

## Summary

In this thesis, 'How knowledge came from China to Europe. The role of Jesuits and VOC-servants, 1680-1795', the role of Jesuits and servants of the Dutch East India Company has been analyzed in the knowledge flow from China to Europe in the period of 1680 to 1795. Chinese ideas and practices gained a lot of interest in Europe in this period. The Society of Jesus had been the most prominent religious order in Asia for centuries. For a long time also the VOC was the strongest among the trading companies. Both organisations contributed to the flow of knowledge from China to Europe in their own manner. Jesuits translated Chinese books, and collected objects and personal observations. The VOC servants predominantly transported Chinese goods, and a few collected books and objects themselves. In addition, the VOC occasionally looked after the transport of letters and parcels of Jesuits in China. Why and how did I investigate the role of Jesuits and VOC employees in the flow of knowledge from China to Europe?

### *Research design*

Nowadays in Global History and the history of science a lot of attention is being paid to the complex process of exchange of knowledge between Western and non-Western societies. Scholars increasingly distance themselves from the Eurocentric view of an early modern diffusion of knowledge from the Western centre to the rest of the world. Moreover, historians do agree that in the highly developed regions in Europe and China comparable developments in science took place until the Industrial Revolution. Yet, there also exists a firm belief that the Chinese once laid ahead in technology but stagnated after 1600, when the European surpassed them.

Whether Europe or China was the leading one, the important notion in my research is that a substantial exchange of knowledge occurred between these continents. The Jesuit Order and the VOC contributed to this exchange considerably. Steven Harris has considered these overseas organizations comparable, as members of both organizations had to learn about local practices for example. According to Harris the loyalty of Jesuits and VOC servants far away from home, made that the Order and the Company could play such an important role overseas. Other studies only examined their involvement in collecting knowledge as separate organizations. The Jesuit Order was believed to prevent progress in science. Over time historians paid more attention to the contribution of the Jesuit Order to the development of science. The role of the VOC is also acknowledged. Although the trading company was less active in the stimulation of research, the VOC facilitated a flow of goods and the creation of botanical gardens, as Harold Cook has shown.

According to Karel Davids the Jesuit Order and the VOC were even complementary in the process of knowledge circulation. They exchanged knowledge for services during the seventeenth century. This cooperation was remarkable as Jesuits were despised in the mainly Protestant Republic. From earlier studies it appears that this religious tension did not necessarily hindered relations between Jesuits and VOC employees abroad. For example, the VOC sometimes tolerated the presence of missionaries in their settlements.

Jesuits and VOC-servants who contributed to the collection of knowledge often had relations with European scholars. Historians who investigated international relations within the Republic of Letters however hardly examined these worldwide connections of scholars, missionaries and merchants. For example, Joel Mokyr only described the impact of small expert groups on early modern science.

The largest part of the research about Jesuits, VOC servants and their contribution to knowledge exchange, applies to the seventeenth century. Less is known about their activities in the following period. This was a period in which the knowledge flow from China to Europe underwent a new development, and in which both the Jesuit Order and the VOC had to face new challenges in China. This book therefore explored the role of the Jesuits and VOC-servants in the knowledge flow from China to Europe in the period 1680-1795. By looking at the connections of Jesuits and VOC-servants with each other, with European scholars and also with Chinese, new light has been shed on the role of the ‘overseas organization’ and the ‘overseas network’ in early modern global knowledge flows.

The central questions in this thesis were as follows: *what was the role of Jesuits and VOC-servants in the knowledge flow from China to Europe in the period from 1680 to 1795? And which differences and similarities did they show in this process?* These main questions have been answered on the basis of seven aspects of the knowledge flow.

To draw a picture of this flow I made an overview of types of knowledge in questionnaires and publications about China. A large part of the European curiosity was oriented towards what I called ‘practical knowledge’, namely astronomy, geography, natural history, agriculture, technology, medicine and economy. This knowledge was at least as much wanted as the ‘proto-sinology’, such as Chinese history, literature and philosophy, and therefore forms the main focus in this research.

Subsequently the connections between Jesuits and VOC servants that could be beneficial to the knowledge flow were studied. While suspicion against the Jesuit Order grew in the Republic, Jesuits and VOC servants in China, and in Dutch settlements at the Cape of Good Hope, Southern India, Malacca and Batavia met up with each other regularly in the years of 1680-1710. To what extent did religion play a role in their relations? Also, I analyzed to what extent VOC employees in China were involved in the passing on of the growing amount of knowledge sent to Europe by Jesuits in the entire period 1680-1795.

Furthermore, the knowledge flow depended on the cooperation of the Chinese authorities. At the end of the seventeenth century Emperor Kangxi still welcomed foreigners. French Jesuits were allowed to build up a new mission in China and the Dutch sent an embassy to the court. However, during the eighteenth century many missionaries were expelled, and European merchants had to accept a stricter policy. As Europeans were now only allowed in China under strict conditions, they needed an appropriate method to be able to collect knowledge. How did they respond to these developments?

The relations of Jesuits and VOC-servants with European scholars have been studied by focusing on ten Jesuits and four VOC employees, namely the Jesuits Grimaldi, Dentrecolles, Parrenin, Gaubil, D’Incarville, Hallerstein, Yang, Amiot, Cibot and Bourgeois, and the VOC servants Witsen, Hemmingson, Certon and Van Braam. I have studied their relations with European scholars, the degree to which they answered their questions, and their reputation in the circles of these scholars and other interested people. During the last decades of the eighteenth century the Jesuit Order was abolished, and the VOC headed straight towards bankruptcy. The knowledge flow must have suffered from the weakening of both overseas organizations. How did these developments influence the relations with European scholars, the answering of questions and the reputation of Jesuits and VOC servants in Europe?

