Book of Abstracts

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Content

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II. 11:10 – 12:50

P14: Knowledge Transfer between Europe and Ming-Qing China – Technology

"Strong Liquid" from the Western Ocean: Introduction, Manufacture and Applications of Nitric Acid in Ming-Qing China

Jin CAO

Aqua fortis or qiangshui 强水 ("strong liquid"), which is nitric acid, was first introduced to China by the Jesuits at multiple instances during the Ming and Qing dynasties. Xu Guangqi (1562-1633) was the first Chinese to record related knowledge from his communication with Matteo Ricci (1552-1610), later Johann Adam Schall von Bell (1591-1666), Joachim Bouvet (1656-1730) and Matteo Ripa (1682-1746) independently described the substance to the Chinese and treated production methods together with its different applications such as separating and assaying of gold and silver, etching copperplates for printing and manufacturing of thermometers. This paper concentrates on newly discovered historical materials, mainly from the Kunyu gezhi 坤輿格致 (Investigations of the Earth's Interior) by Schall von Bell and his Chinese collaborators but also from the Kaicheng jiyao 開成紀要 (Record of Essentials of Inception and Completion) by Xu Guangqi. The passages relevant to the production and applications of "strong liquid" are analysed, especially with regard to the origins of the European knowledge and their perception in China. Additionally, the case of producing and using nitric acid in China is employed as an example for a formerly unavailable and unknown man-made substance with a complex production process involving rare, often likewise unavailable materials such as glass and different mineral agents. Questions relating to translation, terminology and the finding of alternatives and replacements are consequently included into the discussion as well.

Gauging Qi: Introducing the European Thermometer into the Kangxi Court

Qijin HAN

Jesuit employment of Western objects, books and knowledge was one of the pronounced strategies for promoting a top-down evangelisation in their China mission. However, facing a society with a dissimilar and intricate cosmology of its own, the Jesuits had to sophisticatedly select and deal with the Western scientific and technological knowledge they were to translate in order to make it comprehensible, acceptable, and even fashionable for the Chinese elites. This is clearly shown by the process of introducing the European thermometer into the court of the Manchu emperor Kangxi (1654-1722). By examining two relevant Jesuit attempts taken place during the Kangxi reign (1662-1722), this micro-historical research will allow a better understanding of the patterns and dynamics of Sino-Western knowledge

exchange in the era of early modern globalisation.

Rescuing the People from these Disasters: Proposals from the Taixi shuifa 泰西水法 (Hydromethods of the Great West; 1612)

Sabine KINK

The Taixi shuifa, composed by the Chinese scholar-official Xu Guangqi 徐光啓 and the Italian Jesuit Sabatino de Ursis, is a joint East-Western publication on water-related scientific, medical, and technological topics, the latter targeted at supporting China's vital agriculture. Due to recurrent floodings and droughts, this sector had increasingly come under pressure towards the end of the Ming dynasty. The Taixi shuifa can thus be seen as a scholarly attempt to improve through the introduction of Western technologies usable for small-scale water supply or drainage the deteriorating situation of the farmers, especially in the arid northern parts of the country. The treatise initially enjoyed quite some academic popularity in China, whereas the intended practical benefit for rural crisis management was quite disappointing in the longer run. Starting out from its difficulties to convey technical contents by means of the written word, this paper explores the Taixi shuifa's proposals for improvement and identifies some of the reasons for the lack of implementation on site.

Huogong qieyao and the Jesuit Involvement in Military Matters during Late Ming Times

Jonas SCHMID

In 1643, one year before the fall of the Ming dynasty, the German Jesuit Adam Schall von Bell (湯若望, 1591-1666) and his Chinese collaborator Jiao Xu (焦勗) finished their work on the "Essentials of Gunpowder Warfare" (Huogong qieyao 火攻挈要), a comprehensive account of the process of manufacturing, storing and using gunpowder weapons small and large. How come that Jesuits–among others Schall von Bell–were so deeply involved in manufacturing gunpowder weapons? This paper traces how–with the help of Chinese friends or supporters of the Jesuits–after the 1620s the Jesuits alleged and real knowledge on artillery and gunpowder weaponry ensured the good standing of the Jesuits in China and how Schall von Bell's work on the Huogong qieyao implicitly refers to earlier discussions and works among the Jesuits and their Chinese collaborators on military affairs.

Medicinal Drug & Knowledge Transfer between Spanish America and 18-Century China

Angela SCHOTTENHAMMER

Connections between China and the new Spanish colonies in America are known for an exchange of silver for silks and porcelains. Botanical substances used as medicinals, however, also played an important role in these global transfers, as did 'Western' medicinal knowledge. Myroxylon balsamum (L.) Harms var. pereirae (Royle) Harms, Copaifera officinalis L., two botanical balsams, Cinchona officinalis or 'Peruvian bark', so-called 'bas di liyo' 巴斯第略 ('pastilles'), Zea mays. L., that is maize, or even Theobroma cacao L. ('cokola' or chocolate) and other substances are some of these botanica. My paper will mainly concentrate on balsams, maize, and quinine, and introduce how these substances were used as medicines in China. At the same time, it will look into cross-cultural exchange of medicinal knowledge.

Scientific Instruments as Ritual Objects: A Case Study of Huangchao liqi tushi

Chengsheng SUN

The compilation of Huangchao liqi tushi (皇朝礼器图式, Illustrated Regulations for Ceremonial Paraphernalia of the Qing Dynasty) was an important event of the ritual system in the Qing Dynasty. The ritual objects in the book are divided into six categories: sacrificial utensils 祭器, scientific instruments 仪器, costumes 冠服, musical instruments 乐器, imperial insignia 卤簿, and weapons 武备, altogether more than 1,300 illustrations. Being regarded as following the ancient tradition and for granting the seasons and compiling the calendar, scientific instruments were for the first time included as a category of ritual objects in the history of Chinese rituals. Of all the 50 scientific instruments listed in Huangchao liqi tushi, Western-style instruments account for 47 items. This reflected the ideology of "Chinese Origins of Western Learning" and the "tribute system" mentality at the time. Using Qing archives, literary collections, and other related sources, this paper will first sort out the compilation and various editions of Huangchao liqi tushi, then explore the selection and drawing process of the scientific instruments in preparing the work, and finally analyze the transformation of Western learning from late Ming dynasty to middle Qing period based on this case study.

Political-cultural Shaping of An Equatorial Armillary Sphere: Jiheng fuchen yi

Baichun ZHANG

From 1629 to the 1820s, some of the European Jesuits in China served at official astronomical institutions of the Ming and Qing dynasties, even was appointed as director for the Imperial Bureau of Astronomy, and presided over such works as enacting the calendar and constructing equipment. On November 30, 1744, Emperor Qianlong of the Qing dynasty inspected the Observatory of Peking and visited the six instruments designed and built under the leadership of the Belgian missionary Ferdinand Verbiest from 1669 to 1674. The emperor deemed that the armillary sphere was in conformity with the Chinese tradition, and that the European instruments were superior in graduation and observation, but structurally inconsistent with pre-modern devices. In December 1744, catering to the intention of Emperor Qianlong, a prince and others made a plea to him for constructing a new instrument. In May 1745, the prince emphasized the requirement that the construction be undertaken under discussion of all things related with such Jesuits as Ignatius Kögler and his assistant Ferdinand Avguštin Hallerstein. By January 1754, they finished a large instrument, which was installed at the Observatory of Peking. Emperor Qianlong designated this equatorial armillary sphere as Jiheng fuchen yi, underlying that it followed the "new method" of Ferdinand Verbiest's instruments by reference to the structure of traditional Chinese armillary spheres. As a practical observation device, not only did it represent the emperor's political will, but also showcased the "hybrid" of Sino-European cultures.

Nine-section Bronze Cannon in Eighteenth-Century China

Cheng ZHENG

The "nine-section bronze cannon" was the latest and most complex ordnance in eighteenth-century Qing arsenal. Being a screw-assembled gun, the bronze barrel could be dismounted into nine sections with a separate iron chamber. The design was suitable for long distance transportation and mountain warfare. Investigating Qing archive and other rare materials, this research explores the history of the unusual weapon. From 1732 to 1733, the

Guangdong governor produced the first set of thirty pieces and sent them to Yongzheng Emperor in Beijing. Eight of them were immediately transferred to the front of Dzungar-Qing war in the northwest. These guns were also used in the Jinchuan and Myanmar campaigns (1748-1749 and 1768-1770) in the southwest, while new ones were manufactured in Sichuan. Most nine-section guns belonged to the Han artillery battalion of the Eight Banners in Beijing, and took part in the annual fire drill until the mid-nineteenth century. They only disappeared in China after the Eight-Nation Alliance occupied Beijing in 1900, when some of them became war trophy. Although no surviving piece could be located today, based on the structural drawings in 1841 and a photo in the 1930s, we can reconstruct the details of the exquisite cannon. The screw as a mechanical system was unknown to Chinese artisans until the sixteenth century, and not widely used before the late nineteenth century. The unique eighteenth century Chinese gun might be inspired by the screw-assembled guns from Europe or Mughal India in the fifteenth and sixteenth century.

IP33: Issues in Public Health

Rethinking the complexities and entanglements of Straits Chinese communities in colonial Singapore: discourses and advertisements of opium consumption and detoxification, circa 1830s-1930s

Jean Tzu-Yin CHOU

This research on the social history of medicine explores the internal complexities of Straits Chinese societies and the shift of 'discourse powers' among elite Chinese in the Straits-Settlements-period Singapore on opium selling and consumption, opium prohibition, and medication-assisted treatment (MAT) for opium detoxification, c. 1830s-1930s, with particular reference to the 1930s.

Very few have studied the newspaper advertising strategies used in MATs for opium detoxification and the social meanings of advertisements in colonial Singapore. The existing literature on opium-related themes focuses instead on tax-farming systems in British port cities; opium prohibition across countries and empires; the International Opium Commission; the opium prohibition in relation to Chinese nationalism in late-Qing China; and anti-opium movements and the anti-opium societies in the Straits. Existing scholarship has somewhat disregarded that Chinese merchants in colonial Singapore were involved in MATs and OTC for opium detoxification, failing to explain the complicated internal relationship of the Strait-Settlements' Chinese elites regarding opium-consuming themes.

This paper divides into three periods. The first period is c. 1830s-late1900s, when Chinese opium merchants ran opium divans under the 'Tax-Farming System' and the second is the 1920s, after the establishment of the Government Monopolies Department. The third period is in the 1930s when OTC drugs for opium detoxification became popular among the Chinese public in Singapore. Drawing on evidence from a series of Straits Settlements Ordinances, extracts from Journal of the Straits Medical Association (first published in 1904), and newspapers such as Lat Pau (first published in 1881), Nanyang Siang Pau (first published in 1923), and Singapore Free Press (first published in 1835), this paper scrutinises the changes grounds for opium-related issues in colonial Singapore.

In detail, with the primary sources selected and with case studies on Cheang Sam Teo, Chen Su Lan, Lim Boon Keng, and Yeh Chih Yun, this research first

delineates the shifts of ‘discourse powers' among the Straits Chinese in relation to opium-consumption issues. Second, to demonstrate the medical knowledge circulation and transmission in colonial Singapore, this paper dedicatedly explains how the understanding of the negative impacts to opium consumption was shared by the Straits Chinese intellectuals and transmitted to the public. With the above two dimensions, this paper ultimately generates a historical account for the complexities and entanglements of the Straits Chinese in colonial Singapore regarding opium-related themes.

