

PROJECT APPLICATION

submitted in January 2021

PROJECT DESCRIPTION

The immediate cause for starting this project was the sensational rediscovery in 2015 of the *Kunyu gezhi* 坤輿格致 (Investigations of the Earth's Interior; 5 chap., 244 pp., 1640; hereafter KYGZ), a Chinese mining treatise based largely on Georgius Agricola's (1494-1555) *De re metallica* (1556). This partial translation, initiated by the Chinese official Li Tianjing 李天經 (1579-1659) and carried out by the Jesuit missionary Johann Adam Schall von Bell (Tang Ruowang 湯若望; 1592-1666), was lost for more than 350 years. Involving one of the most significant protagonists and polymaths of the German Renaissance and the most influential China-bound German Jesuit missionary, this text is of extraordinary importance not only for the history of East-West relations, but also for German cultural history.

In addition, and for comparative reasons, we are investigating another important and largely neglected text, the *Taixi shuifa* 泰西水法 (Hydromethods of the Great West; 6 chap., 208 pp., preface 1612; hereafter TXSF). The TXSF, mainly composed by the Italian Jesuit missionary Sabatino de Ursis (Xiong Sanba 熊三拔; 1575-1620), contains a systematic discourse on both theoretical and practical aspects of water and water management as well as forays into the medical field. Topically this technological manual differs from the KYGZ by embedding the presented new techniques in a traditional everyday setting, while at the same time it shares commonalities with the KYGZ in the domains of water drainage and natural philosophy.

The targets of this project are systematic, comprehensive as well as paradigmatic. It comprises studies of (甲) the Western books transferred to China, (乙) their selective translation by the Jesuits and their Chinese collaborators, (丙) the terminological and conceptual strategies and choices adopted during such efforts, (丁) the reception and perception of the texts on the Chinese side as well as (戊) the political, social, economic, cultural and ideological backgrounds and intentions of the different historical actors. The final aim of these case studies is (己) to deal with issues of intercivilisational encounters, especially (庚) in the field of useful and reliable knowledge, during (辛) the early period of globalisation, and (壬) to carry out comparisons based on the macro-sociological theory of the "Four Ways of Worldmaking" (*power, wealth, meaning, knowledge*), thus (癸) arriving at novel conclusions with regard to relevant convergences and divergences between China and Europe as well as the occurrence of the Great Divergence. The word "translating" in the project title therefore does not only mean the act of 'translation from one language into another,' but in a metaphorical sense encompasses the whole gamut of both conducive and obstructive political, social, economic, intellectual and cultural factors that were in play during this 'transfer.'

Due to its fundamental importance for a full understanding of the characteristics, complexities, and conjunctures of the transmission process, the critical translation of our two complex Chinese key texts into English is an indispensable part of this project. Yet, since translation only makes sense within a framework of historical contextualisation, our practical and theoretical approaches to translation do not constitute an isolated part, but are integrated into the "Four Ways of Worldmaking" approach, especially in relation to the domains of *knowledge and meaning*.

This project is innovative in several respects: (子) It focuses on technologies and on medicine¹ as well as on geological, mineralogical, hydrological and medical theories based on Aristotelian natural philosophy, whereas so far sciences, especially astronomy,

¹ Medicine is included in the project because the TXSF has medical sub-chapters related to water (hot springs and distillation), but mainly because there is a partner project at the University of Macau directed by Prof. Puente-Ballesteros who deals with Johannes Schreck-Terrentius' (1576-1630) anatomical treatise *Taixi renshen shuo gai* 泰西人身說概 (An Outline of the Human Body from the Great West; edited and published 1643 by Bi Gongchen 畢拱辰).

mathematics and cartography, have been in the centre of research on the Jesuit China Mission. (丑) While due to hermeneutical exigencies hybridisation and “on their own terms” approaches are part and parcel of this project, we aim at defining as precisely as possible the qualitative and quantitative aspects of partial or total acceptance or rejection of ideas and concepts.² (寅) Doubtless, building on the “on their own terms” approach³ is a necessary step in taking serious and for fully understanding and explaining the civilisational settings of late Ming China as well as of early modern Europe, yet our project with its systematic, comprehensive, and comparative approach goes far beyond that concept because it takes direct issue with the “Great Divergence” tenets. So far, California School adherents have concentrated in their comparative investigations on conditions and developments of markets and agriculture, but have paid much less attention to industrial pursuits, the role of the state as well as the meaning and, especially, knowledge domains thereof. Based on our case studies and our comprehensive approach to them, our hypothesis is that the Great Divergence started neither in 1750 nor 1800, but had its decisive roots already during the European Renaissance. Hence our project is both a micro-historical study of specific intercivilisational encounters based on a close reading of primary sources in Eastern and Western languages as well as a systematic comparison of mining and water management in China and Europe within the framework of a historical macro-sociological theory.

1 STARTING POINT

1.1 STATE OF THE ART AND OWN WORK DURING THE DFG PROJECT PERIOD

1.1.1 State of the Art

The two texts at the centre of this project were composed and translated into Chinese by Jesuit missionaries and their Chinese collaborators during the early 17th century. They constitute two sub-projects, one on the KYGZ, the other on the TXSF. Below we will focus on the state of the art with regard to these two texts and their authors and promoters.

a) Text of *Kunyu gezhi*

While general accounts of intercultural exchanges between Europe and China often mention the KYGZ, textual research on this work is inexistent, as the text itself was lost for long. The history of this “Chinese *De re metallica*” has, however, been elucidated to some extent on the basis of information in other primary sources. A pioneer was Prof. Pan Jixing (App. 34, Ill. 1), a leading expert in the history of Chinese science and technology, who was the first to deal systematically with the history of the translation of *De re metallica* (hereafter: DRM) into Chinese. The authoritative version of his research appeared in 1983 in Chinese, and later was translated into English (Pan Jixing (1983) (1991) (1998)). The most comprehensive account of the historical circumstances of the DRM transmission to China, the two different phases of its translation into Chinese by Schall von Bell and his collaborators, its discussion at court against the backdrop of political, economic, social and cultural conditions and especially late Ming mining policy, as well as its disappearance during the cataclysm of the Ming-Qing transition is an article authored by the applicant himself together mainly with Pan Jixing (see Pan, Vogel, et al. (1989)). A further contribution was made by Peter J. Golas (1995), well-known specialist in Chinese mining history, who hypothesized – basically correctly as is borne out by the now available evidence – that only selected parts of Agricola’s complex mining classic were translated into Chinese. More recent publications on the KYGZ are those of Han Fengran (2015) and Vogel (see Vogel (2015), (2019), Fu Hansi [Vogel] (2016)), both authors concentrating on the discovery of the KYGZ manuscript by Han Fengran in the Nanjing Library, the importance of this find, and the prospects of future research focusing on a rigorous study of this manuscript as well as its origins and contexts.

² Hybridisation per se is not an exclusively intercultural, but also an intracultural phenomenon. In our view, it has no explanatory power unless defined in qualitative and quantitative terms within specific historical contexts.

³ See especially Elman (2005) postulating that the Chinese transformed and integrated new Western knowledge into their own theoretical framework and used it selectively to serve their own practical purposes.

Han Fengran has also published an edited version of the KYGZ in 2017, which, however, contains a substantial number of errors and misunderstandings.