## *Results*

### *Knowledge types in questionnaires and publications*

A peculiar phenomenon in the period between 1680 and 1795 were the lists of questions that scholars sent to correspondents in China. Five large questionnaires have been found that were

sent to both Jesuits and VOC-servants. The most famous one was made by the Royal Academy of Sciences in Paris in 1684. Other lists were made by Leibniz in 1689, and by Bertin and Turgot in 1765. All these questionnaires were sent to Jesuits in China. Only one questionnaire was meant for VOC servants, and was compiled by the Batavian Society of Arts and Sciences in 1778. This Dutch list was mainly oriented towards knowledge about nature. An analysis of the other lists made clear that natural history, agriculture, technology and proto-sinology stayed popular subjects throughout the whole period.

These questionnaires were compared to published writings of Jesuits and VOC servants, in order to see to what extent questions were being answered and subsequently ended up in books. Again, published VOC writings were totally different from those of Jesuits. The VOC held a policy of secrecy, and VOC servants usually were not highly educated. Only one VOC servant, Van Braam, published a book about China during the eighteenth century. Jesuits on the other hand tried to impress Europe with many publications about China in order to strengthen their position. Moreover, their writings were increasingly being published by academies instead of the Order itself. The comparison between the questionnaires and the publications revealed that only a part of the demand for knowledge was being satisfied in publications. Astronomy for example was not a popular theme in questionnaires while Jesuits made a lot of astronomical observations that appeared in academic periodicals. Publications clearly didn't show the entire picture of the knowledge flow, and therefore I needed to analyze the role of questions and answers also in the unpublished correspondences.

#### *Religion in connections between Jesuits and VOC servants*

Previous research has shown that in general VOC directors reacted differently to the presence of Jesuits in their territory. Some of them treated the priests as enemies, while others were willing to help them. At the end of the seventeenth century a few VOC servants in Batavia even developed a long-lasting relationship with several Jesuits from the Low Countries at the Chinese coast. At the Cape of Good Hope the directors exchanged services for useful knowledge of French Jesuits. This Dutch cooperation and exchange overseas existed in times of growing animosity towards Jesuits in the Republic.

In my research I explored connections in the period between 1680 and 1710, in which Jesuits and VOC servants met regularly in several Dutch settlements in Asia. Firstly, I compared existing policies of the Jesuit Order and the VOC and the degree to which Jesuits and VOC servants followed these rules. Jesuits had always been engaged in commerce to maintain the overseas mission. Moreover, they needed European ships to correspond with the homeland. The ships were preferably safe and swift, and different ways were being used to send letters to and from Europe. VOC directors were reluctant to carry passengers, and transport of missionaries to Batavia was forbidden. However, priests were often tolerated here as long as they kept quiet. In Dutch settlements in Cochin and Ceylon where directors struggled with an instable Catholic community, proclamations existed against the arrival of priests.

In Cochin and Ceylon the directors were initially willing to help a Belgian Jesuit but eventually declined passage on one of their ships. At the Cape of Good Hope no struggle for power existed, and the relationship with French Jesuits even continued despite the outbreak of war between the Republic and France. In Batavia, Portuguese Jesuits regularly tried to go ashore, sometimes even disguised. Some of them were imprisoned, others had to stay aboard. Yet, they often succeeded to preach or offer sacraments, and eventually could continue their trip. On the other hand, French Jesuits did not receive such a tolerant treatment as official enemies of the state. They were deported to the Republic as prisoners of war, regardless of their proposals to render their services or to share knowledge.

The exchange of knowledge played only a minor role in relations between Jesuits and VOC-servants, and information was exchanged far more incidentally than the findings of Davids would suggest. Exchange of knowledge between VOC directors and Jesuits stopped soon after the men left. Some French Jesuits could have offered their knowledge, but as prisoners they were not given any opportunity to do so.

The religious tension was tangible in meetings between Jesuits and VOC-servants, but only played a modest role. VOC-directors tried to restrict the freedom of Jesuits, and officers ill-treated missionaries who were on their ship as 'papists'. On the other hand, Portuguese Jesuits were never persecuted when they went ashore and met up with Catholics. Relations were thus largely determined by individual or political interests, and were hardly based on religious grounds.

#### *Passing on knowledge and the role of VOC-servants*

The goods and books collected by Jesuits were sent to Europe by using the Russian caravans or European ships in Canton. Until half-way the eighteenth century Jesuits could choose from the two to five ships of the French, English and Dutch companies and from those of the smaller companies. During the second half of the century, English ships outnumbered the ships of other companies by far. VOC servants were willing to carry letters of Europeans, but were reluctant in giving passage on their ships. In three periods of thirty to forty years I explored to what extent Jesuits and VOC servants worked together in Canton and Macau.

At the start of the period 1680-1725 the Dutch sent an embassy to the court of Peking during which Jesuits shared information with them and VOC servants in turn looked after the delivery of letters of the priests. The Dutch did not have a factory in Canton yet, but in Batavia several ministers assisted in sending letters from Jesuits in China to the Low Countries by VOC-ships until at least 1717. Even missionaries of the Propaganda Fide made use of this channel to correspond with Rome. Both the Jesuits and the papal missionaries had an intermediary in the Republic, respectively art-collector Meyers in Rotterdam and banker Sardi in Amsterdam. These findings match with the cooperation found by Davids, although it is not known whether knowledge did pass along this way. The first French Jesuits who set up their investigation of China preferably used French ships to send their work home and did not need the Dutch way via Batavia.