The International Training of Dr. Yang Chongrui, Renowned Public Health and Maternal Health Specialist in Republican China

Mirela V DAVID

This paper uncovers transnational medical cooperation to create public health in China by following the international training of Dr Yang Chongrui. I sketch Yang’s formation as a public health and maternal specialist of international calibre and the foremost national expert in Republican China motivated to solve the dire crisis of high infant and maternal mortality rates. The details of Yang’s Euro-American study tour attest to how she encountered important elements for eugenic public health: hygiene, VD control, lectures on ‘the mentally defective’, puericulture, facilities for syphilitic children, prisons, and hospitals for indigent women. Yang’s interaction with Andrija Štampar who arranged her global tours sponsored by League of Nations Health Organization was also formative in terms of her eugenic beliefs. If her early career was influenced by her postgraduate training in some of the most prestigious American, western, and northern European public health institutions, a decade later when she was trying to build a national network of maternal and infant health and extend her achievements at the First National Midwifery School (FNMS) at a national level and introduce midwives in rural areas, she sought further inspiration from other Asian countries as well as from eastern European countries.

As Assistant in Hygiene and Public Health at Peking Union Medical College Yang was tasked to take over the clinics at the Health Station and develop midwifery around Peking. Groomed by Grant, Yang later became director of the Maternal and Infant Health Department in the Nationalist Government and helped establish maternities nationally. Yang worked as technical expert to the National Maternity and Child Service helping to determine local needs for midwives in Yutian, Nanjing, Tangshan, Hangzhou, and Shanghai. Moreover, Yang drew up plans for rural maternity services in Jiangsu province. Yang also advised James Yen on maternal and infant health for his famous project of mass education from Ding Xian.

Training of Chinese physicians at international hygiene institutions also exposed them to eugenic and social hygiene ideology. Yang’s itineraries that trace her training in Europe and the US also explain how she came to integrate eugenics, birth control and social hygiene in her work on maternal and infant health in China. This study uses documents containing medical tours and Chinese doctors’ reports of their European travels at the League of Nations archive in Geneva as well as Fellowship cards, medical tours, correspondence, and grant applications from The Rockefeller foundation.

Discontinuity and Coherence of the Public Health Practices in China Carried out by the Rockefeller Foundation in 1910s-1920s: From the project of Hookworm Disease Control to the Public Health Education

Yexin LIU

In 1917, the Rockefeller Foundation (RF) began to carry out public health activities in China, but only two years later, its way to develop public health in China shifted dramatically. By using amounts of source materials preserved at the Rockefeller Archive Centre, this paper aims to clarify why and how the RF's public health practice in China shifted from the hookworm disease control to the public health education. By exploring those questions, this paper reveals that the idea to shift the way of public health practice in China, is taken shape particularly in the practice of hookworm disease control. As many challenges and cultural conflicts originated from the hookworm disease project in China, it made the RF to rethink a much more suitable and effective way to carry on its public health program in China, which then made the RF put much of its strength on public health education since 1921. Furthermore, this paper also detects that, in the decision-making process in this shift, multiple actors in the RF participated, with collaborations and tensions. Thus, this paper argues that it is the specific socio-cultural context in China, as well as the various concerns by the Foundation, that make the route of public health practice in China mshifted, and make the approach of public health work in China distinct from those that being taken elsewhere in the world by the RF. Moreover, the paper emphasizes that although the RF has made many changes to the public health work in China, its essential strategy has remained the same, i.e., to build links and collaborations with the local government authorities to develop public health.

P11: Military and Early Modern Entanglement Crisis

Warcraft in the Chinese Littoral: Gong Zhenlin's Experimentation with Gun Casting During the First Opium War (1839-1842)

Sau-yi FONG

The First Opium War triggered an unprecedented military crisis for the Qing empire along the southeastern China coast. To tackle British naval assaults, the Qing mobilized local militias and shored up armament production to strengthen the empire's maritime defense in Guangdong and Zhejiang, the two coastal provinces most threatened by British invasion. This paper examines how China's mid-century maritime crisis kindled literati interest in both indigenous and foreign military technology, and how the Qing's military mobilization in the Chinese littoral generated a network of military technological exchange among provincial officials, local bureaucrats, and statecraft scholars. Focusing on the gun casting activities of Gong Zhenlin (1796-1861), a county magistrate in Zhejiang who participated actively in this network, this paper shows that the Qing's Opium War campaign created new conduits in the production and circulation of military technological knowledge. In particular, Gong Zhenlin collaborated with provincial governors, local scholar-officials, and military artisans to experiment with the new technique of using iron molds (vs. the old technique of sand molded casting) for casting guns while restudying late Ming military treatises. The record of Gong's experiments, titled Zhupao tiemo tushuo (Illustrated treatise on the use of iron molds for gun casting), documents how both textual and artisanal modes of knowledge production played significant roles in shaping the Qing's wartime pursuit of cost-effectiveness and predictability in armament production. After the war, Gong's treatise was circulated in China and beyond as part of the statecraft compilation Haiguo tuzhi (Illustrated Gazetteers on

Maritime States). This paper sheds light on the entanglement of warcraft and statecraft knowledge as well as of textual and material production driven by the military exigencies of the Opium War.

The Codification of Technical Knowledge in Korean Military Workshops, 1592–1635

Hyeok Hweon KANG

This paper examines how Chosŏn Koreans codified technical knowledge about military manufacture during and after the East Asian War of 1592–1598. During this period, there was an influx of new knowledge in the Korean military workshops due in part to the increased diversity and complexity of military technologies deployed, as well as to the incorporation of foreign practitioners such as Japanese prisoners of war and Chinese defectors into said workshops. In response, Korean artisans and practitioners drew on their rich tradition of "prototyping" (*kyŏnyang*) to translate, vet, and codify the new knowledge. I examine two materialities in particular—wheellock landmine and saltpeter. While other objects, like the matchlock musket, was not subject to codification (their knowledge was better left to the artisans alone to learn through bodily practices), these cases show that other forms of technological knowledge were. In fact, Korean works about these two technologies became studied and shared in abstract forms—and through new epistemic resources both visual (schematic drawing) and textual (*ŏnhae*, combining vernacular Korean and literary Chinese). I argue that rather than "art for appreciation" or "social documents," these early works aimed at substantive technical communication. And they subsequently transformed military technology as a form of literacy.

Fire Wagon against Barbarian Cavalry: Development of Military Wagons and tactics in 17~18th century Korea

Jay Jung LEE

The emergence and the expansion of Manchurian state in the early 17th century, culminating in the Ming-Qing transition, posed a significant military threat to contemporary Koreans. Despite having been subjugated to Qing hegemony following Qing invasion of Korea in 1636, Koreans nevertheless remained wary of potential Qing military threat and sought to counteract it. This paper shows how Korean efforts to develop weapons and tactics against Qing armies ushered in discussions and experiments involving both foreign and indigenous military knowledge. In the 17~18th century Korean military discourse regarding Qing threat, Qing cavalry proved to be the most menacing factor. And a new weapon was hailed as a valid countermeasure against cavalry: military wagons. Functioning as a platform for gunpowder weaponry and/or a deterrent to cavalry charge, military wagons were seen as a valid countermeasure against Qing cavalry. Koreans sought to adopt new weaponry through various sources of knowledge. Initially, Chinese military manual Lian Bing Shi Ji ("Practical arrangement of military training") compiled by Qi Jiguang was the primary source for acquiring military wagon tactics. Lian Bing Shi Ji however was not the only intellectual source for utilizing military wagons, as Koreans also drew inspiration from leather guns of European origin in the 17th century. Moreover, the discourse over military wagons led Koreans to rediscover indigenous weapon with centuries of tradition: Hwacha, or the Fire Wagon. Invented as man-drawn cart mounted with up to fifty barrels of handguns since the early 15th century, Fire Wagon was lauded by late 17th century Korean bureaucrats and

intellectuals as a potent weapon against Qing cavalry. From the 18th century, Koreans continued experimenting with various configurations of military wagons, ranging from modified Fire Wagon to new-fangled carriages with European cannons. Eventually the Fire Wagon emerged as the suitable candidate for large scale military production, as discussions in the 18th century royal court and publication of Korean military manuals suggest. Fire Wagon was hailed as a versatile weapon capable of unleashing substantial firepower while functioning as mobile barricades stopping cavalry charges. Thus, Koreans' efforts to react to Ming-Qing transition sparked discussions and experiments involving both conventional and foreign military knowledge, which ultimately brought resurgence of "traditional" ideas in the form of Fire Wagon.

Of Middle Period Geopolitics and Gunpowder Recipes in the Collected Essentials of Military Classics (Wujing zongyao 武經總要)

Benjamin A K SINVANY

Saltpeter, sulfur, and charcoal, the basic components of gunpowder, are found in relative proportions in gunpowder recipes across Eurasia from their first recording until well into the nineteenth century. This paper will focus on the context of the first recorded appearance of these three components in a military text as a recipe for a proto gunpowder and the crisis that precipitated their recording: the founding of the Xia dynasty 夏 (AD 1038-1227) by Li Yuanhao 李元昊 (r. AD 1038-1048). For the first four years of Song emperor Renzong's 仁宗 (r. AD 1010-1063) Qingli 慶歷 era (AD 1040-1048) the Song and the Xia were engaged in military conflict in what is today the Ordos region of China. One of the lasting results of this conflict was the compilation of the Collected Essentials of Military Classics (Wujing zongyao 武經總要, hereafter WJZY), a text of how-to-do military knowledge, troop formations, geographic information, divinatory statements, and historical strategies. This compendium of military knowledge, compiled under the supervision of Zeng Gongliang 曾公亮 an historiographer in the imperial library, included three distinct methods of making and using proto gunpowder (huo yao 火藥). This paper intends to build on previous analyses of these recipes by asking not only how the military crisis between the Song and the Xia inspired the compilation of this text and its particularities that differentiate it from other military and recipe texts, but also what can these three proto gunpowder recipes tell us tell us about the entanglements of embodied knowledge, geography, and military technology in East Asia during this period. This paper will first focus on the compilation of the WJZY during the military conflicts and political reforms of the Qingli era. Then, through a close reading of the three recipes for proto gunpowder themselves, their written style, and the tacit knowledge required to produce them, this paper intends to trace the entanglements of embodied knowledge, geographical knowledge, and military knowledge of East Asia these recipes exemplify. Finally, through comparison of the style and content of canonical texts of The Seven Military Classics 武經七書 codified later in the eleventh century, I will make a claim for why this text is unique and warrants further study.

P15: Materialities of Animal Drugs in Comparative Perspectives between China and Europe

The placenta: a human body part as drug in premodern China

Hsiu-Fen CHEN

For a long time, Chinese had applied the human body parts for medical treatments and ritual healings. Numerous evidences in relation to their collection, production and application can be found in pre-modern recipe books and materia medica. For example, the Compendium of Materia Medica (Bencao gangmu, 1596), the largest volume of its kind, illustrates thirty-five "human drugs" for treating illnesses and nourishing the body. They include human hair, beard, pubes, nails, teeth, saliva, tear, sweat, blood, milk, semen, menstrual blood, urine, stool, bone, flesh, gallbladder, and skull, etc. Of them, the placenta deserves attention for it perfectly displays Chinese ambiguous attitudes towards the uses of human body parts throughout the ages.

The placenta is a natural part of the human body associated with pregnancy and childbirth. It is often regarded as medical disposal nowadays. Yet, using the placenta as drug and nourishment had become popular since mediaeval China. In addition to curing illnesses and nourishing the body, some people also believed its efficacy in for producing children (esp. a son) and even prolonging life. This belief was reinforced by Daoist alchemy in which the placenta sometimes served as an ingredient of elixir. Eating the placenta later caught criticism from certain scholars and elite doctors, who viewed it as a barbarian custom referring to less civilised tribes. They instead advised that the placenta should be properly buried according to instructions of time and place. It was rooted in an old belief that the placenta is bound to the forthcoming fate of a newly born baby.