Since the beginning of the project in 2018, two M.A. theses have been published, one by Fu Yu (2018), who compares the metallurgical parts of the KYGZ as well as their structures with those of Song Yingxing's 宋應星 *Tiangong kaiwu* 天工開物 (Exploitation of the Works of Nature) of 1637, the other by Dong Qi (2019), which is a general investigation on the Nanjing KYGZ manuscript and its contents and also compares aspects of contemporary European and Chinese natural philosophy. Apart from Vogel (2019), recent publications of project members include Cao Jin (2018), who places the KYGZ chapters dealing with silver in a fascinating larger global context, and Alexander Jost (2021), who provides innovative information on other mining and metallurgical works used and paraphrased by Schall von Bell, besides Agricola's DRM.

b) Authors of Kunyu gezhi

Johann Adam Schall von Bell (App. 34, Ill. 2) was the main actor involved in the KYGZ translation. This famous missionary from Cologne was a key figure in the Jesuit China Mission during the Ming-Qing transition and hence numerous studies about various facets of his manifold activities in China exist. Besides the biography by Văth ([1933] 1991), we have the landmark collection of Schall studies edited by Malek (1998) which contains, e.g., essays on Schall research undertaken in East and West, Schall's biography and the European, Chinese and Japanese sources and testimonies informing about his life and reputation, his religious works and actions as well as the conflict with Yang Guangxian (1597-1669), his achievements in astronomy and in the production of astronomical instruments and fire-arms, his contemporaries and Christian friends as well as the political, philosophical and religious circumstances during his stay in China. In addition, a number of other articles written by well-known scholars about various aspects of Schall's life and activities exist in Western and East Asian languages. They can be easily traced in the CCT Database⁴ and also the CNKI Database⁵ and therefore need not to be enumerated here.⁶

In contrast to Schall almost no research is available on Li Tianjing, his superior in the Calendar Bureau and initiator of the translation project on the Chinese side. In Western languages, there are mainly two articles of Chen Min-sun (in Malek (1998, pp. 303-309), (2003c)) that deal with Li Tianjing as one of the main protagonists, while in Chinese the most updated contribution is that of Ru Liangliang (2011). However, no study at all exists on the Chinese assisting Schall in the translation project, i.e. Yang Zhihua 楊之華 and Huang Hongxian 黃宏憲, well-known participants in similar Jesuit undertakings (cf. CCT Database). Their position and status were simply too low for having been considered worthy subjects of bibliographical or other studies during their own time.

c) Text of Taixi shuifa

The second important technical and scientific text investigated in our project is the TXSF of 1612. This work was orally communicated by the Jesuit missionary Sabatino de Ursis (Xiong Sanba; 1575-1620), written down in Chinese by the famous scholar-official and Christian convert Xu Guangqi 徐光啓 (1562-1633; App. 34, Ill. 3) and revised by Li Zhizao 李之藻 (1571-1630), another well-known Christian scholar-official. Although the TXSF, in contrast to the KYGZ, survived, and despite increased attention in the last years, serious research into the origin, genesis and destiny of this work is still rare. On the Chinese side, Xu Guangtai (e.g. (2006) and (2007)), a Taiwanese expert of the history of West-East encounters in science and technology, has surveyed the systematic and theoretical explanations given in the TXSF for all kinds of water phenomena on the background of the differing correlative

⁴ See Dudink, Adrian and Nicolas Standaert (eds.), "Chinese Christian Texts Database (CCT Database)," <http://www.arts.kuleuven.be/sinology/cct>.

⁵ See this database within the CrossAsia Project of the State Library in Berlin.

⁶ Due to limited space our application and application bibliography only contains references to the most important works or such of exemplary nature. For a comprehensive coverage of relevant secondary literature cf. App. 33.

concepts of the Aristotelian Four Elements and the Chinese Five Phases. Zhang Baichun (1995b) has outlined the description of the three water-lifting devices introduced to the Chinese public in chapters one and two of the TXSF. In a recent interesting article, Su Yunmeng and Shi Yunli (2017) have shown in an experimental way that the Archimedean screw was much less effective than the traditional Chinese square-pallet-chain pump in raising water. Since the beginning of this project some further investigations on the TXSF have been carried out. The success – or rather the failure – of efforts to implement in the Jiangnan area the pumping technologies described in the TXSF is examined by Zou Zhenhuan (2017).⁷ Moreover, in his analysis of the transfer of Western natural philosophy to China during the Ming-Qing transition period, Sun Chengsheng (2018) among other Jesuit works also discusses the TXSF's explanations on hexagonal snow crystals. Finally, Liu Geng (2018), who deals with the history of the Jesuit missionaries' cemetery in Beijing, describes the crucial role of this site for the creation and publication of the TXSF.

As for Western debates, such standard reference works as, e.g. Jami, Engelfriet, and Blue (eds.) (2001), do refer to the TXSF, but merely in passing or as but one of various examples of their research on heterogeneous aspects of the Jesuit transmission of Western scientific, technological and medical knowledge to Ming and Qing China. So far, Western research dealing in more detail with the content of the TXSF had been rather limited. It consisted mainly in the articles by Cigola (2015), focusing on the illustrations in the TXSF, and Kurtz (2012), who deals with some of the rhetorical strategies used in its prefaces in their function as legitimizing paratexts. In addition, the contribution by Vogel (2010) discusses concepts about the origin of salt, brine and natural gas, and compares the explanations provided by traditional Western and Chinese natural philosophy in general and in the relevant parts of the TXSF in particular, elaborating on the significance of the Aristotelian theory of the Four Elements for the subject matter. In the meantime, Albert Koenig (2018) (2020) has additionally reported on the Jesuit introduction of hydraulic water lifting machines to China during the Ming and Qing dynasties, with special emphasis on the crucial role of the TXSF in the case of the Archimedean screw pump. Within the project itself and as part of it, two substantial articles of Kink (2019) (2020) about specific contents of the TXSF have to be highlighted, the first dealing with its pumping technology, the second with the tides and the influence of the moon on water. Another ground-breaking article on the TXSF's explanations of snow has been just submitted by her to *Monumenta serica* (App. 9), while she has drafted a further one on the four paratexts of the TXSF (App. 10) which is scheduled to be included in a special volume on Sabatino de Ursis edited by the University of Lecce.

d) Authors of *Taixi shuifa*

Biographical studies of the main authors of the TXSF differ in quantitative and qualitative terms, similar to the case of the KYGZ. What for the study of Schall von Bell is the volume edited by Malek (1998), is for research on Xu Guangqi the volume edited by Jami, Engelfriet and Blue (2001), i.e. a convenient and fundamental summary of investigations on the multifarious aspects of this most important Chinese Christian of the late Ming period. This collective volume comprises studies about Xu Guangqi's administrative career and social position, his role as statesman and statecraft scholar, the nature of his conversion to – and belief in – Christianity, his authorship of Christian treatises and texts, his attitude towards Buddhism, his contribution to the amalgamation of Western and Chinese useful and reliable knowledge⁸ (especially in the fields of astronomy, calendar-making, mathematics, and agriculture (*Nongzheng quanshu* 農政全書), the perception of Xu in Europe, and the political, social and economic contexts in China within which Xu worked and acted.⁹ For Xu's

⁷ On another essay by him dealing with the TXSF see also Zou Zhenhuan (2011).

⁸ For a definition of useful knowledge and its subdivision into propositional (i.e. a) "what" and b) "why" questions) and prescriptive knowledge (i.e. "how" questions) see Mokyr (2002), pp. 4ff.