During the second period between 1725 and 1765, the Dutch finally had their own factory in Canton. However, no connections were found between Jesuits and VOC servants. VOC employees mentioned Jesuits when their activities seemed relevant to the trade or daily life. Dutch ships were not used for mail or a voyage, although the Dutch were neutral during the Seven Year's War. The French minister Bertin and a missionary of the Propaganda Fide in vain advised to use these neutral ships. Meanwhile, Jesuits started a correspondence with the secretaries of the royal academies in Paris and Saint Petersburg, and the Royal Society of London. Also, the Swedish academy showed interest in Chinese knowledge. It was not a coincidence that in this period French, English and Swedish ships carried Jesuit letters, and the Russian land route was being used for several years as well.

The final period is characterized by a regular flow of goods and books from China to the French minister Bertin and his acquaintances. The 'procurator' in Canton who was responsible for shipments was Lefebvre. This Jesuit maintained relations with European and Chinese merchants by giving rich dinner parties, to the great indignation of a few of his companions. VOC servants knew him as one of the Jesuits who stayed in Canton after the trading season, but they did not show up in this circle. Two of them, Hemmingson and Van Braam, did collect and send knowledge themselves. They only had contact with a French Jesuit, De Grammont, with whom they exchanged goods and services. After his return to Peking he remained an important source of information, as he reported for example about the

failed embassy of Macartney. When the Dutch sent an embassy themselves in the following year, VOC servants unfortunately were not allowed anymore to meet the Jesuits at the court.

VOC servants in sum hardly played a role in passing on knowledge to Europe. The Jesuits in charge of the knowledge flow were much more often oriented towards merchants of French, English and Swedish companies and Russian merchants. Cooperation with these partners seemed to have been advanced by the correspondence with the national academies in Paris, London, Stockholm and Saint Petersburg. I will return to this point later.

#### *Methods of obtaining knowledge*

As the freedom of movement was limited, Jesuits and VOC servants had to find ways to obtain access to Chinese knowledge. Jesuits at the court were allowed to do research in the observatory and the gardens. VOC servants in Canton could mainly explore the surroundings of the suburb and were not allowed to enter the city. Moreover, the export of books was forbidden. Yet, both Jesuits and VOC servants managed to collect and send knowledge, partly thanks to helpful Chinese.

The first group of French Jesuits had their hands full with the foundation of their mission and a conflict between the Emperor Kangxi and the Pope. Nevertheless they found time to copy books, interrogate Chinese porcelain makers, and a few Jesuits even mapped Chinese regions in the service of the Emperor.

Emperor Yongzheng started Christian persecutions and banned many missionaries to Canton and Macau. At the court of Peking Jesuits were however highly esteemed and could continue their work. Although Chinese astronomers and physicians were not always cooperative, a brother of the Emperor helped Jesuits to create new maps. At the royal workshops Chinese artisans were willing to share some of their secret skills. Botanical fieldwork suffered the most from the restrictions, and was done preferably when the Emperor left the city. Jesuits visiting the countryside to do mission work also tried to combine this with the collection of plants. Knowledge was obtained by money, by giving presents and often with the help of Christian Chinese.

According to Osterhammel, the increasing restriction of freedom made it more difficult to make personal observations in the environment. However, from this research it appears that Jesuits at the court continued with their empirical research in the fields of astronomy and technology, and found ways to get round difficulties in obtaining knowledge.

For VOC servants it was much harder to obtain access to Chinese knowledge. Although many goods were easily purchased in the many shops in Canton, no European was allowed to have a walk outside the suburb. Yet, Hemmingson and Van Braam showed that collecting knowledge in Canton was not impossible. They worked together with Chinese merchants, painters and even a priest, Carolus Wang. Hemmingson might also be assisted by his Chinese wife. Another VOC servant, Certon, contributed to the knowledge flow to the Republic by taking his well-educated Chinese servant with him during a temporary return to Holland. Only at the court the Dutch suffered from the stricter policy and did not have permission anymore to meet the Jesuits like a hundred years earlier. In short, both Jesuits and VOC servants were not hindered that much and they even were often assisted by Chinese.

#### *Contact with European scholars*

When the first French Jesuits arrived in China with the support of the royal academy, missionaries maintained more and more relations with scholars and other interested people in Europe. Leibniz dreamed of an exchange of knowledge between China and Europe and built up a network of correspondents. He received Chinese knowledge from some of the French Jesuits as well as Grimaldi from the Portuguese mission. Leibniz also corresponded with

VOC-director Witsen, an expert on Tartary, and who had Dutch informants in Batavia. However, Leibniz mainly turned to the Jesuits for knowledge about China.

During the first decades Jesuits spent most of their time to the establishment of the mission and to their duties as servant of the Emperor. Dentrecolles en Parrenin who would contribute to the knowledge flow substantially later on, therefore did not maintain relations with scholars in Europe. Only after the death of Kangxi, Parrenin was able to set up a correspondence with the royal academy again.

From this time onwards, the amount of correspondence with European scholars grew steadily. Gaubil en D'Incarville were instructed by scholars before their departure and sent letters and goods to members of the Parisian academy like Joseph-Nicolas Delisle and Bernard De Jussieu. Hallerstein of the Portuguese mission maintained a correspondence with Portuguese members of the Royal Society and the academy of Sint Petersburg. Due to the close relationship between Gaubil, D'Incarville and Hallerstein, these connections developed into one network, in which French and English academics exchanged knowledge that these Jesuits sent to them. A pious Bavarian noble woman, Maria Theresia Von Fuller-Wellenburg, contributed to this knowledge flow. She corresponded with both Delisle and a few German Jesuits in China and Tonkin. To support these missions she paid for the deliverance of a quadrant to Peking, an instrument passionately desired by Gaubil and Hallerstein.