It is thus my attempt to disentangle Chinese complex towards the placenta as food, drug, panacea and dirt in the premodern times. The questions to be answered are as follow: what were the epistemology and cosmology of the placenta as a human body part as revealed in the medical discourses? How was it prepared into drugs and what was its "materiality" and "efficacy"? How did it draw the boundaries between "to eat" and "not to eat"? Last but not least, what kinds of ethical issues and moral concern were eating/consuming the placenta involved?

Between Medicine and Gift: An Ethnographic Study of a Transformative Medicinal Caterpillar Fungus (Ophiocordyceps sinensis) in Tibet

Siran LIANG

The wild medicinal mushroom Ophiocordyceps sinensis is a priced commodity in China where it is valued for its medicinal properties and as a high-value gift. This paper incorporates a two-month ethnographic study in 2018 in Shangri-La, Diqing Tibetan Autonomous Prefecture in Yunnan Province, China. I illustrate how caterpillar, fungus, Tibetan ecology, medicinal knowledge, Tibetan, Han Chinese, and Hui Muslim enacted a multispecies web across time and space. I first present an ethnographic account on how the precious medicinal caterpillar fungus enabled different forms of highland livelihoods. Second, in the changing constellation throughout the history, the meaning of Cordyceps shifts back and forth between medicine and gift. Third, noticing the new occurrence of 'Fresh Cordyceps', this paper argues that a full understanding of current transformation needs to take into account China's anticorruption campaigns, the rising importance of e-commerce infrastructures, and the biomedicalization of cordyceps through advancing biotechnologies.

Top-Grade Donkey-based Medicine: The Discourse on Ejiao in the Early Modern Chinese Materia Medica

Shihhsun LIU

Nearly all works of materia medica in China throughout the history have listed medicines derived from donkeys as low-grade medicines in the animal division, with the only exception of Ejiao, a donkey-hide gelatin, which has a category of its own and is recognized as top-grade medicine in the animal division because of its unique properties. Ejiao has been regarded as highly effective for blood enrichment in clinics and pharmacies in ethnic Chinese communities. Not only was the gelatin of tremendous importance to people in the ancient times, but it also continues to be used in the modern society. Ejiao was first conceived by boiling cowhides before the cowhide was replaced by donkey hide. Since the Song dynasty, manuals of materia medica, such as Bencao Yanyi (Augmented Materia Medica) by Kou Zongshi, have stressed that the hide of black donkeys is the most suitable material for Ejiao. However, according to the Bencao Xinbian (Newly Compiled Materia Medica) by medical writer Chen Shiduo in the late Ming and early Qing dynasties, the well water from Dong'e County, Shandong, and donkey hide are the real key for the gelatin, and the use of black donkey hide is not mandatory. This paper discusses the changes in raw materials for making Ejiao and the discrepancies between different texts in describing the gelatin in a historical context. The process in which cowhide was replaced by donkey hide as an ingredient is analyzed, and the roles of black donkey hide and the well water of Dong'e County in Ejiao manufacturing are examined. All of these involve the changes in the Ejiao manufacturing process and medicinal knowledge, along with the environmental discourse of the Ejiao's places of origin, the position of the Ejiao in traditional Chinese materia medica, and its relationship with the Nature and cosmology.

Preparing and using placenta in premodern Europe

Bettina R. WAHRIG

Among drugs of animal origin, premodern Europe's drug lore encompassed a considerable number of substances originating from the human body. Besides human skull or mummy, which could only be retrieved from corpses, almost everything that a living body would give off found mention in the treatises: hair, cut nails, and bodily excretions -- most prominently urine and faeces. Products of the reproductive body were important, too, and here, apart from male semen, women's milk was a well-known medicinal substance. Names for placenta in various European vernacular languages, like "after-birth", can be understood both in a temporal and in a numerical sense, just like the Latin translation "secundinae" (the second). The placenta plays a special role in the context of drugs of human origin: It comes from a living body, but it is neither an excretion nor does it compare to any of the inner organs. It plays a role both in rituals around birth-giving and in the preparation of highly valued medications.

Medical manuscripts from the Middles Ages onwards document its use in obstetrics. Placenta and its preparations were seen as effective in ending a birth or retrieving the after-birth. Popular obstetrical cultures provided knowledge about preparing medicinal substances from placenta, but also how and where to bury or keep placentas to safeguard the life and health of the newborn or the household.

The traditional way of preparing medicine from a freshly born placenta was to cleanse and carefully dry it, using moderate heat. Between the late 16th and 17th centuries, alchemical preparations using products of the human body gradually became more complex, and this process eventually took hold of the human placenta

as well. In the second half of the 17th century, the procedure of rotting and then distilling the placenta was first described by Johann Schröder and it was subsequently copied into many other treatises on materia medica.

It is the aim of this paper to better understand the intellectual and technical framework of this transition, but also to compare the practices with Chinese ways of preparing and using placentas in that time-span. Although we know of scientific exchange between the continents, specific knowledge transfer in this respect has not yet been verified. We are especially interested in comparing the introduction of alchemical methods and the persistance of certain rituals, which seem to have taken place in comparable time-spans.

P32: History of Water Resources, History of Oceanography and Maritime Trade Studies

From "empirical water management" to "system building"----An exploration of the development of modern water conservancy science and technology in China

Haijing LI

As a large agricultural country, China has made water conservation a fundamental part of its governance in different dynasties, thus forming the traditional Chinese concept of water management and the idea of 'harmony with nature, people and water'. In the 1920s, faced with the reality of frequent flooding in many rivers, educated people began to think about the development of hydaulic in China. Under the profound influence of the modern western Water Conservancy Science and Technology, China's water conservancy began the arduous transition from traditional empirical water management to the establishment of a modern water conservancy system, from the establishment of hydrologic education, specialized government administration and scientific research institutions to the creation of an academic community, China gradually established a professional and established modern water science and technology system. At the same time, this paper examines the team of early Chinese water specialist, analyses the intellectual and technological origins of modern Chinese water conservancy science and technology, and examines the interaction with the world in the construction of China's modern water conservancy system in a broader context.

Analysis of Coastline Changes and the Main Influencing Factors under Historical Perspective in Hangzhou Bay of China for about 200 years

Junbao HUANG

Analysis of Coastline Changes and the Main Influencing Factors under Historical Perspective in Hangzhou Bay of China for about 200 yearsHangzhou Bay is a typical trumpet-shaped estuarine bay in the world, the coastline changing is an important symbol of shore evolutionary dynamics, but the mechanism is very complicated. This paper adopts a novel approach combining coastline evolution and historical research to explore the main causes of coastline changes in Hangzhou Bay. Based on historical maps, we extract the coastline of Hangzhou Bay in typical years from 1840 to 2022 by human-computer interaction, realize the comparability of the coastline in different years through coordinate normalization measures, analyze the coastline length, rate of change, and area change by baseline method, then confirmed through historiography for special regional nodes and time nodes to scientifically propose the main influencing factors of

coastline changing. The results show that the north shore of Hangzhou Bay is shifting northward in the eastward extension, and the south shore is gradually siltation up northward with different rates in time and space; the coastline changing is mainly influenced by the natural influence of tides and incoming sand of Yangtze River, but the influence of human enclosure activities on the coastline of Hangzhou Bay is obviously intensified since the middle of 20th century. This study has important reference value for other bays or coastline variability studies in the world.

Historical investigation on the technology import and indigenous innovation of the three Gorges Hydropower Station in China

Zhihui ZHANG

The construction of the Three Gorges Project once faced the biggest challenges in the history of dam and hydropower construction. The technical system of the Three Gorges Project is a systematic project, and the 700,000-kilowatt water turbine unit is one of the key technologies that must be solved. The Three Gorges Corporation aims at the world's highest level, through the technology import, digestion, absorption, and innovation, creatively in accordance with the "technology trade, technology transfer, joint design, cooperative production" policy, not only in the import of the most advanced turbine equipment and design software, but also on the basis of China's original technology accumulation, China has gradually cultivated the design, manufacturing and installation capabilities of local hydraulic turbine manufacturers, and carried out relevant technological innovation. On the basis of reading archives and oral interviews, this paper examines the key historical facts in the process of technology import and independent innovation of the Three Gorges hydraulic turbine, and ponders on the inspiration of the Three Gorges hydraulic turbine to the independent innovation of China's manufacturing industry.

IP30: Scientific exchanges in the modern period

Learn from the Soviet Union, or Not? A Study of the Advanced Class of Breeding and Seed Production of Field Crops by Beijing Agricultural University, 1955-1957

Yichen TONG
Ziyi YE
Xingbo LUO

In 1955, F. M. Prutskov, an agronomist from the hometown of Michurin, USSR, was invited to Beijing Agricultural University (BAU) to hold the Advanced Class of Breeding and Seed Production of Field Crops for about two years by Chinese government, the aim of which is to propagandize Michurinism in China where the Morganian genetics was banned then. 20 teachers from various agricultural schools all over China, together with a professor as the class head, a TA and a translator from BAU, came to participate in the class, which was actually an alternative to a formal postgraduate education. According to the requests of the Department of Higher Education of China, Prutskov accomplished his work and received commendation from the principal of BAU in 1957, while the participants didn’t seem to exactly think like that. They found Prutskov’s teaching was unnecessary, impractical and inefficient, therefore studied Morganian genetics and other biological knowledges by themselves in the spare time, and invited some professors from and beyond BAU to hold lectures on more topics than Prutskov's lessons. Especially after the Qingdao Symposium of Genetics in 1956, which

rehabilitated the Morganian genetics under the policy of "Let a hundred schools of thought contend(百家争鸣)," they invited several "stubborn" Morganian professors, and started to publish papers on the topics banned before. However, after the outbreak of Anti-Rightist Campaign in 1957, some of the former participants were politically punished for opposing Michurinism and supporting Morganism. Thanks to their activities, the participants gained in-depth understanding about biology and genetics, so that many of them became deans of provincial agricultural schools or influential scientists later, such as Lu Yonggen(卢永根), principal of South China Agricultural University and academician of CAS. The history of the Advanced Class of Breeding and Seed Production of Field Crops also demonstrated the complex contexts of the development of genetics in the early years of PRC between international relations, domestic politics and individual efforts.

From "Small Fertilizer" to "Big Fertilizer"-A Study on the Introduction of West German Technology into China in the 1970s

Lixuan ZHENG
Li ZHANG

Shanxi Chemical Fertilizer Plant is a national important construction project of China's Sixth Five-Year Plan, with a total investment of 1.65 billion yuan. Construction started in 1983 and synthetic ammonia was produced in 1987. The project introduced the patented technology of crushed coal pressurization gasification of Germany Ruch Coal & Petroleum Technology Co. Together with the patented double-pressure nitric acid production plant of Grand Bahuas of France introduced by Toyo Engineering Company of Japan, and the patented technology of Norsk Hydro to produce nitric acid and phosphate fertilizer, it became the largest fertilizer plant in Asia at that time to produce nitric acid and phosphate fertilizer from coal, and was of great significance to increase food production and improve soil phosphorus and nitrogen imbalance in China.

This study takes the introduction of synthetic ammonia equipment from Germany's Ruch for the construction of the Shanxi fertilizer plant project organized by the Chinese government in the 1970s as an example, and focuses on the change of political awareness from "small fertilizer" to "big fertilizer" in the field of fertilizer construction after the deteriorated Sino-Soviet relations in the 1960s in New China. With the political mass movement with Chinese characteristics and the highly centralized planned economy and scientific research system unable to fundamentally meet the domestic demand for synthetic ammonia, the Chinese government's introduction of fertilizer from Western European countries shifted from imported materials to the technology of complete fertilizer plants, attempting to unveil that the process of technological learning and production leap from 1,000 tons of synthetic ammonia per year to 1,000 tons per day in the new China.