⁹ Apart from Chinese collective volumes dedicated to Xu Guangqi the recent collection of articles of Giunipero (ed.) (2013) may be mentioned here. It deals with biographical matters, intercultural dimensions and Xu's Christian notions.

perception and interpretation of Christendom Übelhör (1968/1969) remains the most comprehensive survey to date. Moreover, as in the case of Schall, a substantial number of other earlier and later publications exist which deal with these and other aspects of this first “Christian pillar,” among which the critical study of Hart (2013) deserves special mention. The same holds true for a new collection of paratexts to Jesuit works (in Italian translation) written by Xu in the course of his career, and shedding light on his strategies to cope with his “hybrid identity” as Chinese scholar official and Christian convert (Giunipero (2020)).

The second Chinese TXSF protagonist, Li Zhizao, was likewise the subject of study for a number of Chinese and Western researchers. These contributions include older and newer biographical accounts, articles discussing Li’s reasons for converting to Christianity, his views about religion, his Confucian-Christian synthesis, his interest and scholarship in mathematics as well as his role as principal collector, editor and publisher of a number of philosophical, ethical, religious, astronomical, mathematical, metrological, geographical and technical treatises composed by the Jesuits, compiled into the *Tianxue chuhan* 天學初函 (First Collectanea of Celestial Studies) of 1626, which included also the TXSF. Of special interest for us is, moreover, Li Zhizao’s participation, together with Francisco Furtado S.J. (Fu Fanji 傅汎際; 1589-1653), in the composition of the *Huanyou quan* 寰有詮 (Inquiry into the Universe), a 1628 Chinese rendering of a Coimbra commentary on Aristotle’s *De coelo*.¹⁰ In contrast to Xu Guangqi and Li Zhizao, the European key player in the TXSF episode, the Italian Jesuit Sabatino de Ursis, thus far had barely attracted scholars’ attention so that apart from some brief information available in biographical reference works (e.g. Pfister (1971) and Dehergne (1973)) only the biographical study of Bertuccioli (1991) could be considered a first short contribution. Only recently, however, the University of Lecce – place of origin of Sabatino de Ursis – has started an initiative to explore the life and work of the Italian Jesuit with the aim to reconstruct his biography from the roots (Frisullo and Vincenti (2020a) (2020b) (2020c)). Also the project member Kink will participate in this effort. For a recent Chinese contribution on de Ursis’ life and his Chinese works see, moreover, Ye Nong and Chen Yixin (2017). Nevertheless, scarcity of information persists for all the other men involved in the TXSF publication, such as authors of prefaces like Cao Yubian 曹于汴 (1558-1634) or collaborators like Yao Yongji 姚永濟 (*jinshi* of 1598).

e) Contexts of Kunyu gezhi and Taixi shuifa

We will mention here a selected number of studies that are especially pertinent for understanding and contextualizing the scientific, technological and medical activities of the Jesuit China Mission during the first half of the 17th century. An important starting point is volume 1 of the *Handbook of Christianity* (Standaert (ed.) (2001)). It contains important state of the art articles with extensive bibliographies of primary and secondary sources written by such authoritative scholars as e.g. Catherine Jami, Hashimoto Keizō, Theodore N. Foss, Giovanni Stary, Peter J. Golas, or Georges Métaillé. They cover science and technology in general, and astronomy, calendar making, astronomical instruments, star maps and catalogues, ephemerides, solar and lunar tables, mathematics, cartography, medicine, pharmaceuticals, botany, cannons, and clocks in particular, but mining and hydrology are missing. Another, helpful and even more specialized introduction into the scientific endeavours of the China Jesuits is Benjamin A. Elman’s (2005) monograph on the history of Chinese science from 1550 to 1900. Both the *Handbook* and Elman’s monograph have the advantage of not only dealing with the Jesuits of the Ming (1368-1644), but also with those of the early Qing period (1644-1911), thus highlighting crucial differences between these two eras. Moreover, as an important pre-condition for understanding the scientific, technological and medical activities of the Society of Jesus, they also provide important, though – especially in the case of Elman (2005) – not always uncontroversial insights into the political, social, economic, cultural and religious aspects of the Jesuit China Mission’s activities from the 16th to the 18th centuries. In addition to these two reference works, the often-quoted

¹⁰ For Li Zhizao as well as Aristotelian works in seventeenth-century China see also the CCT Database.

study of Peterson (1973) about the introduction of Aristotelian natural philosophy into China during the early 17th century has to be underlined, a seminal work based on a close reading of relevant Chinese texts published by the Jesuits (Peterson (1973)). This topic has been taken up more recently by Meynard (2017) presenting an updated overview and new analysis. Moreover, research on the relevant European background material is now much facilitated by the online accessibility of the Coimbra commentaries.¹¹

An interesting investigation on the first major European-Chinese encounter in the 17th century was published by Hart (2013) who tells the story of this intercivilisational relationship from the Chinese side. He stresses especially the reality of power, i.e. the dominance that the Chinese side exerted over the Jesuits, and the way by which the Chinese made use of Western knowledge for their own political, cultural and ideological agenda.

We certainly also take into account the work of Zhang Qiong, especially her book (Zhang (2015)) on Chinese encounters with Jesuit science in the late Ming and early Qing period. This is an in-depth exploration of the influence of the concept of a globe-shaped earth introduced by the Jesuits into China. Zhang's study systematically traces the Chinese reception of this idea in the fields of cosmology, cartography, world geography and classical studies and shows how late Ming and early Qing scholars appropriated the idea of a terraqueous globe for their own ends in order to constitute China's place in the world and to reconstitute its classical tradition. For the intellectual background during the late Ming period and the reception and reinterpretation of Renaissance knowledge transmitted by the Jesuits, the comprehensive examination recently published by Sun Chengsheng (2018) is of great importance for our project.

Moreover, we are closely studying new research on Wang Zheng 王徵 (1571-1644) and Johannes Schreck-Terrentius' (Deng Yuhuan 鄧玉函; 1575-1630) *Qiqi tushuo* 奇器圖說 (Illustrations and Descriptions of Extraordinary Devices; 1627) about the transmission of European mechanics to 17th-century China. This work is important for us, as – similar to the TXSF – the material for the compilation of this scientific and technical treatise was taken from a wide variety of Western sources. They are all conveniently listed in the publication of Zhang Baichun, Tian Miao et al. (2008; vol. 1, pp. 84-153) and need not to be mentioned here in detail. As in the case of the KYGZ and the TXSF, the *Qiqi tushuo* is the result of a collaborative effort between a Jesuit missionary and a Chinese scholar, and it is also richly illustrated. Considering thoroughly the history of this work, the manifold origins of its sources, the nature of Sino-Western collaboration, and the reception, perception and discussion of this treatise by an informed and learned Chinese public will not only provide interesting parallels, but also opportunities for educated guesses when confronted with missing parallel information on the TXSF and KYGZ.¹²

Last but not least, the work of Noël Golvers on the history, origin and composition of the Jesuit missionaries' libraries in China has to be taken into account, especially his *opus magnum* published in recent years (Golvers (2012) (2013) (2015)). Golvers substantially enlarges our knowledge about the Jesuit library holdings and thus provides us with a much better idea about European Renaissance works available to the Jesuits of the China Mission or the production of the KYGZ and TXSF.

1.1.2 Own Work During the DFG Project Period

For own preliminary work *before* the period supported by the DFG see our original project proposal in App. 21, p. 6.

- **Translation of three quarters of both the KYGZ and TXSF which will be published as two separate volumes:** See App. 12 & 14 (overviews) and 13 & 15 (translations). As planned, the translations have been carried out regularly and even during the pandemic within the framework of the seminar "Translating Western Science, Technology and Medicine to Late Ming China," taking place every week during the teaching period. In

¹¹ See Conimbricenses <http://www.conimbricenses.org/contents/>.