These international connections weakened with the death of Gaubil and D'Incarville. Five years later, a new correspondence was started which would lead to the most fruitful and regular knowledge flow of the century. In 1765, the French minister Bertin started his correspondence with two Chinese and a few French Jesuits. These connections became a French national network of not only scholars, but engineers, factory-managers and governors as well. On the eve of the dissolution of the Jesuit Order, contacts with scholars surprisingly intensified.

The few VOC servants who were meanwhile concerned with the collection of Chinese knowledge remained in contact mostly with scholar friends. Witsen shared his knowledge above all to his friend Gisbert Cuper and Hemmingson and Certon sent their letters from Canton only to their acquaintance Jean Theodor Royer in The Hague. On the other hand, Van Braam participated in the Republic of Letters and collected Chinese knowledge for himself rather than for scholars. Hemmingson and Van Braam lived in China in similar times but remarkable enough never cooperated or maintained same relations. Hemmingson was an Orangist while Van Braam admired the American revolutionaries. In short, connections between VOC servants and scholars were more personal and more political than those of Jesuits.

#### *Questions and answers*

Within all correspondence with scholars, questions were structurally asked and answered. This phenomenon arose when the royal academy of Paris compiled a long list of questions. Leibniz also made a detailed questionnaire a few years later, and became an 'inquiry office' to which other interested people send their lists with questions about China. Answering these questions did not go real smooth immediately. Questions were only partly answered, or after a long delay. At the same time, VOC director Witsen played a key role in granting requests for Chinese books. Thanks to his informants in Batavia he managed to deliver a translation of an old Chinese mirror faster than the one made by a French Jesuit.

During the period in which Jesuits did not spend much time to correspond with scholars, no questions were being answered either. Yet, a few Jesuits continued collecting types of knowledge that formed part of the lists. This knowledge eventually was being published, and therefore has been regarded as a delayed answering of the questions.

When correspondence with scholars developed again, the phenomenon evolved into an accurate process of responding to each other's questions and answers. Gaubil and D'Incarville asked for new questions or refused to answer to impossible questions. Hallerstein tried to answer French scholars as well, although this was restricted by his Portuguese superiors. Only the exchange of astronomic knowledge got stuck. Parisian astronomers showed hardly any interest in Gaubil's research, and when they finally did, Gaubil was occupied by mission work. By the time a new small observatory was established for the French mission, Jesuits had not enough skills or time anymore to make observations.

The correspondents of Bertin were interrogated in an unprecedented profound way. The two Chinese Jesuits Ko and Yang received lists with questions and instructions from Bertin, but also from other scholars, and engineers. Here a cultural exchange was to take place of which Leibniz had only dreamed of. Like Leibniz, Bertin served as the conduit to which other interested people like the engineers sent their demands and transport advice. French Jesuits like Amiot and Cibot joined this guided knowledge flow by discussing the many questions almost yearly.

These questions shaped the knowledge flow to a great extent. The collection of Chinese books for example was stimulated by certain scholars who preferred these books to personal observations of Jesuits. As mentioned before, Osterhammel stated that Chinese writings were being collected because Jesuits were obstructed to make observations in the surroundings. His statement therefore is again questionable, and at least does not tell the whole story. The desire for books instead of empirical knowledge is remarkable though, as scholars increasingly acknowledged the value of expeditions as opposed to the armchair knowledge of philosophers.

Besides the VOC servants Hemmingson and Certon who responded to the questions of their scholar friend Royer, no other Dutch merchants did so. Although the Batavian Society and the University of Leiden sent a list of questions, mainly about naturalia, to all Dutch settlements, in Canton no one tried to satisfy this demand. According to a VOC servant they were not able to explore the surroundings and therefore they could not answer the request. However, the three VOC servants in this research showed that this was certainly not impossible. Both questionnaires seemed to remain unanswered, as even Hemmingson, Certon and Van Braam did not formulate answers to them. Van Braam collected knowledge for himself that also formed part of the list of the Batavian Society, like knowledge about Chinese agriculture. He might have responded to this list indirectly, but more likely Van Braam and the Society shared a same interest.

#### *Reputation*

Although Witsen was very useful to obtain access to Chinese knowledge, Leibniz did not approach him as a source of information. The VOC director played a modest role in the correspondence of Leibniz, while Jesuits formed an important part of it. Witsen was not even called by his name when he was mentioned in letters of Leibniz to the Jesuits.

Jesuits were esteemed not only by Leibniz, but by other scholars as well. For example, the treatises of Dentrecolles and Parrenin gained high praise. Scholars often initiated a correspondence with a Jesuit, or showed him the ropes of their discipline before his departure to China. Gaubil though was worried about the perception of Jesuit writings in France. The suspicion of the Jesuit Order grew, and French astronomers did not show any interest in his research. In his eyes, the observations of the Jesuits of the Portuguese mission were more accurate than those of the French Jesuits. However, scholars directly published French observations in academic journals, in which some astronomers even valued the observations of the French Jesuits as better than their companions of the other mission.

During the correspondence with Bertin, the Jesuits Amiot and Cibot wrote in even more modest tones. They tried to avoid sensitive subjects, as Jesuits in France were expelled and a discussion existed about the quality of Jesuit writings. Despite differing opinions the work of the Jesuits was generally still well received. Parts were still published in academic periodicals, and also older observations were being discussed. In sum, the reputation of the Jesuits was not affected that much.