Reevaluating the role of Japanese students' supervisors in the West in 1870s: scientific books and instruments imported by Taizo Masaki

Yoshimi TAKUWA
Shingo HASHIMOTO

This presentation will analyze the role of Japanese students' supervisors in importing scientific books and instruments from the West to Japan in the 1870s. This study is based on a survey of remaining items and purchase records of old books and instruments still existing in Japan. In particular, we will focus on the purchase records of Taizo Masaki, a supervisor of

Japanese students in the UK. Although Masaki later served as the first president of the Tokyo Vocational School (now Tokyo Institute of Technology) from 1881 to 1890, he was better known as a diplomat, and his contributions to science education are less known. This presentation will clarify the background of Masaki's appointment as president of the Vocational School and his connections with the West.

This presentation is divided into two parts. The first part is an analysis of the work of Masaki as a Japanese students' supervisor. Masaki was a Meiji-era bureaucrat fluent in English and had previously studied chemistry at a university in London. He built up a network of contacts in British academia, interacting with university professors mainly in London and Edinburgh. While previous studies have been unclear about Masaki's activities in the UK, this presentation will focus on his contributions to the academic knowledge in the UK, particularly by sending books and laboratory equipment to Japan, as well as inviting foreign researchers to Japan.

The second part is an evaluation of the books and instruments purchased by Masaki. Of the scientific materials purchased by Masaki in the UK, the microscopes and books imported for the professional school in Osaka are now stored at Kyoto University. In particular, the microscopes purchased in 1880 are some of the oldest in Kyoto University's collection of scientific instruments, and are still in good condition when we use them now. It is an important historical evidence that shows how Japanese schools purchased educational materials during the period before private companies such as Shimadzu Corporation began selling imported scientific educational products on a large scale.

The above analysis on Masaki's work as Japanese students' supervisor shows that he had a diverse network of people and latest knowledge of educational materials, especially in the UK. These must have been key factors for Masaki's nomination as the first president of the Tokyo Vocational School when he had to go back to Japan in 1881.

IP13: Mathematical Traditions of East Asia (I)

The Zhusuan (Abacus) Culture in Edo Japan

Zelin XU

Under the influence of economic and trade ties and Chinese culture, Chinese zhusuan (abacus) culture spread and became popular in Japan during the Edo Period, which not only became a basic skill of Wasan (Japanese mathematics), but also an important part of Edo commercial culture and Machi culture. Based on Wasan books, sangaku which were open mathematical wooden plaques with painted decoration and hung on buildings like temples or schools, and other Japanese historical documents, this paper studied the Japanese absorption to Chinese zhusuan and the situation of localization, andanalyzed the Japanesization process and characteristics of pithy formulas of zhusuan, and a comparison was made between the calculation method of Janpanesezhusuan in the Edo eraand the calculation method of Chinese zhusuan in the Ming Dynasty, and the improvements made by the Japanese were explored.

Research on the Origin of Mei Wending's Extraction Method of the Root of Affected Square

Xintong YANG

Mei Wending's book titled Chou Suan (筹算) was a significant work of mathematics in the early Qing Dynasty in China, which had a profound impact on many later mathematicians. It was even introduced into the Forbidden City of the Qing Dynasty and affected the emperor Kangxi. The extraction method of the root of the affected square in this book has always been considered to be invented by Mei Wending. However, after researching, it is found that: (1) Mei Wending's extraction method of the root of the affected square is the inheritance and transformation of the written calculation method of extracting the affected square's root in mathematician Li Zhizao's book titled Tong Wen Suan Zhi (同文算指). (2) Mei Wending's modified method applies Napier's bones in multiple steps of the calculation process, making the calculation and number record of the intermediate steps easier. (3) The advantage of Mei's method is that it makes trial calculations and multiplication of large numbers more faster and convenient, without the need to record intermediate numbers. The disadvantage is that it has more calculation steps and the whole process becomes more complicated with the help of external tools Napier's bones.

Why was "Probability" translated into "Jueyi Mathematics" (决疑數學) in late Qing Dynasty?

Youjun WANG

Jueyi Mathematics was the first Chinese book on probability translated from a long article entitled Probability in Encyclopædia Britannica(1859,8th) written by Thomas Galloway (1796-1851). A British missionary John Fryer(傅蘭雅,1839-1928) and a Chinese scholar Hua Hengfang (華蘅芳, 1833-1902) accomplished the work cooperatively in 1880. In this book, the word "probability" was translated into Chinese term "决疑數學" (Jueyi Mathematics) meaning "mathematics on uncertainty". Why was "probability" translated into "Jueyi Mathematics" rather than other Chinese terms? The problem is worthy of further study because it relates to the translators' understanding the meanings & characteristics of Jueyi mathematics in ancient China and classical probability and also communicates between Jueyi mathematics and classical probability. In this paper, the problem would be studied from three aspects: the philosophical origin & casuistic characteristics of classical probability which Galloway's work owned, the ideas of "Jueyi" in ancient China, and the Chinese translations from the core concepts of western classical probability in late Qing Dynasty.

Probability as a fundamental philosophical notion could be traced back to some Greek philosophical schools and Cicero's philosophy & rhetoric tradition. Its meaning had undergone a complex evolution in western history. Especially in the late medieval period and early modern period, the combination of Casuistry, the case-oriented method of moral reasoning, and probabilism, the philosophical doctrine on conscience & reasonable choice of opinions, influenced significantly on the rise of mathematical probability in 17th century and the development & shaping of classical probability in the following two centuries. The philosophical origin and casuisticn characteristics of classical probability provided an inspiration to explore the ideas of probability in Chinese tradition. As a Chinese version of Galloway's article which was a typical classical probability essay, Jueyi Mathematics should be the most important text for the study. "Jueyi"（决疑）was a term widely existing in ancient Chinese

literatures, representing a method of probabilistic thinking in divination, game, Judgment and other activities. It had taken the meaning of treating uncertainty quantitatively from a pre-scientific method since the early period of Chinese history. The method had many similarities and coincidences with the philosophical and casuistic characteristics in western classical probability. The corresponding between some characteristics in western classical probability and the Jueyi method in ancient Chinese tradition was reflected in the earlier Chinese translations from the core concepts of western classical probability, especially in the fact that Galloway's "probability" was translated into "Jueyi Mathematics" (决疑數學).

P62: Circulation of Scientific and Technological Knowledge between East and West before the early 20th century

The first Latin translation of a Chinese annual calendar (La premi.re traduction en latin d'un calendrier annuel chinois)

Alain ARRAULT

The Biblioth.que nationale de France includes in its holdings what is probably the first Latin translation of a Chinese annual calendar. Dated 1768, the translation, a mixture of literal translation and various explanations, is presented in the form of handwritten sheets inserted directly into the calendar, page after page. Thanks to a letter inserted in this calendar, we know that the translator, Juan Rodriguez (1724-1785), an Augustinian monk living in the province of Guangdong, did this work at the request of Abb. Ren. Gallois (or Galloys, 1713-1772), who must have known the monk during his mission to China in 1767-1768, intended to collect plants sent to the island of France (Mauritius), a mission orchestrated by the famous Pierre Poivre (1719-1786). This translation work has remained unknown, although its first quality – propaedeutic – constitutes an excellent approach to the concrete content of a Chinese calendar, far from the cosmological speculations and astronomical experiments which were the favorite subjects of the Jesuits, throughout their presence in the Astronomical Office of the Manchu government. We shall see that this translation is not free of misunderstandings and errors, but it has the merit of highlighting the divinatory and hemerological nature of Chinese annual calendars.

Ancient Chinese Astronomy in Soviet Scholar and Popular Publications after 1949

Dimitri BAYUK

The end of the Civil war in China marked the end of the hesitation period in the international policy of the Soviet leadership towards the Chinese internal political struggle. The decisive turn was made in 1938. For 10 years, Stalin's government and the central committee of the communist party had consequently supported Mao Zedong's wing and paved his way to power.

But only the final establishment of the Maoist Communist Party of China as the sole ruling force in the country opened the door to massive publications about everything Chinese in the Soviet press. Ancient Chinese astronomy almost immediately found its place in the flow of the publications about China, Chinese history and Chinese culture, although it was never in the spotlight. Two factors of such auxiliary but constant interest can be distinguished. First, China's implicit invitation of to the Soviet nuclear programs indulged more intense attention of Chinese scientists to the space exploration. Second, the declared Marxist rationalism has always been offset by a penchant for beliefs in

supernatural forces and divinatory practices, such as oriental astrology.

The publications can be roughly classified as scientific and popular. Both types relied heavily on cooperation between Soviet and Chinese scholars and/or students. As an example of the first type, Elvira Berezkina's translation into Russian of the 九章算術 [The Nine Chapters on the Mathematical Art] is analyzed (the translation was published in 1957). As an example of the second type, one can cite an article by Zhu Kezheng published in the Priroda magazine in 1953. In the preface to her work, Berezkina acknowledged Professor Li Yan and Assistant Professor Zhou Song Yuan. The names of those who participated in the preparation of Zhu Kezheng's publication in Russian could not be found out.

Such cooperation was terminated after 1956, when a new wave of tensions arose in Sino-Russian relations. The disagreements were focused on the border delimitation issues that became sensitive as early as in 1689 and were definitely settled, as it was alleged, only in 2005.

Research on Metallurgical Translations during the Westernization Movement in the late Qing Dynasty -- "Baozang xingyan", "Yinkuang zhinan" and "Lianjin xinyu" as Case

Hao CHANG

The introduction of Western metallurgical technology, especially the knowledge of steelmaking and silver chaining, was one of the self-improvement policies of the Qing government. Steelmaking can be used to build ships to resist foreign powers and chain silver to increase national wealth. During this period, the most systematic introduction of metallurgical knowledge came from the translations of "Baozang xingyan", "Yinkuang zhinan" and "Lianjin xinyu" translated by the Jiangnan Arsenal. Under the current situation of foreign enemies, the Manchu Qing government wanted to develop a metallurgical technology that could surpass that of Western countries, so it translated some of the more important Western metallurgical books. By doing so, China has the opportunity to surpass the West or compete with the West in a short period of time. However, with almost no metallurgical knowledge, translating some relatively simple metallurgical books should be more suitable for Chinese people to absorb, but this will not be able to compete with Western countries. For example, the method of chaining silver in "Baozang xingyan" published in 1884 and the "Yinkuang zhinan" published in 1891 are two completely different methods. The former is a large investment, large production scale, complex and expensive equipment, complicated process and requires knowledge of chemistry and physics. Such a difference shows the difficulties faced by the Manchu Qing government in introducing Western metallurgical technology. The Manchu Qing government's ambitions naturally tended towards large-scale production. But the government has the intention but is powerless, so it has to settle for the next best thing and introduce some relatively simple knowledge. Under the conditions of no teachers, no students, no instruments, etc., no matter whether it is simple or more advanced books, these metallurgy textbooks from Western universities, or popular metallurgy books, the final result is the same. At the end of the Qing Dynasty, almost no one cared about them in China. These metallurgical books that have been translated with great effort and given a mission have been shelved.

The Sino-Indian exchanges seen through the images of the star gods of the 28 Lunar Mansions

Huichih CHUANG

Chinese has the beliefs about the star gods of the 28 Lunar Mansions since the Warring States Period. According to bamboo slips and unearthed images, these gods had the following characters in the Han Dynasty: 1. Each group image was combined with the star points and the image of the god. 2. Some of the constellations were the parts of the 4 mythological animals. 3.The ancient Chinese astronomy and astrology were classified as “Judicial Astrology” and “Medical Astrology” systems, the star gods had no effects to the common people. 4. They were worshiped by the government. With the decline of mural tombs, the changes of science and religions, these images disappeared after the middle of the 3th century.