¹² For other secondary literature on the *Qiqi tushuo* see the CCT Database.

addition to some Tübingen staff members doing research on premodern China, mainly PhD and MA candidates are participating, thus bringing together senior and junior researchers and representing the ideal of *integrating research into teaching*. The established procedure is as follows: Whoever is responsible for the translation of a passage (most of them now by the project core members Kink, Cao and Vogel themselves) has to prepare it in written form with all critical annotations and remarks included. This draft translation is distributed to the other participants at least a week before the respective session and is then discussed in great detail by all the participants. The assigned translator carries out corrections and revisions directly during the session so that they can be followed by the other participants via projection of the text on a screen. The product of this effort is always checked once more by Cao and Kink, and eventually by Vogel himself making the final revisions and decisions. This procedure guarantees that the result is a highly reliable, unified and standardized translation which in the end will have passed through different stages of rigorous cross-checking of both the source and target languages. Simultaneously, we continue to compile our glossary of technical terms used in both our texts which guides us in making specific decisions concerning consistency, differentiation or ambiguity in our English renderings and serves as a tool of reference for the investigation of similar texts.

- ***First inroads into the two thematic monographs to be published:*** We started to draft parts of the English monographs of the two sub-projects.¹³ For a short version of their tables of contents see below under 2.3, for more detailed versions see App. 16 & 17. Some of the results were already published as separate articles for which see the list of project-related publications below and App. 5 to 8, and 11. For not yet published works and lectures see App. 10-10, 24-26.
- ***Successful application and organisation of a symposium in China, 2019:*** This fruitful and rewarding event was financed by, and took place at, the Sino-German Center for Research Promotion (SGCRP), Beijing, 29 March 2019-2 April 2019, under the title “Transfer of Scientific and Technical Knowledge between Europe and China during the Early Modern Period.” The application was submitted together with Prof. Zhang Baichun, Center for Comparative Studies, Institute for the History of Natural Sciences (IHNS), Chinese Academy of Sciences, Beijing, and the European Centre for Chinese Studies at Peking University (ECCS). For the programme and a report see App. 22 & 23, for yet not published lectures 24 & 25.
- ***Successful application for a three-year Sino-German Mobility Program (2020-2022):*** On the basis of the above-mentioned symposium, the Premodern China Studies division of Tübingen and the Institute for the History of Natural Sciences, CAS, Beijing, applied for, and were granted, this generous SGCRP exchange programme (ca. 200,000 €) supporting mutual visits and exchange between scholars working at German or Chinese universities on the topic of “Transfer of Technical and Scientific Knowledge between Europe and China during the Early Modern Period.” This program will allow us to enter into close contact with leading scholars working at mainland Chinese universities and to intensify our exchange with them. It will also permit us to concentrate our DFG funds earmarked for research travels and visiting scholars on colleagues and institutions beyond mainland China.
- ***Participation in the 27th Agricola Colloquium “Kunyu gezhi or the History of the Chinese Translation of De re metallica,” Agricola Research Center Chemnitz, 24 Nov. 2018:*** See App. 29 & 30.
- ***Establishment of a project homepage:*** See [project homepage](#).
- ***Giving or organising individual lectures:*** See project homepage under “Events.”
- ***Complementing our comprehensive bibliographies of primary and secondary sources:*** See App. 32 & 33.

¹³ A more popular German translation of the KYGZ without most of the text-critical annotations will be undertaken after the termination of this project.

- **Complementing the holdings of relevant China Jesuitica in the Tübingen Sinological library**, especially with regard to the monograph collection and new editions and facsimile publications of Chinese treatises authored and published by Jesuits of the China Mission.
- **Participation in the publication of a small monograph on Schall von Bell, edited by Claudia von Collani and to be published by the Ricci Institute in Macau.**
- **Inquiring and ascertaining a venue for publication of the research results within a monograph series “Translating Western Science, Technology and Medicine to Late Imperial and Early Republican China” with Brill Publishers in Leiden.**
- **Weekly project meetings via Zoom with minutes and work-to-do.**

1.2 PROJECT-RELATED PUBLICATIONS OF APPLICANT AND COLLABORATORS

- **Cao** (2018; publ. 2020), “From Ricci’s World Map to Schall’s Translation of *De Re Metallica*: Western Learning and China’s Search for Silver in the Late Ming Period (1583–1644),” *Crossroads (Studies on the History of Exchange Relations in the East Asian World)* 17/18: 93–138.
- **Fu Hansi (Vogel); Cao** (transl.) (2016), “*Kunyu gezhi* jingxian yu shi: Agelikela *De re metallica* (*Kuangye quanshu*) 1640 nian zhongyiben” (The Sensational Re-appearance of the *Kunyu gezhi* [Investigations of the Earth’s Interior]: The 1640 Translation Manuscript of Agricola’s *De re metallica*), *Aomen lishi yanjiu* (Macau Historical Studies), 14: 73-87.
- **Jost, Alexander** (2021), “Beyond Agricola: The Multiple Origins of European Knowledge in Adam Schall von Bell’s Chinese Mining and Metallurgy Handbook *Kunyu Gezhi* (1640),” *Chinese Annals of History of Science and Technology* (forthcoming).
- **Kink** (2019), “Beistand für die Himmlischen Kräfte: Pumpentechnik in Sabatino de Ursis’ *Taixi shuifa* 泰西水法 (Hydromethoden des Großen Westens; 1612),” *Rundbrief des 27. Agricola-Gesprächs*, 4.11.2018, Chemnitz, pp. 23-39, <https://www-user.tu-chemnitz.de/~fna/27kink.pdf>.
- **Kink** (2020), “Shared Ideas, Divergent Approaches: The Hydromethods of the Great West (*Taixi shuifa* 泰西水法) and the Question on Tides,” *Chinese Annals of History of Science and Technology* 4.1: 63-101.
- **Pan Jixing, Vogel et al.** (1989), “Übersetzung und Verbreitung von Georg Agricolas ‘De re metallica’ im China der späten Ming-Zeit (1368-1644),” *Journal of the Economic and Social History of the Orient*, 32: 153-202.
- **Vogel** (1989), “Georg Agricolas ‘De re metallica’ in China,” *Schriften der Georg-Agricola-Gesellschaft*, 15:41-62.
- **Vogel** (2010), “‘That which Soaks and Descends becomes Salty’: The Concept of Nature in Traditional Chinese Salt Production,” in Vogel and G. Dux (eds.), *Concepts of Nature: A Chinese-European Cross-Cultural Perspective*, Leiden, pp. 469-515.
- **Vogel** (2015), “Sensational Rediscovery of a Manuscript: The Chinese Translation of Georgius Agricolas *De re metallica* of 1640,” see on [Academia.edu](https://www.academia.edu).
- **Vogel** (2019), “‘Das wird gewiss die Staatskasse füllen!’ Johann Adam Schall von Bells chinesische Übertragung von Agricolas *De re metallica libri XII* im Jahre 1640,” *Rundbrief des 27. Agricola-Gesprächs*, 4.11.2018, Chemnitz, pp. 52-78, <https://www-user.tu-chemnitz.de/~fna/27vogel.pdf>.

2 OBJECTIVES AND WORK PROGRAMME

2.1 ANTICIPATED TOTAL DURATION OF THE PROJECT

The anticipated duration of the whole project is 36 + 12 months. As already stated in the original application, the main reason for requesting now **an additional 12-month support** is that more time is required for the intensive intratextual and intertextual research necessary for the clarification of the complex syntactical and semantic problems and the historical contexts of both texts.

