesuit mapmakers avoided reiterating natural history information from the central and southeast coastal provinces, which were already familiar to Europe at that time. The Jesuits' natural history exploration stemming from the cartographic project focused primarily on frontier knowledge, seeking fresh insights aligned with their inquisitive nature of seeking curiosities. Similar to Jean-François Gerbillon's pursuit of natural history, the works of Régis, Jartoux, and

[284] Cams, *Companions in Geography*, 122-124.
[285] Du Halde, *Description… de la Chine*, 4:470. « On ne sçait rien de bien particulier des plantes que fournit le Thibet, ni des avantages qu'on en peut tirer pour le commerce : on pourroit en être instruit par la voie de *Bengale*, car il y a plusieurs années que le chemin de là jusqu'au Thibet y est connu. »

Mailla in this field came to fruition through their involvement in land surveying missions, but their endeavors were less regionally confined. Whereas Gerbillon was obligated to accompany the emperor traveling and surveying in Mongolia, the mapmakers' tasks allowed their endeavors to encompass all of the Qing Empire, from Manchuria in the north to Taiwan in the south.

CONCLUSION

The French Jesuits arrived in China with multifaceted roles: Catholic missionaries, envoys of the French king, and correspondents of the *Académie royale des sciences*. They were perceived by the Qing court as Western courtiers, astronomers, mathematicians, and surveyors. Nonetheless, it is important not to forget their identity as members of the Jesuits—an order with a culture of seeking edification from nature propelled by individual enthusiasm and mandated by the nature of their constitutions. Between 1688, when the *mathématiciens du roi* first set foot in Beijing, and 1718, upon completing the Kangxi Atlas, the French Jesuits in China enriched European knowledge of natural history by providing an abundance of Jesuit literature documenting their travel encounters. Regardless of difficulties and obstacles in the early stage of the French mission, Louis Le Comte, relying on his immense curiosity and enthusiasm, presented European readers at the time with as comprehensive and accurate information about China as possible in his *Nouveaux mémoires sur l'état présent de la Chine*. In his own words, this work emerged from his "continuous travels and a relentless quest for the rarest treasures in the country."[286] Jean-François Gerbillon and Jean-Baptise Régis, despite enduring the hardships of traveling through the wilderness of Mongolia and Manchuria, spared no effort in meticulously documenting the natural world in their surroundings while fulfilling their surveying duties. Their collected information formed a significant portion of the sources for the fourth volume of Jean-Baptise du Halde's *Description… de la Chine*, which stands as the first monograph dedicated to the regions written in French. The *Lettres édifiantes et curieuses*, likewise, serves as a testament to Jesuit enthusiasm for matters of curiosity, in which we see efforts in natural history research undertaken by Pierre Jartoux and Joseph-Anne-Marie de Moyriac de Mailla.

However, arriving in China did not guarantee automatic access to natural history knowledge. Circulation of scientific knowledge, argues Kapil Raj, was "the processes of encounter, power and resistance, negotiation, and reconfiguration that occur in cross-cultural

[286] "Avertissment," in Le Comte, *Nouveaux mémoires*. « … & dans des courses continuelles, & dans une recherche curieuse de ce qu'il y a de plus rare dans le pays ; … »

interaction."[287] Local knowledge was never free-floating ideas easy to access by foreign travelers but depended on scientific practitioners' capability to gather the knowledge and local informants' willingness to share. The Jesuits' ability to contribute to the construction of knowledge about natural history in China relied on their position vis-a-vis various domestic and overseas agencies and institutions. Enthusiasm for nature notwithstanding, the French Jesuits' natural history pursuits were contingent on the favor of the two monarchs they served: King Louis XIV and the Kangxi Emperor. The journey of the *mathématiciens du roi* to China was not initiated by Jesuit curiosity toward the natural world of the East but by the Sun King's imperial ambitions in Asia. Louis Le Comte's work on the natural history of China simply took advantage of the mission of gathering geographical data in Asia as instructed by the *Académie royale des sciences*. Jean-François Gerbillon's travels to Mongolia were not dictated by his own will but by the emperor's needs in cartography. The situation of the Jesuit mapmakers following Gerbillon was comparable: Although the making of the Kangxi Atlas bestowed privileges upon the mapmakers and enhanced their travel experience, they were obligated to adhere to the directions ordered by the emperor. In short, the French Jesuits in China fulfilled their natural history pursuits by taking advantage of both French and Qing imperial ambitions.