Ancient Indian also had the star gods of the 27 (or 28) Lunar Mansions. There are many related records in Buddhist scriptures, but we can also fine the differences among them. After Buddhism was introduced to China, the ancient India astrology and astronomy theories came with it. The related images in China could be divided into 2 types. The first is "the images of the gods of the 5 stars and 28 Lunar Mansions ". In this type, the images were painted on papers or silks with the inscriptions about their names, temperaments, hobbies and etc. The second is“the dependents of Tejaprabhā Buddha”. They were painted on the silks or on the wall of grottos, they had no difference from the usual Buddha statues. The ancient India astrology also included the Horoscope Astrology system, it could be used to personal divinations, the images of the star gods could protect the believers. But we still want to ask: What are the other differences of the t images? How did the new beliefs replace the old traditions? From science to religions, what’s the effect of the process of dissemination? How many original elements disappeared along with it?

Staring from the images and literatures, this study would like to discuss about how the belief of the Indian star gods of the 27 Luner Mansions spread to China during the Han and Tang Dynasties. It would focus on the missing, reconstructed and merged elements. It would also discuss the using cases, different belief sects, and prevailing time from the images and related information, and think about how and how much were the astronomy and astrological traditions preserved from the ancient China.

Translation of western agronomic knowledge in Chinese agronomy publications

Yi-ting LAI

In the late 19th century, the Western Affairs Movement was in full swing in China, and intellectuals began to translate Western scientific texts related to agriculture into Chinese. Agriculture still played the key role in late Qing dynasty, and society lacked accurate knowledge of western agricultural equipment and mechanical tools; this background created the conditions for the emergence of publications on Western agronomy.

The Journal of Agricultural Sciences (Nong xue bao 農學報) was the first scientific periodical edition on agronomy, it contained numerous translations introducing Japanese, European and American knowledge of agricultural science. On the other side, intellectuals and agricultural experts tried to use the “modern” translated science to explain traditional agricultural knowledge in China.

This paper will explore the Journal of Agricultural Science as well as other agronomy publications of the 19th-20th centuries, and will discuss the idea of the combination of the Western scientific knowledge and Chinese traditional agricultural ideas.

How to translate a Western pharmacopeia? The understanding and strategy of Ranpō physician Hashimoto Soukichi

Tzu-Jung Lily WANG

Hashimoto Soukichi (1763-1836) was the first Ranpō physician (蘭方醫, also known as Rangakusha 蘭學者) who introduced the knowledge of chemia/ pharmacopeia from Europe and translated them into Rankanaigai Sanhouhouten 蘭科内外三法方典 (1804-1813) in Edo Japan. Sanhouhouten contains six volumes which consisted of various general and popular drugs, prescriptions, and remedies in the West. Hashimoto also identified some drugs or remedies that were related to the traditional Japanese Kanpō medicine. One might ask what if Hashimoto could not find any equivalent names of drugs or Kanpō prescriptions matching with the Western sources, and how did he adapt to the concept of Western pharmacopeia and try to translate this into Japanese? Not to mention transmitting different systems of medical and pharmacy knowledge requires comprehension and skill in languages and medicine. Therefore, this paper aims to examine and analyze Hashimoto's strategy in his Sanhouhouten. By doing so, I will compare the Sanhouhouten with its Western primary source Pharmacopoea Galeno-Chemico-Medica, Probatissimis Auctoribus Ratione et Experientia Fundata (1764), which was written and composed in Latin and Dutch by a Dutch physician named Wouter van Lis (1709-1784). Moreover, to find out what did Hashimoto understand Western chemia/pharmacopeia, and how did he assimilate and combine this knowledge with East Asian medicine to design the 'new or unique' names of drugs and prescriptions.

Congling, an Overlooked "Cosmic Mount" of East Asian Cartography: Traditional Chinese and East Asian Buddhist cosmographies in interaction

Wei Ting YANG

The most important mountain in Buddhist cosmology known to the wide audience and not only to the experts in Buddhist studies is Mount Sumeru. According to traditional Buddhist cosmology, the Sun, the Moon, diverse worlds, the four terrestrial continents and several mountains are all located around it. However, Buddhist texts contained references to some other outstanding mountains of the Jambudvīpa continent that also belonged to the group of selected landmarks determining the structure of the Buddhist world maps; one of such mountains is Congling (蔥嶺 or 葱嶺, literally "Onion Peak").

The Congling mountain is different from Mount Sumeru in several ways; for instance, there is no special description of this mountain in the Buddhist scriptures. But some Chinese sources, such as the Hanshu 漢書 (History of the [Former] Han dynasty) and the treatise Shuijingzhu 水經注 (Commentary on the Treatise on Rivers), mentioned "Congling" as one of Yellow River sources. Congling also appears on certain Chinese and Japanese Buddhist maps.

These sources suggest that Congling was one of important "cosmological" mountains in East Asian cosmography and geography. In my presentation I will pay special attention to Congling as one of major features of Japanese Buddhist maps.

(Mis-)Interpretation of Euclidean Logical Procedures in Matteo Ricci's and Xu Guangqi's Translation of the Elements

Alexei VOLKOV

In their translation of the Elements of Euclid Xu Guangqi 徐光啓 (1562–1633) and Matteo Ricci (1552–1610) published in 1607 under the title Jihe yuanben 幾何原本 faced certain difficulties when translating "proofs by contradiction". This particular method of logical inference based on Stoic logic and widely used in Western mathematical tradition was not known in China. This may have been the reason why whenever Ricci and Xu dealt with the proofs of this kind their translations were not correct. In my paper I will provide several examples of the proofs mistranslated by Ricci and Xu and discuss the ways in which the translators modified the original text of the treatise.

The Historical Intersection of Kaoju Xue and Science

Shu-Wei HSU

The relationship between kaoju xue (evidential scholarship) and science has been one of the controversies in Chinese academic history since the late Qing Dynasty. The emergence of this topic itself originated from the historical situation of intellectuals at that time, who were in favor of science under the Western impact and the political changes. Liang Qichao and Hu Shih were among the representative figures.

The definition of "science" will shape the views on this topic. Although both Liang and Hu regarded kaoju xue as science, their views of the scientific method were different, and their positions on the relationship between kaoju xue and the first eastward spread of Western learning were even more opposite. On the other hand, they both felt the incongruity between kaoju xue as a method and its academic achievements, mainly in the fields of classics and history. This is the reason for later researchers to question the view that kaoju xue is equivalent to science.

However, both sides of this topic agree on the empiricist-like features of kaoju xue, such as "seek truth from facts" and "without proof one can't believe it". Therefore, in this paper, we will first sort out the representative discourses around this topic and distinguish the imagination of science in different positions. Then, we will return to early modern Europe and China, where empirical science and kaoju xue emerged respectively, to outline the intellectual and cultural pursuit of "factual knowledge" in each historical contexts. Finally, we will take the empiricist Francis Bacon and the Ming dynasty kaoju xue scholar Fang Yizhi as examples, analyze their epistemological differences on reliable knowledge and its presentation in the study of nature. That will deepen our understanding of the intersection of kaoju xue and science in the modern East Asian history.

Yi Sang-Hyŏk's □尙爀 understanding and innovations about the Sino-Western algebraic method Jiegenfang 借根方 as seen in his Chagŭnbang Monggu 借根方蒙求 (1854)

Jia-Ming YING

Yi Sang- Hyŏk □尙爀 (1810-1883?) was an chungin 中人 mathematician in 19th-century Chosŏn Korea. The Sino-Western algebraic method Jiegenfang 借根方 (Borrowing Root and Powers) was transmitted into Korea around mid-18th century through the Qing Chinese compendium incorporating both Chinese and Western mathematics, the Yuzhi shuli jingyun 御製數理精蘊 (Essential Principles of Mathematics, Imperially Composed, 1723). Yi's Chagŭnbang Monggu 借根方蒙求 (Initiative Pursuit for the Method of Borrowing Root and Powers, 1854) was the first Korean treatise solely

devoted to Jiegenfang. Besides giving his explanations to basic calculation principles and his own organisation and solutions to many problems copied from the imperial compendium, Yi also presents in this treatise some original problems and a new way to express fractional results from polynomial divisions. Moreover, this treatise set in motion a series of Korean studies that compared Jiegenfang with a traditional East Asian algebraic method, Tianyuanshu 天元術 (Method of the Celestial Element).

P29: New Research on the Development of Ancient Materials in China

The adoption and innovation of iron production technologies in Central China

Kunlong CHEN

The extractive technology of iron is one of the most important technological innovations in human history, which gave a much wider population access to a cheap metal material with good mechanical strength, and greatly improved productivity of early societies. Originating in the Near East at around late 2nd millennium BC, the bloomery smelting technique, or the direct method, was widely adopted in the old world and remained the only method to smelt iron until late medieval time. However, in early central China, an alternative method to extract iron, namely the cast iron smelting technique, has been widely adopted since 6th -5th century BC. By applying a higher smelting temperature and stronger reducing condition, the iron can be reduced and alloyed with carbon in the cast iron smelting process, forming an iron-carbon alloy which can have a melting temperature below 1200 degrees, achievable by early smelting furnaces. Although current archaeological and experimental researches suggest the production of cast iron can also be achieved in bloomery smelting furnaces, the key technical elements to utilize such a hard and brittle material, namely the decarburization and malleableization methods, were exclusive to those craftsmen in Central China. With the annealing and fining (chaogang，炒钢) technique subsequently developed at 6th -5th century BC and 3rd century BC, a sophisticated iron production technological system has been gradually developed in Central China, able to produce a wide array of iron-carbon alloys with various mechanical strength, at different production cost. In this talk, by synthesizing the research work carried out in the past few decades, we present an updated development history of the iron production technologies in early Central China, while also attempted to understand the adoption of such a technological trajectory from both technical and socio-economical perspective.

Technical transition from bronze to brass in medieval North China, 10th-13th Century

Jianfeng CUI
Hongyan XIAO

With recent excavations in Xinli site (a royal sacrificial hall above a mausoleum, 10th -11th CE), Baomacheng Site (a royal temple, 12th CE) in Jilin Province, in Liaoning Province and Taizicheng Site (a royal summer palace,12th -13th CE) in Hebei Province, it is an opportunity to reflect on the “brass issues”, particularly the origination, localization, characteristics and social functions of Chinese cementation brass technology in the 11th -14th CE. Of the copper and copper-alloy objects found on sites, around 40% in Shenmiao Site, 60% in Xinli Site and more than 90% in Taizicheng Site are brass objects. It is a significant change because bronze was the dominant copper-alloy used in society

before the 11th CE. To figure out more information on those brass objects, some selected samples from these sites were analyzed using XRF, SEM-EDS, ICP-AES and MC-ICP-MS to investigate the production technology, chemical compositions and lead isotopes of the brass objects. The results show that these brass objects might have been made roughly at the same time using local cementation technology. The lead isotope results indicate that the copper or zinc used to produce brass most likely originated from local ores in Northeast China. These brass objects represent one of the earliest instances of brass made with cementation technology in China, and are different from imported brassware from the Western countries during 4th -9th CE. We believe that the diffusion and localization of cementation technology might have been the result of trade along the Silk Road and a crisis of tin shortage in northern China during the 10th -12th CE.