2.2 OBJECTIVES AND METHODS

The objectives and methods to be addressed are in substantial parts identical for both Jesuit missionary translation projects, but there also exist some marked differences. This is one of the reasons why their comparison is interesting, significant, and meaningful. As usual in the humanities, a variety of methods and theories is adopted for disentangling the complexity of historical situations and developments and the intentions of actors of different political, social, economic and cultural backgrounds. As we have already outlined this in detail in the original application and because no major changes or adjustments in objectives and methods are necessary, we simply list here the relevant entries as they had been spelled out and described in the original application (cf. App. 21, pp. 7-16). For new primary sources or secondary literature directly pertinent for our two sub-projects see under 1.1.1 above.

a) Importance of text-critical annotated translations and editions

- b) Practical organisation of the text-critical annotated translations**
- c) Theoretical approach to our text-critical annotated translations**
- d) Comprehensive evaluation of the texts**
- e) History of editions**
- f) Authorship and composition**
- g) Origin of Western information**
- h) Translation of Western terms**
- i) Intercivilisational transmission of complex concepts and systems**
- j) Targets of the Jesuit China Mission**
- k) Reception and perception on the Chinese side**
- l) Jesuit transmissions of other useful and reliable knowledge and their interpretation**
- m) Political, social, economic, cultural and ideological contexts**
- n) Comparison with the Protestant missionaries' translations of science, technology and medicine**
- o) Cross-civilisational comparisons in the history of early globalisation**

2.3 WORK PROGRAMME

The work programme for the remaining period of this project is rather straightforward and can be divided into two parts:

Translation monographs: Until ca. end of June 2021, i.e. the end of the first three-year phase, we intend to finish the translation of the remaining parts (ca. one quarter left; see App. & 13 and 14 & 15) of both the KYGZ (Vogel, Cao, Kink) and the TXSF (Vogel, Kink, Cao).

Thematic monographs: In the twelve-month extension from ca. July onwards we will concentrate on finishing the two thematic volumes. For an outline of their overall contents see below, while for a more detailed breakdown see App. 16 & 17.

Hans Ulrich Vogel and Cao Jin

**Translating Renaissance Knowledge in Mining and Smelting to Late Ming China:
Johann Adam Schall von Bell's *Kunyu gezhi* 坤輿格致
(Investigations of the Earth's Interior) of 1640**

Foreword

Preface

I. Introduction

1. State of the Art
2. Research Questions
3. Sources
4. Methods and Theories

II. General Context of the Intercivilisational Encounter

1. Jesuit China Mission
 - a. Demand in China for European Knowledge and Books
 - b. Request from China for Books
 - c. Response in Europe to Book Request
2. The Chinese Background
 - a. Political, Social and Economic Conditions
 - b. Religious and Intellectual Trends

III. History of the *Kunyu gezhi*

1. First Mentioning of Agricola (1627) and *De re metallica* (1639) in China
2. Institutional Framework of the Project
 - a. Astronomical Reform
 - b. Calendrical Bureau
 - c. "Ten Collateral Matters Regarding Mathematics (*dushu* 度數)"
3. Li Tianjing and Schall von Bell's Motivations
 - a. Mining and State Revenue

- b. Systematic and Comprehensive Contents
 - c. Excellent Illustrations
- 4. Composition Process
 - a. First Phase, 1638-July 1639
 - b. Second Phase, July 1639-July 1640
- 5. Project Participants
 - a. Li Tianjing (Promoter)
 - b. Schall von Bell (Main Author)
 - c. Yang Zhihua and Huang Hongxian (Collaborators)
- IV. Contents of the *Kunyu gezhi*
 - 1. Classification of the *Kunyu gezhi*'s Content
 - a. Preface (paratext)
 - b. Ores
 - c. Probing
 - d. Mining
 - e. Smelting (missing)
 - 2. Origins of the *Kunyu gezhi*'s Contents
 - a. Western Sources
 - b. Chinese Influences
 - 3. Analysis of the *Kunyu gezhi*'s Contents
 - a. Stylistic Characteristics
 - b. Systemic Aspects
 - c. Concepts and Theories
 - d. Terminologies
 - e. Encounters
 - f. Harmonies
 - g. Hybridisation
 - h. Clashes
- V. Reaction of the Central Governments
 - 1. Mining and Mining Policy during the Late Ming
 - a. Mining Policies of the Late Ming
 - b. Eunuchs as Mining Tax Collectors
 - c. Mining Unrests
 - d. Ambivalent and Mostly Negative Perception of Mining
 - 2. Attempts at Application the *Kunyu gezhi*
 - a. Shelving of Application in 1640
 - b. Court Discussion on Application in Jan. 1643
 - c. Court Discussion and Approving Application in Jan. 1644
 - d. Court Ordering Application, Jan.-April 1644
 - e. Proposal of Implementation, Southern Ming, 1645-1647
 - 3. Mining and Mining Policy during the Early Qing
 - a. Ambivalent and Mostly Negative Perception of Mining
 - b. Mining Activities
 - 4. Attempts at Application of the *Kunyu gezhi*
 - a. Court Discussion on Application in 1644
 - b. Liu Yunde and Yingzhou, 1676-1684
- VI. Fate of the *Kunyu gezhi*
 - 1. Loss of the Original Manuscript
 - 2. Survival of *Kunyu gezhi* Copies
 - a. Nanjing Copy
 - b. Tiantai Copy (missing)
- VII. Comparisons with Later Periods
 - a. Agricola's *De re metallica* in Latin America

- b. Revival of Interest in Jesuit Technical Treatises during the Opium Wars
- b. Protestant Missionaries' Treatises on Geology, Mineralogy, Mining and Smelting during the Late Qing

VIII. The "Great Divergence" in the Light of *Kunyu gezhi*

- 1. Geology, Mineralogy, Mining and Smelting in Europe: Power, Wealth, Knowledge and Meaning
- 2. Geology, Mineralogy, Mining and Smelting in China: Power, Wealth, Knowledge and Meaning

IX. Conclusions

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Sabine Kink

Translating Renaissance Knowledge in Hydrology, Water Management, and Medicine to Late Ming China: Sabatino de Ursis' *Taixi shuifa* 泰西水法 (Hydromethods of the Great West) of 1612

Foreword

Preface

I. Introduction

- 1. State of the Art
- 2. Research Questions
- 3. Sources
- 4. Methods and Theories

II. General Context of the Intercivilisational Encounter

- 1. The Early Jesuit China Mission
 - a. The Jesuit Order as a Global Missionary Enterprise
 - b. Taking a Foothold in the Middle Kingdom
 - c. Accommodation Strategy and its Implementation
- 2. The Chinese Background
 - a. Socio-Political and Economic Conditions
 - b. Religious, Cultural and Intellectual Frameworks

III. History of the *Taixi shuifa*

- 1. Protagonists and Other Actors Involved in the Creation of the TXSF
 - a. Westerners
 - b. Chinese Actors
- 2. Appeal of a Compendium about Water
 - a. Tradition of Assisting Agriculture
 - b. Novel Approaches to the Presentation of Knowledge
 - c. Technical Illustrations
- 3. Chronology of the Composition of the TXSF
 - a. Sources of Information
 - b. Overcoming Internal and External Hindrances
 - c. Role of the Zhalan Cemetery as a Place of Encounter
 - d. Pump Models: Fabrication, Demonstration and Gift Giving
 - e. Financing the Project
 - f. Changing the Title and Success of the First Printing