The journey of the *mathématiciens du roi* in China had a challenging beginning, as they were newcomers with limited resources against hostility from the well-established Portuguese *Padroado*. Le Comte's activities in north-central China were cut off due to Portuguese hostility. The geographical scope of his botanical account therefore was somewhat limited. Cultivating personal relations with Kangxi and the Manchu officials in Beijing, Gerbillon and the following mapmakers had better financial and political securities when traveling and engaging in scientific activities in comparison to Le Comte. Nevertheless, they were not guaranteed this privilege. Rather, it was the outcome of their dedicated services to the emperor. Due to Kangxi's strong demand for their surveying and mapmaking expertise, the French Jesuits held a favorable status in China endorsed by the imperial authority. The emperor personally attended to their needs,

[287] Raj, "Beyond Postcolonialism… and Postpositivism," 343.

granting them access to remote and difficult-to-reach lands, instructing local officials and people to aid them, and providing the necessary resources for their scientific endeavors. The power dynamics were in favor of the French Jesuits, creating opportunities for them to exchange knowledge with a diverse range of local individuals, spanning from commoners to elites.

On the ground, the Jesuits relied on local sources of information, including both written texts and individual informants. Interactions between French missionaries and local communities played a key role in the development of hybrid natural history knowledge. According to Mario Cams, the collaboration between French Jesuits and Qing mapmakers led to the emergence of hybrid cartographic practice, challenging the conventional belief in a one-way knowledge transfer where European cartographic techniques were imposed on China.[288] Natural history works of the Jesuits in China, rooted in their cartographic experience, exhibited a similar pattern of hybridity. The observations made by the French Jesuits and the information shared by local people constituted two integral pillars of the Jesuit natural history works. The French Jesuits actively approached Chinese species through observations and comparisons with European species, forming their conclusions. Additionally, they took into account the experiences of local people in relation to the practical uses of species and the cultural significance of natural products within specific cultural contexts.

The hybridity of Jesuit natural history emerged in close connection with their travel experiences. In open-air settings, the natural history works of the Jesuits did not evolve through a distinct separation of science from other practices, as seen in laboratories or academia. Instead, they intermingled with the complex knowledge systems of various ethnic groups within the Qing Empire. During these exchanges, the Jesuits' perception of science, i.e., a European one, did not assert dominance in interactions with other knowledge systems. As the Jesuits traversed China, they found themselves in a world of different natural landscapes and knowledge traditions. They encountered people ranging from common farmers and herdsmen to highly learned literati who mastered medical and herbal classics. They adeptly engaged new information in their pursuit of

[288] See Mario Cams, "Not Just a Jesuit Atlas of China: Qing Imperial Cartography and Its European Connections," *Imago Mundi* 69, no. 2 (2017): 188-201.

curiosities. Rather than being passive information providers, local agencies, both individuals' folk knowledge and systematic written works, shaped the production of Jesuit natural history knowledge. Furthermore, Qing China was a multiethnic empire. The hybridity of Jesuit natural history extended beyond an interaction between the Chinese and the French. The Qing rulers deliberately promoted interaction among the ethnic groups under their rule, creating a new knowledge landscape that the Jesuits encountered. The Qing Empire encompassed the Manchus, the Chinese, the Mongolians, etc., whose lifestyles and ways of approaching nature were brought together under the Qing knowledge framework. All contributed to the Jesuits' understanding of the natural history of China. Such rich and multi-aspect knowledge of natural history cannot be acquired in a single location but was the result of extensive travel. Their natural history works reflect relatively unrestricted pursuits of knowledge across a vast geographical expanse, during the period when the French Jesuits enjoyed imperial favor on the eve of the suppression of Christianity in China in 1721.

The End of Jesuit Open-Air Science in China

In 1720, the fortunes of the French Jesuits in China came to an end. Disputes over Chinese rites resurfaced with the arrival of the second papal legate, Jean Ambrose Charles Mezzabarba (1682-1741), who reiterated the papal prohibition of allowing Chinese Catholic converts to practice certain Chinese rites. Kangxi, considering foreigners lacking authority to judge the practices of his subjects, issued a ban on preaching Christianity in 1721.[289] While a certain number of Jesuit missionaries were allowed to stay in Beijing for scientific reasons, their privilege of freely preaching all over China came to an end. Kangxi died in 1722. His successor, the Yongzheng Emperor (b. 1678, r. 1722-1735), continued the prohibition against preaching Christianity. In his letter reporting the difficulties the Jesuits faced under the reign of the new emperor, Joseph-Anne-Marie de Moyriac de Mailla transcribed the decree issued by the Minister of Rites in 1724 ordering the expulsion of missionaries:

[289] Ross, *A Vision Betrayed*, 196-197.