VOC servants hardly played any role in the Republic of Letters. Hemmingson and Certon mainly hoped to please high placed persons but stayed out of the scholarly world. Van Braam on the other hand was a member of several societies and a respected man in Dutch scholarly circles. In the United States he impressed scholars like museum director Peale with his Chinese collection. In his travelogue about China he was praised as an empirical collector and merchant by his editor. Van Braam himself mainly tried to rise in esteem in governmental circles in the end.

### *Conclusions*

By studying and comparing relationships that the Jesuits and VOC servants maintained with each other, with the Chinese, and with those interested during a long period, I could form an image of their changing role in the knowledge flow from China to Europe. There are striking similarities, but also differences, which offer new perspectives on this knowledge flow.

### *Exchange of knowledge between China and Europe: reciprocity and diversity*

Chinese goods and ideas were very popular in Europe in the early modern period, and during the eighteenth century the interest in Chinese goods and ideas grew even more. In the knowledge flow from China to Europe studied in this research, there was a continuous interest in knowledge on both sides, especially in technical information. This confirms the views of Hobson, Berg and Waley-Cohen, who propose that there was a widespread exchange of technical knowledge between China and the West up until about 1800.

Although many Jesuits suffered persecution, at the Chinese court they noticed little of this. The emperors retained their interest in specific types of expertise, including technical skills and knowledge of these Jesuits. Chinese kept techniques secret sometimes, but they also showed an ongoing willingness to contribute to the knowledge flow. Without this willingness the knowledge flow could not have taken place on such a large scale.

Moreover, the Chinese willing to help were often Catholic converts or Cantonese people and thus already oriented towards the West. From a Chinese perspective these 'Western' Chinese were sometimes considered to be a different species. For example, an opponent of Christianity in his book on Macau claimed that Chinese only became Christians when they already dressed as Europeans or visited the homes of European merchants frequently.<sup>1393</sup> The flow of knowledge would possibly have taken place on a smaller scale if these 'Western' Chinese had not existed.

In this study we also became acquainted with a particular group of these 'Western' Chinese: the overseas Chinese. First of all, the Chinese in Batavia were asked for Chinese books and translations. Then there were the overseas Chinese who stayed in Europe temporarily for their Christian formation or as servant to a merchant. Earlier some of the Christian Chinese had lived in Europe and worked together with scholars, such as Michael Shen Fuzong. The Chinese clergy studied in this research on the other hand, mostly acted as source of information after their return to China. Ko and Yang were thus involved in the

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<sup>1393</sup> The author of this work *Aomen jilüe* (A record of Macau) from 1751 was Zhan Rulin, a civil servant who worked just outside of Macau as supervisor of foreign affairs, Hsia, 'The question of whom?', 95-96.

knowledge flow to France, and Carolus Wang contributed to the transfer of knowledge to interested Dutch. They were not the 'living dictionaries' walking around in Europe that Leibniz had dreamt of, but a useful source of information at a distance. The servant of Certon, Tan Assoy, in a sense did act as a living dictionary in the Republic, but could only offer his services for a short period. These observations demonstrate that the exchange of knowledge between China and the West was indeed a reciprocal process, but that the Europeans played the leading role.

In Europe, the interest in China was clearly much greater. After all, throughout the period questionnaires and correspondences were being formed, in which 'practical knowledge' stayed a reoccurring topic. However, differences in interest among European countries arose gradually. At the end of the eighteenth century the collection of all kinds of practical knowledge appeared mostly a French affair with French merchants and interested people involved. In contrast, there were no more letters and packages sent to scholars in London, nor did English merchants in Canton played an important role in the activities of the Jesuits. The English interest in Chinese knowledge seemed to have disappeared. This is nicely illustrated by the motives behind the British legation of Macartney in 1794. The ambassadors believed that China was not only in decline, but also that the Chinese would benefit from the superior English technology. In the Republic a curiosity towards knowledge about China seemed to have disappeared for a longer time. A possible explanation will be presented later on.

#### *The decline of the 'overseas organization' as a vehicle of knowledge*

In the first decades of the studied period, both Jesuits and VOC employees sent knowledge from China to European scholars. Both the Order and the Company still had a strong position at that time. Clearly a close relationship existed between these 'overseas organizations' and the flow of knowledge from China to Europe. These findings fit in with the picture drawn by Harris and Cook of the Jesuit order and the VOC.

Later on, the role of both overseas organizations in the knowledge flow decreased. The position of the Order and the Company weakened after all, while the flow of knowledge blossomed. While some Jesuits did only mission work, others tried to combine this with doing research. Moreover, the involvement of Jesuits in the collection of knowledge only increased, despite the exile and persecutions of Christians. The growing aversion to Jesuits in Europe did not have any influence on the knowledge flow either. While Jesuits published their writings less and less frequent themselves, scholars took this task upon them. The most comprehensive knowledge flow even took place after the expulsion of the Jesuits from France and the abolishment of the Order. Some Jesuits feared that the involvement in the large-scale knowledge flow would lead to a scandal. The Jesuits in charge of the knowledge flow however continued their research as 'former Jesuits', and did not leave the mission. They instead chose to work for their patron and sponsor Bertin, and thus chose to preserve their relationship with interested people in Europe. Meanwhile, the VOC struggled with competition and in the last decades of the eighteenth century, VOC rulers lost their grip on the employees in Canton. It was probably no coincidence that VOC employees gathered most knowledge in this period of decline, just like the Jesuit Order.