IV. Contents of the *Taixi shuifa*

1. Paratexts
 - a. Chinese Prefaces
 - b. List of Collaborators
 - c. De Ursis' "Basic Discourse on Hydromethods" (*shuifa benlun* 水法本論)
2. Classification of the *Taixi shuifa*'s Contents
 - a. Implements for Using the Water of Streams and Rivers
 - b. Implements for Using the Water of Wells and Springs
 - c. Methods for Using the Water of Rain and Snow
 - d. Further [Information] about Hydromethods
 - e. Some Questions about Hydromethods (Aristotelian Natural Philosophy about Water Related Phenomena)
 - f. Illustrations
3. Origins of the *Taixi shuifa*'s Contents
 - a. Western Books and Alternative Sources of Information
 - b. Chinese Influences
- V. Analysis of the *Taixi shuifa*'s Contents: Selected Case Studies
 1. Innovative Hydraulic Pumps for Practical Application
 - a. Traditional Chinese Water Lifting Devices
 - b. Characteristics, Advantages and Shortcomings of the Western Pumps
 - c. Description of the Continuous [Water] Rise Pump [Reciprocating Pump]
 - d. The Limits of Comprehensibility and the Significance of the Technical Illustrations
 2. Theoretical Explanations of Natural Phenomena Related to Water: The "Shuifa huowen" Chapter
 - a. Aristotelian Four Elements Theory vs. Chinese Five Phases
 - b. Deductive Reasoning vs. Correlative Thought
 - c. The Influence of the Moon on Water
 - d. Explanations on Snow and its Hexagonal Crystals
- VI. Linguistic Features of the *Taixi shuifa*
 1. Locating the *Taixi shuifa* within the Jesuit "Translation Project"
 2. Limits of Translatability and Efforts to Bridge the Gap (Illustrations, Pump Models, "Sinisation" of Western Concepts)
 3. Terminology and the Question of Neologisms for Technical Terms
 4. Names for God and the Christian Message between the Lines
- VII. Tracing Reception and Success of the *Taixi shuifa*
 1. Reprints and Later Editions of the *Taixi shuifa*
 2. Influence of the Nanjing Persecution
 3. Tangible Results and Practical Impact: Implementations of Western Pumping Technology
 - a. The Case of Jiangnan
 - b. Reasons for the Virtual Non-Adoption of the Innovative Technologies
 - c. Adoption of Western Pumping Technology in Japanese Mining
 - d. Later Jesuit Hydrotechnical Activities: Aleni, Verbiest
 4. Comparison with Later, Similar Jesuit Works and their Fate
 - a. Alfonso Vagnone's *Kongji gezhi*
 - b. Johann Schreck's *Yuanxi qiqi tushuo*
 5. Acceptance of Western Useful and Reliable Knowledge in Learned Circles
 6. The Question of "Outdatedness" of Western Knowledge Transmitted by the Jesuits
- VIII. The "Great Divergence" in the Light of *Taixi shuifa*
 1. Hydrology, Water Management and Medical Uses of Water in Europe: Power, Wealth, Knowledge and Meaning
 2. Hydrology, Water Management and Medical Uses of Water in China: Power, Wealth, Knowledge and Meaning
- IX. Conclusions

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- Zhang Baichun 张柏春, Tian Miao 田淼 et al. (2008), *Chuanbo yu huitong: 'Qiqi tushuo' yanjiu yu jiaozhu* 传播与会通: 《奇器图说》研究与校注 (Transmission and Integration: New Research on and Annotated Edition of the *Qiqi tushuo*), 2 vols., Nanjing: Jiangsu kexue jishu chubanshe.
- Zhang Qiong (2015), *Making the New World their Own: Chinese Encounters with Jesuit Science in the Age of Discovery*, Leiden: Brill (Scientific and Learned Cultures and their Institutions; 15).
- Zou Zhenhuan 邹振环 (2011), "*Taixi shuifa*, *Tongwen suanzhi*: zai gongjuxing zhishi cengmian huitong Zhong Xi" 《泰西水法》、《同文算指》: 在工具性知识层面会通中西 (*Taixi shuifa* and *Tongwen suanzhi*: Thoroughly Understanding China and the West on the Level of Instrumental Knowledge), in his *Wan Ming Hanwen xixue jingdian: Bianyi, quanshi, liuchuan yu yingxiang* 晚明汉文西学经典: 编译、诠释、流传与影响 (Classical Texts of Western Learning in Chinese in Late Ming: Their Translated Editions, Annotations, Circulation and Influence), Shanghai: Fudan daxue chubanshe, pp. 191-222.
- (2017), "Zhong Xi shuiwenhua hudong zhong de 'bian' yu 'chang': yi *Taixi shuifa* zai Ming Qing Jiangnan diqu de chuanbo wei li" 中西水文化互动中的“變”與“常”:以《泰西水法》在明清江南地區的傳播為例 (On the 'Changing' and 'Laggard' Elements in the Interaction of Water Culture between China and the West:

A Case Study of the Transmission of *Taixi shuifa* in the Jiangnan Area of the Ming and Qing Dynasties),
Nanguo xueshu 南國學術 (South China Quarterly) 7.3: 395-413.

4 Relevance of sex, gender and/or diversity

Though the participants in the project have been selected clearly on the basis of their competence, it is worth to be mentioned that two of the three project members are female.

5 SUPPLEMENTARY INFORMATION ON THE RESEARCH CONTEXT

5.3 OTHER INFORMATION

a) This project is of **great national importance** due to the eminence of two of the historical protagonists, i.e. Georgius Agricola, one of the most prominent scholars of the German Renaissance and considered also as the “father” of mining science, mineralogy and geology, the other Johann Adam Schall von Bell, the most influential German member in the history of the Jesuit China Mission. Moreover, this research is carried out under the auspices of the **UNESCO Subcommittee on Research and Education**, Memory of the World Programme (see App. 35).

b) Towards the end of the project we intend to organize a final international workshop bringing together scholars from all parts of the world that are important for our project. This will also provide us with an opportunity to present our findings to a critical public before we go into final publication of our main results. For funding this workshop we will apply first of all with the Chiang Ching-kuo Foundation for International Scholarly Exchange, Taiwan.

c) The project members have already **successfully worked together** in authoring the following work which is now in the process of publication by Tübingen University Press: *Die Falschmünzerbande vom Alten Rabenhorst im Distrikt Tongzi, Guizhou (1794); Band 1: Die chinesische Dokumentensprache der Qing-Zeit (1644-1911) in Forschung und Lehre; Band 2: Chinesische Dokumente, ca. 800 & 250 pp.* (see App. 18 & 19).

d) **Another work to be finished in collaboration** between Vogel, Cao et al. after the termination of the DFG project is *Wu Qijun (1789-1847) and the Diannan kuangchang tulüe (Illustrated Account of the Mines and Smelters of Yunnan): Mining and Smelting Technology in Late Imperial China*.

6 PEOPLE/COLLABORATION/FUNDING

6.1 EMPLOYMENT STATUS INFORMATION

Vogel, Hans Ulrich, Prof. Dr., Chair for Chinese History and Society, C-4 Professor, entitled to fully work until the end of the summer term of 2022.

6.3 COMPOSITION OF THE PROJECT GROUP

Two of our Tübingen staff members doing research on premodern China regularly participate in the project, mostly as collaborators in the translation. They are joined by a number of PhD and MA candidates as well as by other students (not listed here) excelling in Classical Chinese. Because of the pandemic, our regular weekly translation sessions during the semester teaching period take place via Zoom.

Staff members: Prof. Achim Mittag (participant in SGCRP Mobility Program), Christian Buskühl MA.

Postdoc: Dr. Cao Jin (project member).

Doctoral candidates: Guo Aiting MA, Sabine Kink MA (project member), Anna Strob MA, Sebastian Demuth MA.