The characteristics and trading network of glass beads in Tarim Basin of Xinjiang in the Han and Jin dynasty

Dong WANG
Rui WEN

The ancient glass bead is a precious material that remains in human history. Although it is small in size, they are made of expensive materials and complicated technology, representing the advanced handicraft manufacturing technology and the most of the trendy aesthetic taste at that time. Based on archeological reports, we made statistics on ancient glass products in Xinjiang, the results shown that the early glass beads were mainly distributed along the Tianshan Mountains, during the Han and Jin dynasties, the core area of glass beads shifted to the Tarim Basin rim. In terms of function, glass beads in Xinjiang were mainly used as ornaments, with artifacts including necklaces, bracelets, chest chains, and earrings, which were mostly found in women's tombs, and were often used in combination with natural precious gemstone beads. In addition, we determined the chemical compositions and manufacturing technology of bodies and decorations of glass beads from three typical sites of the Tarim Basin rim: Bizili site, Shengjindian site and Yingpan site by using LA-ICP-AES, EDXRF, Raman Spectrometry, and SR-μCT. Based on these, combining data from other scholars, found that there are mainly five types glass in Xinjiang, including plant ash glass, natron glass, high potassium glass, lead barium glass, and mineral soda alumina glass. At the same time, this paper talks about the origin of different types glass by comparing with the characteristics of glass composition in other regions. Finally, this research discusses the reason why the core area of glass products distribution in Xinjiang shifted from Tianshan Mountain to the Tarim Basin rim by analyzing the experimental data and archaeological material and documents. In the second millennium B.C., beading culture was widespread in the Xinjiang region and owned acceptance widely among local people, which is the prerequisite for the emergence of glass beads in large numbers in the region. Secondly, numerous glassmaking and working shop around Xinjiang are necessary conditions that the Tarim Basin rim excavated many glass beads. After the strategy of the Han Empire to resist the Hun in the north and govern the regions in the west, the economic and political center of Xinjiang shifted southward with the establishment of the safeguard city in the western region, and the southern route of the Silk Road became prosperous as never before. The relatively stable trade environment was the

fundamental reason for the emergence of a large number of glass beads.

Development and application of silk micro trace detection technology based on immunology method

Yang ZHOU

Silk is a kind of protein material that is very susceptible to aging and degradation due to environmental influences. According to the unearthed state of silk relics, they can be divided into physical silk fabric, carbonized silk fabric, mineralized silk fabric and soil samples. Carbonized silk fabric, mineralized silk fabric and soil samples are difficult to identify by conventional methods. In view of this, China National Silk Museum has carried out joint research with Zhejiang University, Zhejiang University of Science and Technology and other universities, and proposed to use immunological methods to analyze and detect ancient silk fabrics. The immunological technique combines the sensitivity of enzymatic chemical reactions and the specificity of antigen-antibody reactions, which makes it a sensitive and specific detection method. Silk fabric has properties of protein. Taking silk fibroin in silk fiber as the research object, hydrolysate and characteristic amino acid sequence of silk fibroin were used as the molecular markers of silk protein. Polyclonal antibodies and monoclonal antibodies to silk protein were prepared by animal immunization to achieve the specific recognition of ancient silk fabrics. These antibodies can be directly used for the identification of silk species, and the detection limit can be up to nanogram level. Based on the preparation of silk specific antibody, the detection techniques of silk micro traces were developed, such as enzyme-linked immunoassay (ELISA), immunofluorescence assay (IFM) and electrochemical immunosensor. it provides a series of sensitive, specific and quick identification methods for the residues of silk. By using the above methods, the problem of identification of silk relics unearthed from more than 20 important sites at home and abroad has been solved systematically, and added a number of important archaeological evidence for the origin of silk and the spread of textile culture along the Silk Road.

Study of the Lacquering Materials and Techniques in Ancient China

Shuya WEI
Yingchun FU

Lacquerwares are the precious cultural relics in Asia, which play important role in the history of China. To study the materials and techniques used for making lacquerwares in different period of times is significant for people to understand the development and inheritance of the techniques. In this study, archaeological lacquerwares including lacquer wine sets, lacquer wooden sword, lacquer umbrella, lacquer screen etc. from Eastern Zhou to Qin and Han Dynasties (770BC-220AD) were studied. The techniques of Pyrolysis gas chromatography/ Mass spectrometry (Py-GC/MS) and Fourier Transform infrared spectroscopy (FTIR) were applied for the identification of the organic materials used in the lacquer objects, while Scanning Electron Microscopy And Energy Dispersive Spectrometry (SEM-EDS), Raman spectroscopy and X- Ray Diffraction (XRD) analyses were conducted for the characterization of the inorganic components. Especially Near infrared spectroscopy (NIR) combining with chemometrics, partial least squares (PLS) quantitative models was introduced into the quantitative analysis of oil to lacquer ratio in the ancient lacquer films. The results show not only urushiol （containing 3-pentadecyl catechol） but also Laccol

（containing 3-heptadecyl catechol ）were detected in different lacquerwares. Oils including perilla seed oil, linseed oil, sesame oil, mastic resin, rosin resin and blood were found additives, respectively. Different lacquering techniques such as Youshi (油饰 oil mixed with pigment to make pattern on the lacquer layer), the Yuanqi (垸漆)and the Caoqi (糙漆) craft were revealed in different period of times. It is worth noting that the use of bone ash in the ground layer and varies ground layer making techniques including ash mixed with lacquer, ash mixed with blood and ash mixed with oil were revealed. The study can definitely enrich people's understanding of the lacquering materials and craft in the past.

Study on the Preparation Technology of Mi’se Celadon Based on Experimental Archaeology

Junming WU
Yuexia SANG
Rixin SHAN
Naizhang ZHENG
Chao LEI
Jianming ZHENG

Mi’se celadon of Yue kiln has been a hot topic in the field of ceramics archaeology. In recent years, with the archaeological excavation of Housi’ao kiln site in Shanglin Lake, scientific studies have been applied to chemical composition, sintering technology, microstructure and coloration of Mi’se celadon, instead of literature survey on its origin and the difference in coloration between it and common celadons. However, relevant experimental verification research has not been systematically carried out. In this work, chemical composition and sintering temperature of Mi’se celadon were studied, by using refiring technique, scientific characterization technology and multivariate statistical method, in order to identify its sintering temperature, theoretical sintering temperature and coloration elements. Theoretical model with the chromaticity values of the celadon before refiring was established, with which the refired samples could be classified. As a result, the effect of sintering process and the porcelain saggar on chromaticity and coloration mechanism of Mi’se celadon can be verified. By means of energy dispersive X-ray fluorescence spectrometer (ED-XRF), thermal dilatometer and spectrophotometer, the common celadon and Mi'se celadon unearthed at the site of Housi’ao kiln in Shanglin Lake in Tang and Five Dynasties were systematically analyzed. The key technological parameters of the refiring of Mi'se celadon in the Yue kiln were determined. The refiring process experiment of Yue kiln Mi'se celadon was carried out, and by comparing the chromaticity results of the samples before and after refiring, the effects of saggar material and firing mode on the color of celadon were further verified, and the firing process and color mechanism of Yue kiln Mi'se color celadon were preliminarily proved. The results show that the main reason for the color difference between Mi'se celadon and common celadon during the Tang and Five Dynasties is not due to the difference in the content of the main coloring material Fe2O3, but mainly due to the unique firing technology of the mouth of porcelain saggar along the sealing glaze, that is, the mouth of porcelain saggar along the sealing glaze effectively overcomes the oxygen rich air from the outside into the interior saggar during the cooling process, and the glaze layer which is not completely solidified on the surface of the firing celadon inside the saggar produces secondary oxidation.

Unveiling the mystery of the ancient tea-bowl glaze: evidence for advanced manipulation in the creation of ε-Fe2O3 films in clay-based porcelain

Yong LEI
Ming GUAN
Ding MA
Yu GUO
Xiangjun WEI

In Song Period (960-1279 CE), long-term development of tea culture and continuous improvement of ceramic technology collectively contributed to the summit of black tea wares (particularly hare's fur cups). More fascinatingly, recent researches reported high-pure, micron-size ε-Fe2O3 film, was stabilized on ancient ceramic glaze but difficult to synthesize via modern chemistry, which has attracted special attention. In order to interpret the mysterious synthesis and coloration mechanism of ε-Fe2O3 produced in the high-fired, high-calcia, high-alumina silicate system, a strategy combined nano-material-science methods and theoretical calculation was firstly developed to investigate the ε-Fe2O3 in hare's fur glazes. A significant discovery is demonstrated that Al-doping played a crucial role in ε-Fe2O3 stabilization. Simultaneously, the complicated control of atmosphere and firing environment also led to different optical performance by controlling the metallic-like reflection effect resulted from distinct size-distributed and oriented ε-Fe2O3, refreshing and deepening the cognition of Chinese high-fired glaze. Hence, the explanation both in Al-doping from clay resource and the unfixed but flexible manipulation of firing technology in ancient China may effectively provide a revolutionary alternative synthetic approach for paving the road toward ε-Fe2O3 synthesis and application.

IP8: Epistemic Genre as Conceptual Tool in Chinese Medical History (I)

Ritual Healing Through Finger Sealing: Jue (訣) as techniques ("Tricks") and genre ("Tricks of the Trade") 7th-11th centuries

Marta HANSON

This paper focuses on the earliest Chinese evidence of ritual healing practices called "palm tricks" (zhangjue 掌訣) in the first half of China's Middle Period (800-1400). This term referred to hand-based rituals that associated meanings to different phalanges as if tabulated on the palm. They relate to earlier mudras or seals (yin 印) and ensigillation (shouyin 手印) that were used therapeutically. Therapeutic seals were objects often made of wood that were pressed or "printed" on patients' bodies or printed on paper for patients to ingest. Michael Strickmann first used ensigillation to designate the Buddho-Daoist form of exorcism that used healers' hands in rituals. Developing further upon Strickmann, Paul Copp called shouyin simply "hand seals" and historicized them as a new Buddhist-influenced Chinese religious practice. This paper examines the earliest medical-religious records of what was called "palm tricks" in some 7th-century medical and Buddhist texts. Furthermore, Constance Cook has argued that the second character in zhangjue, jue (tricks of the trade, mnemonic, formula, etc.), was already a genre distinction in the excavated text, Jingjue 荆决 (訣) (Tricks of Jing, ca. 2nd c. BCE). Building upon these scholars' insights, this paper addresses four questions: 1) When and within which genres did authors describe hand-based rituals? 2) how did "palm tricks" differ from "hand seals" (shouyin)? 3) In contrast to the better-known sub-genres - koujue 口訣 (oral jue) and gejue 歌訣 (sung jue) - what kind of "handy knowledge" did zhangjue tabulate and for what purposes? 4) when did jue refer not just to special techniques but to a distinct genre one could call "Tricks of the

Trade"? This paper thus emphasizes how the hand not only facilitated cognitive functions but also was integrated into ritual functions through "palm tricks" and how the term jue also function not only to designate special "tricks" - oral, sung, or in hand - but also a distinct genre in the first half of the Middle Period.

Travel Medicine along the Premodern Silk Road in the Perspective of Medical Landscape

Wei CHEN

In pre-modern times, travel was fraught with hazards and it was common to encounter illness in exotic places. Different medical traditions have suggested solutions to the symptoms and have aggregated knowledge to varying degrees. One of the ways in which knowledge is aggregated is in the form of daily medical texts which are designed to provide first aid in the absence of a specialist doctor. Such works are abundant in many medical traditions. Such works are abundant in many medical traditions. However, much of the content of everyday medicine is still aimed at home medicine. For travel purposes, there are more specialised works on travel medicine, which need to be examined in the context of their formation in the medical landscape. Today's travel medicine is a branch of medicine at the intersection of epidemiology, public health, geography, and preventive medicine, as are ancient writings on the subject, which incorporate not only knowledge of health care but also reflect a wealth of experience with climate, environment, and psychology. Travel medicine is as much about the flow of knowledge as it is about the convergence of knowledge. The way in which medical knowledge is assembled in different contexts both provides a knowledge landscape and integrates the landscape of the Silk Road travel encounter. This report intends to describe the interaction of knowledge with different pre-modern approaches to tourism using the knowledge landscape method, focusing on the travel medical treatises by Islamic physicians in the 9th century, such as Qusta ibn Luqa and al-Razi, and to make a preliminary comparison with related Chinese writings.

Ancient Canons vs. Contemporary Practices – Medical Practice in China during the Twelfth Century

Asaf GOLDSCHMIDT

Song dynasty China (960-1276 CE) was a period of major transformation. Some scholars claim that these transformations represent the Chinese "renaissance" signaling the dawn of modernity. During the eleventh century, printing technology became popular and the government sponsored printing and promulgating of a wide variety of literature, including medical canons. These printing projects made medical literature widely accessible to literati. Some of these newly printed medical canons were hundreds of years old not always compatible with existing clinical practices.