The emergence of the knowledge flow from China to Europe had largely been made possible by the Jesuit order and the VOC. In the course of the eighteenth century, however, the 'overseas organization' was no longer leading as a vehicle of knowledge. At the time of the deteriorating position of the Jesuit Order and the VOC, there was no longer a close relationship between overseas organisations and knowledge collection. The views of Harris and David are therefore not applicable to the flow of Chinese knowledge which took place from about 1700.

### The rise of 'overseas networks'

The relations that Jesuit and VOC servants had with scholars increasingly characterized the knowledge flow. In the knowledge flow from China to Europe in the period 1680-1795 the 'overseas networks' gradually took over the key role that the Jesuit Order and the VOC as 'overseas organizations' previously had been played. These networks had several distinguishing features.

To begin with, three phases were distinguished in which overseas contacts evolved to networks where knowledge flowed from China to Europe. Around 1685 the collection of knowledge was stimulated by the questionnaires that the Royal Academies of Paris and Leibniz sent to the Jesuits in China. At the same time VOC director Witsen maintained relations with Dutch and Chinese people in Batavia. Thus arose the first networks of Jesuit, VOC employees and scholars. In this first period French Jesuits were not always able to spend time on research. From about 1725 overseas networks flourished. In this second phase Jesuits corresponded with the secretaries of various national academies. The greatest knowledge flow existed during the third phase, when in 1765 the French Minister Bertin began a correspondence with the two Chinese priests and a few French Jesuits. At the same time VOC servants Hemmingson, Certon and Van Braam also collected knowledge about China, mainly to please governors. In this last period networks are therefore considered to emerge mostly along national lines. This trend of emergence, flowering and nationalization of overseas networks was particularly characteristic of the Jesuits. As VOC servants did not belong to any network in the second stage, their networks clearly developed more erratically than those of the Jesuits.

Overseas networks were indeed conducive to the knowledge flow, but did not guarantee a smooth running. We have seen that previously received knowledge was sometimes forgotten in the long term in the Republic of Letters, or even disappeared. For example, Van Braam did not seem to know that the Chinese sailing wheelbarrow had already been described before and was even depicted in atlases. Van Braam moreover studied Chinese instruments which were right at that moment being described by Jesuits as well. Overseas networks of Jesuits and VOC servants functioned apparently in separate ways.

### *The 'question and answer mechanism'*

Yet, usually the networks contributed to a highly efficient knowledge flow, as the many questions from Europe were being answered in a very structured way. I therefore would like to speak of a 'question and answer mechanism', which shaped the knowledge flow to a large extent. This mechanism developed between 1680 and 1795 to a smooth-running process whereby some Jesuits were already trained in Europe and received funding from scholars. In turn, they responded carefully to the changing demands of these scholars. Their efforts did no longer serve the goal of sustaining the Order. It is true that the mission in China benefited from the funding. However, after the dissolution of the Order the mission did not formally exist anymore, while at that time the most extensive form of the question and answer mechanism started.

I regard this mechanism as the most characteristic phenomenon of the flow of knowledge from China to Europe in the period between 1680 and 1795. It had a fundamentally different character than the long distance inquiry that had existed for centuries in the Spanish empire between Spaniards at home and overseas. That knowledge flow mainly came about from a bureaucratic motive to centralize power. I would also like to argue that the relations that Jesuits and VOC employees had with scholars derived their particular strength from this 'question and answer mechanism'. Moreover, this mechanism not only existed in their relations with scholars, but also promoted the formation of mutual connections between

Jesuits and merchants. I consider this mechanism an addition to the vision of Lux and Cook. They have described strong and weak ties between scholars within the Republic of Letters. According to network theory weak ties exist between people who personally meet or are recommended by friends, whereas relations between friends or family are considered to be strong ties. The members of the Royal Academy of Paris were forbidden to share information with other academies, and therefore Lux and Cook considered the ties with their academy as strong. This would have impeded the circulation of knowledge within the Republic of Letters, while weak ties on the contrary were conducive to this process. My research has shown that the relations scholars had with missionaries and merchants in China played a considerable role in the knowledge flow, and that these could be either strong or weak. I therefore propose a revision of the characterisation of connections. Relations between Jesuits and merchants on the one side, and interested people on the other could be weak as well as strong, and in all cases contributed to the circulation of knowledge. Many relationships between Jesuits and scholars originated from a personal meeting or a recommendation from another scholar. In line with the findings of Lux and Cook these weak ties clearly had a positive impact on the knowledge flow. However, there were also Jesuits who shared knowledge with scholars as correspondents of several academies, and clearly developed strong ties with them. In this capacity they even promoted exchange of knowledge between scholars, as knowledge was shared between the Royal Society and the Russian Academy of Paris at the instigation of some Jesuits. These strong ties had a positive impact on the flow of knowledge, just like weak ties. The relations that VOC servants maintained with Royer had a friendly nature, and could thus be labeled as strong. Witsen and Van Braam had been members of a scientific society, and as such also had strong ties with scholars. These strong ties had a favorable impact on the exchange of knowledge again. The phenomenon of the 'strength of weak ties' that, according to Lux and Cook promoted the exchange of knowledge between members of the Republic of Letters, was not always applicable to the networks in which Jesuits, VOC servants and scholars participated. The relations that Jesuits and merchants had with scholars must therefore be defined in a different way. The question and answer mechanism seems to be a useful concept. Whether Jesuits or VOC employees were member or correspondent of an academy or society, whether they had met scholars personally or knew them only indirectly, the question and answer mechanism gave all these weak and strong connections a particular strength.