MA candidates: Patrick Aberle BA, Anja Chen BA, Han Qijin BA, Sheng Jia BA.

Some of the participants pursue research topics that are closely connected to our research project (for more details see project homepage):

- **Anna Strob**, MA, PhD cand.: “Translating Renaissance Science to Late Ming China: Alfonso Vagnone’s *Kongji gezhi* 空際格致 (Investigation into Celestial Phenomena; c. 1633),” PhD Scholarship of the Gerda Henkel Foundation, 2020-2022 (SGCRP Mobility Program).
- **Christian Buskühl**, MA, PhD cand.: “Palace Intrigues in the Late Ming Period: The ‘Three Cases’ (*san’an* 三案).”

- **Sebastian Demuth**, MA, PhD cand.: “The Making of a Chinese World Chronicle: Li Zhi 李贄 (1527-1602) and the *Shigang pingyao* 史綱評要 (General Outline of History, Appended by Critical Notes of Prime Importance; 1613) in the Context of Late Ming Historiography.”
- **Patrick Aberle**, BA, MA cand.: Works on the *Celiang fayi* 測量法義 (Meaning and Methods of Measurement; 1607), written by Matteo Ricci (1552-1610) and Xu Guangqi (1562-1633) (SGCRP Mobility Program).
- **Anja Chen**, BA, MA cand.: Deals with Johann Schreck’s (1576-1630) trigonometry treatise *Dace* 大測 (Grand Measure; 1631) (SGCRP Mobility Program).
- **Han Qijin** 韓奇金, BA, MA cand.: Investigates the *Yanqi tushuo* 驗氣圖說 (Illustrated Explanation of Testing Air; 1671) written by Ferdinand Verbiest (1623-1688) and the *Yanqi hanshubiao shuo* 驗氣寒暑表說 (An Explanation of the Cold-and-Hot Meter for Testing Air; n.d.) drafted by his French successors (SGCRP Mobility Program).
- **Sheng Jia** 盛佳, BA, MA cand.: Does research on the *Yuanjing shuo* 遠鏡說 (On the Farseeing Telescopes; 1633), written by Johann Adam Schall von Bell S.J. (1591-1666), the first scientific work to systematically introduce knowledge about telescopes to Chinese readers (SGCRP Mobility Program).

6.4 COOPERATING RESEARCHERS IN GERMANY

We collaborate, or intend to do so, with numerous individual researchers and/or institutions in Germany. Due to the pandemic, these activities were, however, interrupted and could not be fully enacted.

We distinguish between *Project and Translation Collaborators* and *Associated Researchers*, the first category being scholars who will work closely with us on certain topics related directly to the KYGZ and the TXSF, participate in the translation work and provide us with advice in other content matters, the second being colleagues who work on topics and themes related to our project in a wider sense. Some of them also participate in the **SGCRP Sino-German Mobility Program** (see App. 27). Collaborations of prime importance are underlined.

Project and Translation Collaborators

- Prof. **Christine Moll-Murata**, Sektion Geschichte & Philosophie Chinas, Fakultät für Ostasienwissenschaften, Ruhr Universität Bochum; social and economic history of China (SGCRP Mobility Program).

Associated Researchers

- Prof. **Helmuth Albrecht**: TU Bergakademie Freiberg, Chairman of the Georg-Agricola-Gesellschaft zur Förderung der Geschichte der Naturwissenschaften und der Technik e.V.; research on the history of science and technology.
- Prof. **Iwo Amelung**, Goethe-University, Frankfurt am Main, Faculty of Language, Cultures and Arts, Frankfurt am Main; history of scientific terminology and water management during late Qing period (SGCRP Mobility Program).
- Dr. **Lars Bluma** (to be contacted = tbc), Prof. **Thomas Stöllner**, Deutsches Bergbau-Museum, Bochum; European mining history.
- Dr. **Chen Hailian** 陈海连, University of Leipzig, Ostasiatisches Institut Sinologie, Leipzig; history of Chinese mining and of technological elites during the late Qing period (SGCRP Mobility Program).
- Dr. **Nanny Kim**, Heidelberg University, Department of Chinese Studies, Heidelberg; Chinese mining history during the late imperial period (SGCRP Mobility Program).
- Prof. **Regine Mathias**, Sektion Geschichte Japans, Ostasienwissenschaften, Ruhr-Universität Bochum; mining history in Japan.
- Prof. **Friedrich Naumann**, Wissenschafts-, Technik- und Hochschulgeschichte, TU Chemnitz, Chairman of Agricola-Forschungszentrum Chemnitz; Agricola research.
- Prof. **Erich Pauer**, ehemals Japan-Zentrum, Philipps-Universität Marburg; Agricola in Japan.

- Prof. **Erhard Rosner**, Sinologie, Ostasiatisches Seminar, Universität Göttingen; mining and medical history in China.
- Prof. **Dominic Sachsenmaier**, Göttingen University, East Asian Studies, Göttingen; East-West contacts during the late Ming and history of globalisation (SGCRP Mobility Program).
- Dr. **Matthias Schemmel**, Max Planck Institute for the History of Science, Berlin; research on *Qiqi tushuo*.
- **Jonas Schmid**, MA, Institut für Sinologie, China-Schul-Akademie, Universität Heidelberg; research on the *Huogong qieyao* 火攻擊要 (Essentials of Gunpowder Warfare; 1643), written by Adam Schall von Bell and his Chinese collaborator Jiao Xu (SGCRP Mobility Program).
- Prof. **Claudia von Collani**, Würzburg University, Faculty for Catholic Theology, Würzburg; history of the Jesuit China Mission, research on Schall von Bell, participation of project members in a collection of articles about Schall von Bell edited by von Collani.

6.5 COOPERATING RESEARCHERS ABROAD

We also collaborate, or intend to do so, with numerous individual researchers and/or institutions abroad. Unfortunately, these activities were interrupted by the pandemic and thus could not be further developed for the time being.

Also here we distinguish between *Project and Translation Collaborators* and *Associated Researchers*, the first category being scholars who will work closely with us on certain topics related directly to the KYGZ and the TXSF, participate in the translation work and provide us with advice in other content matters, the second being colleagues who work on topics and themes related to our project in a wider sense. Some of them also participate in the **SGCRP Sino-German Mobility Program** (see App. 27).

Project and Translation Collaborators

- Prof. **Beatriz Puente-Ballesteros**, Faculty of Social Sciences, Department of History, East-West Interactions and Exchanges, University of Macau, “Translating Western Anatomy to Late Ming China: Convergences and Divergences in the Light of the *Taixi renshuo shuogai* 泰西人身說概 (An Outline of the Human Body from the Occident; 1643),” three-year project (2018-2021) at University of Macau.

Associated Researchers

- Dr. **Chen Xinyu** 陈欣雨, Beijing Administrative College, Department of Philosophy and Culture, Beijing; research on the Jesuit Bouvet and his *Yijing* studies, history of the Jesuit Chala (Zhalan) cemetery (SGCRP Mobility Program).
- Dr. **Chen Zhihui** 陈志辉, Inner Mongolia Normal University, Institute for the History of Science and Technology, Hohhot; history of mathematics and astronomy of late imperial China and relevant East-West exchange during that period (SGCRP Mobility Program).
- Prof. **Karel Davids**, Vrije Universiteit Amsterdam, Faculty of Humanities and the School of Business and Economics, Economic and Social History, Amsterdam; global history, maritime history, and history of technology.
- Prof. **Chris Evans**, University of South Wales, *et al.*: collaboration with Dr. Cao Jin within the framework of a panel taking place at the World Economic History Conference (WEHC) in Boston, Mass. (July/August 2018), during which Dr. Cao lectured on the global role of silver in the 17th century and the KYGZ.
- Dr. **Noël Golvers**, Sinology, Faculty of Arts, University of Leuven, and Ferdinand Verbiest Institute, Leuven; history of the Jesuit China Mission, especially transmission of European books and knowledge to China.
- Prof. **Han Qi** 韩琦, Chinese Academy of Sciences, Institute for the History of Natural Sciences, Beijing; history of Jesuit China Mission and knowledge transfer between West and East in late imperial and early republican China (SGCRP Mobility Program).