In this paper I will discuss the tension between existing 'proven' medical practice and the knowledge included in the newly printed and widely accessible for the first time medical canons. Using a medical case histories from various sources, I will discuss the extent to which physician applied the medical theories and practices of the canons when they treated patient in the clinical realm. In other words, I will ask did Chinese physicians during the twelfth century rely on their experience, which we may term as 'empirical knowledge', or did they defer to the written word of the canons?

In this paper I will show how physicians were at times ambivalent toward these medical canons. On the one hand, they used quotations from these medical canons

as means of establishing authoritative position when persuading members of the patient's family to choose their diagnosis and treatment suggestions over other physicians. But, on the other hand, when documenting their practice in their own records, they stated that the canons included mistakes, problems, and inconsistencies.

P21: The Cross-Action between Astral Science, Medicine and Divination in East Asia

Saturn and Melancholy in Chinese Astrology

Jeffrey KOTYK

Saturn in Hellenistic astrology is the planet of melancholy. We can observe identical themes associated with Saturn in Chinese astrology from the ninth century onward, following the introduction of horoscopy from abroad. Saturn effectively governs over depression, loneliness, and other mental conditions. In this way, astrologers attempted to predict the onset of such mental health problems based on the day of the week (e.g., Saturday) and the movement of Saturn relative to an individual's nativity (natal horoscope), but the extant literature also shows that they provided magical and even dietary measures to offset ill effects. The proposed paper will survey the association between melancholy and Saturn in Chinese astrological literature from the ninth to sixteenth centuries, demonstrating that astrologers attempted to explain and treat mental illness. This study will primarily examine five texts: Qiyao rangzai jue 七曜攘災決 (ninth century), Xingxue dacheng 星學大成 (sixteenth century), Lingtai jing 靈臺經 (ninth or tenth century), Chengxing lingtai biyao jing 秤星靈臺祕要經 (ninth or tenth century), and Kuyō hiryaku 九曜密曆 (eighth or ninth century).

Research on the Contraindication of Acupuncture and Moxibustion in the Almanacs of the Ming and Qing Dynasties

Shenmi SONG

Almanacs of the Ming Datong Calendar（大统历）and Qing Shi Xian Calendar（时宪历）record two kinds of Contraindications of Acupuncture and Moxibustion (zhenjiu jinji, 针灸禁忌). One is the item "contraindication of acupuncture due to where the human-Spirit stays in each day (zhuri renshen suozai buyi zhenjiu, 逐日人神所在不宜针灸)" of thirty days; and the other is the calendar notations of "not appropriate for acupuncture (buyi zhenci, 不宜针刺)" under some days, each of which was embodied in two kinds of forms in historical calendars. The former can be traced back to the almanacs in the first half of the ninth century, and the latter could be back to the excavated calendars of Eastern Han Dynasties. The two contraindications remained part of such content for a long period. The locations in the body where acupuncture was forbidden for thirty days mainly derive from the medical work The Thousand Golden Prescriptions for Emergence (Beiji qianjin yaofang, 备急千金要方), which might be further traced back to the medical works from around the time of the famous doctor Hua Tuo (华佗). And the notation "not appropriate for acupuncture" is just the spirits related to the terms "blood taboos (xueji, 血忌)" and "blood branches (xuezhi, 血支)", the meaning of which changed in calendars.

A preliminary study on the relationship between five-color & pulse diagnosis and five phases in unearthed medical manuscripts

Man GU

Color & pulse diagnosis is an important method based on the corresponding relationship between observing the complexion and diagnosing the pulse, to detect the disease at its onset, diagnose the location of the disease and judge the fatality of the disease. Its principles and applications are extensively recorded in the Huangdi Nei Jing. The excavation of the Maishu Shangjing in Tianhui medical manuscripts on bamboo slips allows us to see the important position, theoretical basis, and application methods of color & pulse diagnosis in the early TCM diagnosis and treatment system, especially the role of the five phases theory in the construction of color & pulse diagnosis theory. This lecture attempts to explore and analyze the relationship between the five-color & pulse diagnosis and the five phases in the unearthed medical manuscripts, and to re-examine and evaluate the long-contested issues in academic history, such as the precedence of the five phases' mutual restraint and mutual generation, as well as the difference of the five phases in current writing and ancient writing.

A Study the Phrase 'Sanjiu 三咎'in the Shiwen 十问 Manuscript from the Mawangdui 马王堆 Han Medical Manuscripts and 'Sanjiao 三焦'Essence and Function in TCM

Feng DU

In the Shiwen 十问 Manuscript from the Mawangdui 马王堆 Han Medical Manuscripts,'Wuzang 五藏'is juxtaposed with 'Sanjiu 三咎'. It follows from the above that 'Sanjiu 三咎'must be the parenchymal organ at least in the early Han Dynasty. Studies have shown that 'Sanjiu 三咎'should read 'Sanao 三奥'.'Ao 奥'refers to the southwestern corner in the rooms and it extends to the organ inside the body. 'Sanjiao 三焦'should read 'Sanao 三奥'in ancient period medical Canon and it must be the parenchymal organ. 'Sanjiao 三焦' is one of the 'Liufu 六腑'organs in 'Inner Canon of Yellow Emperor 黄帝内经', but in the later evolution process, the concept of 'Sanjiao 三焦' is gradually functional. The theory of 'Sanjiao 三焦' later thought it with name but without form. The causes are many and may directly connected to the breakthrough of ontology. During the period of Wei-jin, the metaphysical ontology experienced a multiple transformation process. Ancient medical book classics are of an era, the period of Wei-jin Dynasties has been regarded as a period of great significance in classicize new TCM.

P43: Historicizing the "Miracle": How to Explain the Development of Science, Technology, and Medicine in Modern Korea (with authors of "Science and Civilization in Korea" series)

Korean Engineer Lost in Between Elitism and Liberalism

Kyonghee HAN

When the Asian economic crisis, so called the IMF crisis, occurred in 1997, Korean engineers were furious. The seniority-based employment stability, which until then was barely being upheld, was greatly weakened. Following this, the social prestige and reputation of the profession of engineering began to decline, and there was a strong preference to and shift toward professionals in the medicine and law. At the time, Korea's elite engineers called this situation a science and engineering crisis, and found themselves in a state of disappointed and frustrated.

Now, more than 20 years later, many students preparing for the college entrance exam aspire to pursue majors in science and engineering. The reason for this is simple: the job prospects in these fields are better than those in the humanities and social sciences. However, when it comes to the social status of engineers, the elite engineers still maintain negative response and even show cynical one. They think that getting autonomy in their research work has not been assured and their claim for that is not being taken seriously. Additionally, they believe that their overall position in society as influential leaders, and the particular role in science and technology policy, is not clear and unstable.

Recently, expressions such as “jeongchi-gonghak (political- engineering)” and “beop- gisulja” (law- engineer) appear frequently in the Korean media. In the former political-engineering, the suffix engineering makes politics prescribed and determined without reconsideration and the later law-engineer is a metaphor of law enforcement of people related to law where the engineer implies workers doing their job without thoughts and heart so that the essence of law is heavily underminded. Taking such perspectives into consideration, it appears that the desired attempt of Korean engineers to become an elite or professional group that is respected and recognized by society has not been very successful. This also raises the fundamental question as to whether Korean engineers even have the appropriate capacities as responsible experts and leaders to lead the post-industrial era. This study targets to that question. This study aims to emphasize the fact that the success of the techno-national regime paradoxically became an obstacle to the struggle of Korean engineers in being recognized as autonomous experts and a responsible elite bureaucratic group. It is only through disengagement from this trajectory for success that Korean engineers will be able to succeed in exploring new paths for themselves.

Science, Technology, and Everyday Life in Modern South Korea

Tae-Ho KIM

Recent scholarship on the history of science, technology, and medicine (STM) in modern Korea has remarkably facilitated both in quantity and quality. Still, they usually focus on specific fields of STM or those of industry, and follow disciplinary narratives. Although this approach is helpful and much needed considering the current state of historiography of STM in modern Korea, it inevitably reveals some limitations, especially in that it often leads to histories following the perspectives of suppliers/producers of STM. However, modern STM has been "imported" to Korea while people were not familiar with its philosophical basis, most of Korean people have remained as consumers/users that have experienced the impact of modern STM in everyday life. Considering this historical context, researchers of the history of STM in modern Korea should note the gap between the perspectives of the suppliers/producers and consumers/users: the latter might not be as interested in the disciplinary approach as the former.

To fill this gap, this study aims to examine how modern STM has changed the daily lives of Koreans through various examples. Rather than following the existing classification of academic or industrial disciplines, this study focuses on the memories and everyday experiences of end-users. For example, rubber gloves and refrigerators may belong to different realm in terms of production, but can be grouped together in a space called "kitchen," from the perspective of users. Through this approach, this paper would attempt to find a framework to explain the history of modern

(South) Korea through lenses of science, technology, and medicine. The framework can be described as "the dialectic of expectation and possibility."

Achievements and the Limits of Civil Regulations on Science and Technology in Korea

Eunkyoung LEE

Korea achieved great achievements in both democracy and economic growth after the liberation in 1945. During the struggle for democracy, many social issues were given a lower priority than political issues. It was not until the late 1990s that Korean civil society began to tackle social problems in environment, welfare, labor, etc. Democratic decision making in science & technology policy was among them.

However, it was not easy for the civil activists to get into the science & technology issues for some reasons. First of all, science & technology has been regarded as the primary source for the national power and national competitiveness. Any critical ideas about science & technology have been likely misunderstood to hinder the national development. In addition, civil activists were said not to be qualified enough to make opinions in science & technology.

Many trials to put some regulations on science & technology resulted in lawmaking. The first was the Framework Act on Science & Technology enacted in 2001, which includes the article telling the government to do the Technology Assessment allowing citizens to participate in. That is the first clear statement of the participation of citizens in science & technology policy, although only in TA.

The second was the Bioethics and Safety Act, enacted in 2005. Bioethical concerns were widely raised when the human embryo cloning research was aggressively carried out in Korea by Dr. Hwang Woo-suk. The bioethical pressure from the civil society was strong enough for the government to organize a committee setting the guidelines for the act. Among the members of the committee were religious leaders, social scientists, representatives of civic groups as well as professional researchers. It was the first successful trial for civilians to regulate R&D which was promising for the national competitiveness.

Who were the activists to get into the social issues of science & technology in Korea where people have such strong belief in the power of science & technology for the national development? How did they persuade people and technocrats? What did technocrats and researchers do to be less affected in the R&D policy by the legislation? Answers to these questions can explain the achievements and limits of the social movement for democratic decision-making and civic regulation in science & technology in Korea.

III. 14:10 – 15:50

P56: Resilience during Crises in East Asia

TB epidemic in the Western Pacific region: the case of Japan (1960-1970)

Arnab CHAKRABORTY

The year 2021 was extremely significant for the Western Pacific region, particularly for studying the epidemic of Tuberculosis in the region. To facilitate its adoption, the Western Pacific Regional Framework to End TB, 2021-2030 was developed and endorsed by the seventy-two session of the WHO Regional Committee for the Western Pacific. The framework captures the diversity of TB epidemiology in the Region, ranging from low-burden countries that are on the verge of eliminating TB to countries with a very high TB burden. This paper will

examine the existence of TB in Japan between 1960- 1970s, and how the local policies helped reduce the spread of TB in that decade. Up to 1950, the infections and disease became entangled with the daily life of the local population impacting them in the daily lives, while there was a rapid decline of people with TB in the 1960s.