#### *Reliability*

Until about 1725 Jesuits and VOC employees worked together, and passed on knowledge to each other and to interested people in the Low Countries. Why were VOC servants in the remainder of the period so rarely involved in the transmission of letters and parcels of Jesuits? In the relations of Jesuits with merchants from other companies and nations I have found two factors occurring simultaneously that promoted the flow of knowledge. These factors included the presence of reliable intermediaries and the guidance by national academies. These favorable factors were largely missing in the relations between Jesuits and VOC-servants.

Firstly, I would like to draw a parallel between the 'credibility' of scientists that was important in the Republic of Letters and the 'reliability' of intermediaries in overseas networks. Reliable middlemen were essential for the knowledge flow in these networks, in the way credible scholars were indispensable for the dissemination of knowledge in the Republic of Letters. The reliability of a go-between was probably more important than a shared nationality or the speed and safety of ships. For example, ships of the French trading company were once preferred by Jesuits of the Portuguese mission to the Portuguese ships usually in charge of the shipment of their letters. This was caused by the fact that their patroness Von

Fuller-Wellenburg cooperated with French Jesuits, scholars and merchants at that time.<sup>1394</sup> The knowledge flow to Russian scholars halted when the ambassador Lange no longer took care of the transfer of knowledge and resources between China and Moscow. VOC servants in Batavia were a reliable partner for Jesuits in China until 1725. Only in this period a few ministers took care of their letters to Europe. Recently networks of brokers like couriers, translators, missionaries and entrepreneurs have been investigated, which enabled the global exchange and development of knowledge in the period of 1770-1820.<sup>1395</sup> The indispensable middlemen in my research preceded the formation of these networks on a smaller scale.

Mutual trust rarely depended on religious origin. The religious struggle that was waged in the Republic against the Jesuits was after all hardly noticeable in the relations between Jesuits and overseas merchants. The minor role of religious tensions overseas is also evident from the fact that Jesuits and English merchants closely worked together. In the early eighteenth century some English merchants were known by missionaries for their willingness to transport letters and instruments. This cooperation was not only a question of regular encounters, but also of confidence. Twice French Jesuits deposited large sums of money to the East India Company from which Jesuits received interest yearly until after the abolishment of the Order. These financial transactions were thus durable. Still many English detested Catholic priests, just like the Dutch did. Similarly, the East India Company seemed to have had a strict policy against the transport of Catholic priests. Apparently Jesuits were not afraid of anti-Roman sentiments. Instead, they seemed to be confident about the services rendered earlier by English merchants and sailors.

#### *National academic guidance*

The reliability of merchants was co-influenced by the involvement of a national scientific institute in the knowledge flow. When a structural demand for knowledge was formulated from such academies or societies, merchants seemed more willing to cooperate in the transfer of this knowledge. No direct connection exists between this reliability and the 'national academic guidance' as phenomenon, but together they formed the best combination for a smooth flow of knowledge.

In the visual representation of the knowledge transfer it is clearly observed that Jesuits, merchants and scholars cooperated in all three periods when national academies were involved in the collection of Chinese knowledge. The involvement of national academies in the flow of knowledge thus promoted the formation of close ties between Jesuits and merchants. In case of strong links between Jesuits and members of national academies, connections often existed between Jesuits and merchants of the respective nations. This phenomenon was to be expected from the close contacts of French Jesuits with scholars of the same nationality. Indeed, the first group of French Jesuits departed with a questionnaire of the royal academies and a national travel certificate. The last group of French Jesuits worked for Bertin who was a minister, head of finance of the Compagnie des Indes and a sponsor of the French Jesuits. He can be considered as the embodiment of the link between knowledge collection, religious mission, trade and politics. I have also found this phenomenon to occur in relations of Jesuits with scholars and merchants of the English, Swedish and Russian nations. These merchants all offered a helping hand in the transfer of knowledge collected by Jesuits for the national academies of their homeland. In cases of national academic guidance Jesuits, merchants and scholars all took part in one large overseas network.

#### *Vehicles of knowledge: a comparison*

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<sup>1394</sup> Hsia, *Noble patronage*, 91.

<sup>1395</sup> Roberts ed., *The brokered world*.

The above findings show an important difference between the roles that Jesuits and VOC servants played in the knowledge flow from China to Europe. This difference is considered the most important explanation for the remarkable low level of involvement of VOC servants in both the collection of knowledge by Jesuits and the transfer of knowledge to Europe.

According to Harris the order of Jesuits and the VOC as overseas organizations had similar strategies to function over long distances. Regular correspondence with the board in Europe was a necessary condition, also considered as a minimal means to comply with the rules of their organization. Moreover, the gathering of knowledge belonged to the official activities of both Jesuits and VOC servants. From my research it is shown that the activities of Jesuits and VOC servants even showed more similarities. Although the position of the Order and the company in China and Europe weakened, individual members were at that time involved most with the knowledge flow. Despite the limited access to China and Chinese knowledge, both Jesuits and VOC servants focused on Chinese who were oriented to the West. Finally, some VOC servants as well as many Jesuits took part in the Republic of Letters.

The extent and nature of the involvement of VOC servants in the knowledge flow differed significantly from the involvement of the Jesuits. This was primarily caused by the large difference between goals and policy of the Jesuit order and the trading company. Conversion was accompanied by the promotion of missionary work and the Chinese civilization. The pursuit for profit did not benefit from a thorough knowledge of China, and knowledge was preferably kept as confidential information in the competitive arena of VOC servants. Moreover, Jesuits paid a lot of attention to the knowledge of Chinese astronomy, proto-sinological themes and techniques, while most VOC servants were particularly interested in local nature and geographical measurements.