> The Europeans who are at the court are useful for the calendar and provide other services, but those in the provinces are of no use. … In accordance with what the Governor of Fujian proposes, those who are useful should be left at the court; as for those spread in Beizhili and other provinces of the empire, if they can be useful, they should be brought to the court; the others should be taken to Macao.[290]

The Jesuit mission in China encountered major setbacks: Following the prohibition, they were stripped of many privileges as imperial-licensed missionaries and were expelled from all provinces. Restrictions were imposed on those who stayed in Beijing. Free travel to other provinces was strictly limited. Consequently, Jesuit scientific activities in China suffered significant hindrances. The Jesuits lacked opportunities to access natural history in the field and to exchange ideas with local informants from multiple ethnical backgrounds across China. Although they were allowed to stay in Beijing for scientific endeavors, the travel constraints curtailed their access to a variety of knowledge on the ground.

The French Jesuits' scientific works lost open-air characteristics forged by travel experiences and reverted to static and indoor practices. The Jesuits continued to work as mathematicians, astronomers, clockmakers, and translators in their workshops in Beijing. The natural history of China produced by the Jesuits, meanwhile, transitioned from an open-air science to a less dynamic form of knowledge produced solely in Beijing. Knowledge of natural history developed in Jesuit gardens in Beijing deviated from the concept of open-air science. In 1723, Dominique Parennin, a Jesuit mathematician who was once a member of the mapmaker team and then continued to serve at the Qing court after Kangxi's death, drafted a letter to Bernard Le Bovier de Fontenelle (1657-1757), the secretary of the *Académie royale des sciences*,

[290] Joseph-Anne-Marie de Moyriac de Mailla, "Lettre du P. de Mailla missionnaire de la Compagnie de Jésus. Au Père de la même Compagnie. À Péking, ce 16 Octobre, 1724," in *Lettres édifiantes et curieuses, écrites des missions étrangères par quelques missionnaires de la Compagnie de Jésus*, vol. 17, ed. Jean Baptist du Halde (Paris: Le Clerc and Le Mercier, 1726), 213-214. « Les Européans qui sont à la Cour y sont utiles pour le Calendrier, & y rendent d'autres services : mais ceux qui sont dans les Provinces ne sont de nulle utilité : … Conformément à ce que le *Tsongtou* de *Fokien* propose, il faut laisser à la Cour ceux qui y sont utiles : quant à ceux qui sont répandus dans le *Petcheli* & dans les autres Provinces de l'Empire, s'ils peuvent être utiles, il faut les conduire à la Cour ; les autres, qu'on les conduise à *Macao*. »

reporting several materia medica he had gathered in Beijing.[291] Upon receiving the letter, Fontenelle lamented that the Jesuits had lost in accessing the vast realm of natural history in China as a consequence of the prohibition:

> What a vast field for botanical exploration! However, the Missionaries do not have the convenience that one might imagine here. It is not worthwhile to dwell on such a specific matter with regret. All European sciences are going to be stifled in their infancy in China, as they no longer want to receive the skilled individuals who brought the dual light of these sciences and religion there.[292]

[291] Dominique Parennin, "Seconde lettre du Père Parennin à messieurs de l'Académie des sciences," in *Lettres édifiantes et curieuses, écrites des missions étrangères par quelques missionnaires de la Compagnie de Jésus*, vol. 17, ed. Jean Baptist du Halde (Paris: Le Clerc and Le Mercier, 1726), 409-446.
[292] Académie royale des sciences, *Histoire de l'Académie royale des sciences, année 1726, avec les mémoires de mathématiques & de physique, pour la même année, tirés des registres de cette Académie* (Paris: Imprimerie royale, 1728), 20. « Quel vaste champ pour herboriser ! mais les Missionnaires n'en ont pas la commodité qu'on s'imagineroit ici. Il ne faut pas s'arrêter à des regrets sur un sujet si particulier, toutes les Sciences Européennes vont être étouffées à la Chine dans leur naissance, puisqu'on n'y veut plus recevoir les habiles gens qui y portoient la double lumière de ces Sciences & de la Religion. »

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