- Prof. **Roger Hart** (to be contacted = tbc), College of Liberal Arts & Behavioral Sciences, History Faculty, Texas Southern University, Houston; history of West-East contacts in mathematics during the late Ming, especially with regard to Ricci and Xu Guangqi.
- Prof. **Hsu Kuang-tai** 徐光台, History of Science and Technology, National Tsing Hua University, Hsinchu, Taiwan; Aristotelian natural philosophy during the late Ming period, research on TXSF.
- Dr. **Huang Xing** 黄兴, Institute for the History of Natural Sciences, CAS, Department of History of Science and Technology in Pre-Modern China, Beijing; history of Chinese metallurgy (SGCRP Mobility Program).
- Dr. **Alexander Jost**, Salzburg University, Department of History, Salzburg; Chinese mining history and history of Chinese science and technology; close collaborator of our project as being responsible for tracing the origin of information in the KYGZ.
- Prof. **Kim Yung Sik** (tbc), Department of Asian History, Seoul National University; research on natural philosophy in China since the Song period, research on *Qiqi tushuo*.
- Dr. **Albert Koenig**, The University of Hong Kong, Department of Civil Engineering, Hong Kong; introduction of hydraulic water lifting devices to China during the Ming and Qing period, role of the TXSF for the Archimedean screw pump.
- Dr. **Li Mingyang** 李明洋, Institute for the History of Natural Sciences, CAS, Department of History of Science and Technology in the West, Beijing; technology transfer and science communication between China and Europe during late Qing and early republican period (SGCRP Mobility Program).
- Prof. **Lü Lingfeng** 吕凌峰, University of Science and Technology of China, History of Science, Hefei; history of Chinese astronomy and influence of Western astronomy in late imperial China (SGCRP Mobility Program).
- Prof. **Thierry Meynard** 梅谦立, Sun Yat-sen University, Philosophy, Guangzhou; philosophical exchange between China and the West, influence of Aristotelian thought and natural philosophy in late imperial China (SGCRP Mobility Program).
- Prof. **Shang Zhicong** 尚智丛, University of Chinese Academy of Sciences, Philosophy, Beijing; history of natural philosophy in late imperial China, research on influence of Aristotelian theories in China and especially on Verbiest's *Qiongli xue* (SGCRP Mobility Program).
- Prof. **Shi Yunli** 石云里, University of Science and Technology of China, School of Humanities and Social Sciences, Department of History of Science, Hefei; history of Chinese astronomy and scientific exchange between Europe and China in late imperial China, research on TXSF (SGCRP Mobility Program).
- Prof. **Mario Oronzo Spedicato**, Modern History, University of Salento, Lecce; research on Sabatino de Ursis (workshop and joint book project with Kink on the role of de Ursis in the Jesuit China Mission).
- Prof. **Sun Chengsheng** 孙承晟, Institute for the History of Natural Sciences, CAS, Department of History of Science and Technology in the West, Beijing; history of thought, natural philosophy and Sino-European contacts in science and technology in late imperial China (SGCRP Mobility Program).
- Prof. **Tang Kaijian** 汤开建, Ji'nan University, Institute of Chinese Culture and Ancient History, Guangzhou; history of Macau, research on Jesuit China Mission, edition of complete collection of Schall von Bell's Chinese treatises, edition of entries about Ricci and other missionaries in Chinese works (SGCRP Mobility Program).
- Prof. **Tian Miao** 田淼, Institute for the History of Natural Sciences, CAS, Department of History of Science and Technology in the West, Beijing; history of Chinese mathematics as well as exchange of mathematical and mechanical knowledge between Europe and China in late Imperial China; research on *Qiqi tushuo* (SGCRP Mobility Program).
- Prof. **Antoni Ucerler**, S.J., Ricci Institute, San Francisco; research on Chinese Christian books in 17th-century Japan, invitation and generous support for research visit of Dr. Cao

Jin in August 2019 (see report in App. 31), return visit by Prof. Ucerler in Tübingen in Febr. 2019.

- Dr. **Wang Xiaofei** 王晓斐, Laboratoire SPHERE, CNRS, Paris, IHNS, CAS, Beijing; Jesuit scientific practices in Europe and China (SGCRP Mobility Program).
- Dr. **Yang Lijuan** 杨丽娟, Chinese Academy of Sciences, Institute for the History of Natural Sciences, Beijing; transmission of the history of geology to late Qing China (SGCRP Mobility Program).
- Prof. **Yin Xiaodong** 尹晓冬, Capital Normal University, Physics, Beijing; history of fire weapons in late imperial China and relevant exchange between Europe and China during the late imperial period (SGCRP Mobility Program).
- Prof. **Zhang Baichun** 张柏春, Institute for the History of Natural Sciences, CAS, Center for Comparative Studies, Beijing; history of Chinese machines and technology, exchange of mechanical knowledge between Europe and China, studies on TXSF and the *Qiqi tushuo*, main collaborator on the Chinese side in the SGCRP Mobility Program.
- Prof. **Zhang Qiong**, Department of History, Wake Forest University, Winston-Salem, North Carolina; research on Jesuit China Mission, transfer and reception of European knowledge during the late Ming period.
- Dr. **Zhao Daying** 赵大莹, National Library of China, Section of Rare Books in Foreign Languages, Beijing; history of European books in libraries of the Jesuit China Mission, research on history of DRM in China (SGCRP Mobility Program).
- Dr. **Zheng Cheng** 郑诚, Institute for the History of Natural Sciences, CAS, Department of History of Science and Technology in the West, Beijing; history of military technology and fire weapons in late Ming China and relevant exchange between Europe and China during the late imperial period, research on Li Zhizao (SGCRP Mobility Program).
- Dr. **Zhou Wenli** 周文丽, Institute for the History of Natural Sciences, CAS, History of Science and Technology in Pre-Modern China, Beijing; history of mining and metallurgy in premodern China (SGCRP Mobility Program).
- Prof. **Thomas Zimmer** 司马涛, Tongji University, Research Center for Chinese-German Social and Cultural Exchange, Shanghai; history of the premodern Chinese novel and travel literature, research on interaction and epistemology in the transfer of knowledge between Europe and China during the late Ming period (SGCRP Mobility Program).

6.6 COLLABORATION WITH RESEARCHERS WITHIN THE PAST THREE YEARS

On invitation by Prof. Michael Lackner and Prof. Klaus Herbers the applicant was a Fellow at the International Consortium for Research in the Humanities "Fate, Freedom and Prognostication: Strategies for Coping with the Future in East Asia and Europe," University Erlangen-Nürnberg, Oct. 2019-Febr. 2020.

For collaborations within the project see under 6.4 and 6.5.

6.10 OTHER SUBMISSIONS

This application for an additional 12-month period of support has not been submitted to any other foundation.

In 2019 we successfully applied for a three-year Sino-German Mobility Program (2020-2022) with the Sino-German Center for Research Promotion (SGCRP). See also under 1.1.2 and App. 27 & 28.

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