The major difference between both parties was the lack of involvement of VOC servants in the collection of knowledge about China, and in the transfer of knowledge that Jesuits sent to Europe. Despite requests from the University of Leiden and the Batavian Society, only a few VOC servants in China contributed to the knowledge flow. Most VOC servants were obviously not sufficiently skilled to perform research, and European merchants in Canton only had limited freedom to move around. On the other hand, some VOC servants had managed to build a collection of their own. VOC servants also played a minor role in the logistics of the Jesuits. However, merchants from other nations *were* involved. In short, the contribution of VOC servants to the knowledge flow did not have to be so small.

The comparison of the social world of Jesuits and VOC servants shows that they did not operate in the same European institutional contexts. This is why there was not a single overseas network of Jesuits, VOC servants and scholars in most of the eighteenth century. One reason for this modest involvement in the knowledge flow was the lack of 'national academic guidance' in the Republic. As a result, there were no strong connections between Jesuits and VOC servants and with Dutch scholars. Interest in China in the Republic in the eighteenth century was probably less than in other countries. Illustrative is the interest in the Chinese sailing wheelbarrow which existed among Europeans, but not among Dutch people. The sailing wheelbarrow was included as a topic in the questionnaire of the Royal Academy of Paris and the German scholar Leibniz wanted to incorporate the Chinese vehicle in his cabinet of curiosities.<sup>1396</sup> Although there was a lot of interest in the Republic in the sailing wheelbarrow around 1600, hardly anyone was still interested in this carriage in the eighteenth century.<sup>1397</sup>

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<sup>1396</sup> Needham, *Science and civilization in China* IV, Part 2, 278-280.

<sup>1397</sup> Linschoten wrote with admiration about the 'smart men' of China that glided through the landscape on their sailing wheelbarrows as though they moved over water. The engineer Simon Stevin made a remarkable fast version and his demonstration on the beach made a big impression. Prince Maurits traveled on the 'windt-wagen'

In order to examine the extent to which 'national academic guidance' was conducive to connections between Jesuits and merchants in the flow of knowledge from China to Europe, further research could be focused on another group of Jesuits and merchants belonging to a nation without a national academy. The Portuguese Jesuits and merchants in Macau are in this respect an interesting research subject.

In this study we saw that Jesuits of the Portuguese mission in Peking collected astronomical and geographical observations throughout the eighteenth century. In Macau, Jesuits were doing research into borax just before their arrest in 1762. They sent knowledge to interested Portuguese people in Lisbon, London and Saint Petersburg. Jesuits of the Portuguese mission gathered knowledge about China and sent this to interested people in Europe, like the French Jesuits did.

It was evident that these Jesuits transmitted letters and parcels through the Portuguese ships in Macau. Although Portuguese power in Asia declined in the eighteenth century, Macau remained the centre of Portuguese transports to Batavia, India and Lisbon.<sup>1398</sup> Macau was regarded as less and less important, but for Jesuits of the Portuguese mission, the city had always been a vital artery to their mission.<sup>1399</sup> It was the centre of arrival and departure from and to Portugal for the missionaries, and for the transfer of letters and resources.<sup>1400</sup> Around 1740 the Jesuits even owned a ship, which sailed between Macau and Lisbon. However, we saw that some of the Jesuits from the Portuguese mission received their books and instruments from England, and not from Portugal.

This was possibly related to the fact that a national academy was founded in Lisbon only in 1779. Before that time scholars had not handed questionnaires to Jesuits leaving for the Portuguese mission. Also, not much of the work of these Jesuits was published in Portugal. There was no 'national academic guidance' to speak of.<sup>1401</sup> Further studies could investigate to what extent Jesuits from the Portuguese mission still sent knowledge to Portugal on Portuguese ships. The outcome of this research can tell us whether the lack of academic guidance - as in the Dutch case - had an impact on the relations between the Jesuits of the Portuguese mission and Portuguese merchants and scholars.

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from Scheveningen to Petten for about 100 km in about 2 hour. This speed was unique in the time around 1600. The inventor considered the sailing wheelbarrow only as a 'toy' and not as useful object, see Davids, *The rise and decline* I, 242. Especially the Dutch were very interested in the vehicle. Cornelis Matelief has written about the vehicle in his *Journael, ende historische verhael* from 1648, see Lach and Von Kley, *Asia in the making* III, Book 4, 1616. According to Needham, the Chinese sailing wheelbarrow made a large impact and was even the inspiration source for the 'land yachts' on the beaches of Belgium and California in the twentieth century, see Needham, *Science and civilization in China* IV, Part 2, 276-280.

<sup>1398</sup> In the 18th century about 24 ships sailed between Macau and Lisbon. Most of these ships left Macau in the period between 1740 and 1760, Godinho, 'The Portuguese'. Portuguese private traders also played an important role in business with China and other trading centres in Asia.

<sup>1399</sup> Wills, *Embassies and illusions*, 43.

<sup>1400</sup> The speed of the Portuguese ships was comparable with the ships of most other merchant companies. The voyage from Macau to Lisbon, often with a stop in Bahia, typically took 8 months, but could also sometimes take 6 or 11 months, see Godinho, 'The Portuguese'. French and English ships still took longer to sail to Europe (9 to 10 months).

<sup>1401</sup> However, the Portuguese Jesuits did make a great contribution to the development of networks in which knowledge could circulate in the Portuguese territories, see Fontes da Costa and Leitão, 'Portuguese imperial science, 1450-1800', 40.