In assessing the role of TB control policies during the period under review, it will be examined how the situation in Japan could be compared to the overall nature of TB control in the Western Pacific region. This paper will focus on the WHO WPRO and how their directives specifically focused on the region were effective in establishing a clear strategy to counter the crises of TB. The policies were also co-dependent on the immigration policies of the countries, as TB was detected most among the migrant population coming to the country. This provides a unique dilemma faced by the countries in this region where they could not alter their immigration policies since they were dependent on the migrants coming from outside to help build the countries. This paper will also briefly compare the policies to control TB in the context of the Western Pacific Region with South Asia which was also TB-prone.

The first non-opium 'opioid crisis': Why was morphine abused in late Qing and early Republican China?

Yun HUANG

The generalised opium smoking in Late Qing and early Republican China could be termed as the first 'opioid crisis', and later, the wide misuse of morphine, a drug refined from opium, was the first non-opium 'opioid crisis' in modern China. This paper explores the underlying reasons for the emergence of morphine abuse and how it engulfed the Late Qing and early Republican China. It argues that several factors contributed to the spread of morphine misuse in this period. Those factors are the advocacy of medical missionaries, the business expansion of western pharmaceutical companies in China, the anti-opium movements of the Chinese authorities and the rising anti-opium discourse. This non-opium 'opioid crisis' continued onto the early Republican era, mainly because of the resilience of the illicit drug economy, the poor public health system that was aggravated by lack of medicine, and the inefficiency of the governance of the early Republican China authorities. This paper suggests the importance of studying the complexity of the drug history in modern China and the necessity of exploring more about the history of psychoactive substances beyond opium. It shows how a public health crisis – the first non-opium 'opioid crisis', began in China and responses of the Chinese governments. This paper also situates this crisis in the context of the worldwide crisis of psychoactive substances abuse and the global initiatives of international control at the turn of the twentieth century.

“National Medicine” or “East Asian Medicine”? A Study of Cross-boundary Network of Medical Exchange in Wartime East Asia

Yun XIA

This article examines a network of cross-boundary exchange among Kampo physicians in Japan, colonial officials and doctors in Manchukuo, and traditional medical experts in China, and reflects on how such a network enriches our understanding of wartime collaboration, Asianism, as well as the modernization of traditional medicine in East Asia. It traces the development of the Kampo Revival movement in Japan and how it merged force with struggles for preserving Traditional Chinese Medicine (TCM). Despite the deteriorating Sino-Japanese relations, the

Chinese and the Japanese found a common cause in rejuvenating their shared medical tradition. Their collaboration laid important personnel as well as institutional foundation for postwar development of traditional medicine.

On a theoretical level, this study calls for a re-examination of Asianism, a pluralistic movement that was later notoriously associated with and overshadowed by Japanese expansionist policies. With an analysis of diverse expressions, institutional building and often conflicting individual agenda in the cause of reviving traditional medicine, the author shows the historical foundations of Asianism in the realm of traditional medicine and its unintended results. Secondly, the call to return to "classic formulas" offered an important yet hitherto neglected alternative to the prospect of traditional medicine, which has been predominated by theories of modernization and scientification. Thirdly, this study challenges the conventional wisdom on wartime collaboration. Subject of this article were "collaborators" on both sides, who shared a longer-term cultural and professional heritage and successfully transformed their relations into "friendly cooperation" highly promoted in post-war East Asia.

From Japanese Model to Soviet Ideology: The Transformation and Resilience of Chinese Acupuncture 1933-1958

Liang WAN

Traditional medicine has faced severe challenge from biomedicine in the broad areas of East Asia since the end of the nineteenth century. Indigenous practitioners appropriated various strategies to demonstrate, transform, and thus justify their knowledge and clinical experience. The now widely accepted concept of Traditional Chinese Medicine (TCM), including Chinese acupuncture, is a result of reconfiguration, or negotiation among various knowledge origins under specific contexts. Japanese acupuncturists initiated systematic transformation of acupuncture while facing the strong demand of "westernization" of the Meiji government from the end of the nineteenth century. Chinese physicians, not only acupuncture practitioners but also doctors in the Chinese Communist army, adopted the Japanese model to justify their practices. After the founding of PRC in 1949, acupuncture was updated according to the Soviet medicine. Pavlovianism, in particular, dominated the explanation of mechanism of acupuncture and allegedly justified a holistic view of body in Chinese traditional medical ideas. However, neither Japanese westernization nor Sovietisation exterminated previous knowledge of this treatment. Although Chinese practitioners redemonstrated the mechanism of acupuncture, traditional experience was, not without struggle, applied largely in clinical encounters. This partly explains Chinese physicians' rapid retracement to traditional theories in 1957 when the Chinese government began to promote "national heritage".

Creating State Secret: China, Cold War and Sharing of Epidemiological Data

Chen LU

China has always been criticized by other governments, international organizations, academic researchers, and media for accountability and transparency in epidemiological data sharing, no matter in the SARS in 2003, or the covid pandemic recently. The epidemiological statistics have been considered a state secret since the establishment of the People's Republic of China. The decision was a result of the lack of understanding of the value of sharing this information, the country's concern about the data to be used against the communist

regime, as well as the foreign policy shaped by the cold war. This paper aims to examine the historical, ideological, and political context that shaped the sharing of epidemiological data with the international community. How did epidemiological data become state secrete that is highly confidential? How has the foreign policy of China shaped its scientific exchange with international communities? What does it tell us about the Chinese government perceives the WHO and how the change of perceptions influenced its data-sharing activities with the organization? Through exploring the resistance to sharing epidemiological data and the restriction in scientific exchange, this paper contributes to the understanding of the ideological and political complexities that lead to China's reluctance of sharing epidemiological data with the WHO, as well as other countries and institutions in the recent past and present.

P41: The Body in Crisis: Power, Resistance, and Human Engineering in East Asia

Conscripting Blood: Military and Anti-Authoritarian Blood Donation in South Korea

Inga K. DIEDERICH

This paper examines the paradox of blood collection in South Korea's democratization movement as an instrument of state control over citizen's bodies, on the one hand, and an expression of democratic resistance to authoritarianism, on the other. Today, the bulk of South Korea's national blood reserve is drawn from soldiers and students. While both groups are considered donors, however, their donations are distinguished by conflicting political motivations. Military blood collection began under Yusin authoritarianism (1972-79), when the state cracked down on unregulated blood markets by drawing on its well-regulated supply of conscripts. By contrast, student blood donation is rooted in a tradition of altruistic medical activism in support of anti-state movements, notably in the organization of blood drives and framing of blood donation as a pro-nation, anti-authoritarian act in the 1980 Gwangju Uprising and contemporaneous democratization movement. This paper interrogates the historical development and legacies of these coexisting but politically-opposed systems of blood collection, which contribute to a shared national supply but represent divergent visions of the nation. In doing so, it expands upon histories of medicine that consider the economics of blood (as gift or commodity) rather than exploring the multiple and often-overlapping politics competing within a single "donor" system. The history of how South Korea's national blood store emerged from the intersection of state militarization and anti-state activism reveals the ways in which managing blood as a national property or community resource establishes claims upon the body politic by enacting politics through the body.

Minor Claims for Care: Centering Japanese American Hibakusha

Crystal K. UCHINO

Science has mapped the impacts of the atomic bombing of Hiroshima and Nagasaki in concentric circles, each ring representing a dose of radiation and a cluster of corresponding effects on survivors. This mapping has been the basis for much of the knowledge created about irradiated bodies as well as Japanese infrastructures of care that emerged in response to critiques of research without care approaches to survivors. At the same time minority bodies have mostly been excluded from the nation-based

infrastructures of care established in the decades that followed. This paper centers on the counter-memories of Japanese American hibakusha, who comprise the third largest demographic of atomic bomb victims, to interrogate the burdens they faced in their search for care. In particular it directs attention to how transpacific migrant claims for care came up against statist remembering of the atomic bomb as they reimagine an ethics of care beyond nation-based bodies.

Protection against Bodies: Governing Reproduction under the Eugenic Protection Law in Japan (1948–1996)

Sujin LEE

This presentation revisits the Eugenic Protection Law (yūsei hogo-hō, 1948–1996) through the lens of biopolitical rationality and its impacts on reproductive bodies. The Eugenic Protection Law enacted in postwar Japan aimed to prevent the "birth of inferior descendants" and protect the "life and health of mothers." Under this Law, more than 30 million induced abortions were performed during the period between 1949 and 1996, while approximately 16,000 people with allegedly hereditary diseases were subject to forced sterilizations and 60,000 women received forced abortions for eugenic reasons during the same period. This presentation brings attention to the politico-medical discourse of reproductive bodies as manifested in the Eugenic Protection Law to illuminate how bodies, especially, women's reproductive bodies were constituted as a site of government and technological intervention as well as a primary target of intersectional discrimination against racialized, gendered, and dehumanized objects. Biopolitical rationalities embedded in postwar Japan's administrative and medical practices reveal that the logic of protection sought for the preservation of the quality of the Japanese race instead of the protection of individual human rights. Furthermore, the Law's nationalist objective—which is deeply connected to racism—justified eugenic intervention into certain bodies, i.e., those were deemed "unworthy" of reproduction and whose present or even potential existence was deemed "undesirable" for the nation. To highlight continuing issues with the now-abolished law, this presentation concludes with a reflection on how the victims of forced sterilizations and abortion have challenged biopolitical subjectivity through reconstructing narratives of bodies.

"A Sea of Blood and Hatred": Persuading People to Hate Drug Criminals in China's Anti-Narcotics Campaign of 1949-1952

Thomas CHAN

This paper analyzes how the Chinese Communist Party (CCP) created and spread new forms of subjectivity and social belonging in the formative years of the People's Republic of China (1949-present). Specifically, it examines how the Chinese Communist Party (CCP) blended medical and emotional discourses to foster communal hatred of narcotics users and promote social cohesion. Drawing from Sara Ahmed's conceptualization of hatred as a way of producing and animating subjectivity, the paper argues that the CCP saw hatred as a key tool of unification and brought people together through hating and committing acts of emotional and physical violence against drug users and traffickers. Propaganda officers and police forces worked hard to persuade people to hate drug criminals, writing anti-narcotics songs, plays, and skits to make hating drug users and traffickers a fun and interesting activity for audiences. The paper underscores how the CCP encouraged mass participation in ostracizing and killing narcotics producers, consumers, and traffickers to spawn a

shared social hatred of them and how people responded to state efforts to incite hate. To conclude, the paper considers the unlikely agency of some accused drug criminals who resisted the tides of public and state pressure and challenged their accusers.

Standard Man of a Nuclear Family: Dosimetry, Racialized Irradiation and the Human

Sang Eun Eunice LEE

Tracing the afterlife of atomic bombs dropped on Hiroshima and Nagasaki, this paper explores the construction of the Standard Man through the imperial archive of racialized sufferings of hibakusha, or "person affected by a bomb," alongside poetic digestions of the bomb and its lasting impact on racialized bodies. The science of radiation dosimetry underwent a drastic change since 1945, from one focused on the medical and laboratory use of radiation to one of large-scale exposure based on wartime and experimental atomic bomb detonations. Alongside this scientific development of a fictional body, I situate poet April Naoko Heck's A Nuclear Family and its exploration of the lasting impact of the bomb across generations beyond the hibakusha populations, as she elucidates the effects of the bomb and radiation in the body, memory and life through her matrilineal history. Embedded in this lineage are physical digestions of the bomb, from irradiated foods to burnt etchings on the skin from the blast, to metaphorical digestions of the "nuclear family" as a modern conception of the normative family life. Bringing together the history of the science of radiation dosimetry with metaphorical digestions of atomic bombs, this paper situates the change in dosimetry, radiation "protection" and the development of the "Standard Man," in a poetic exploration of racialized violence of atomic bomb detonations and ensuing acute, chronic and generational radiation exposures in A Nuclear Family. In so doing, it underscores the role racialized marginality plays in solidifying the Human.

P40: (Re)Conceptualizing the Body Multiple in East Asian Medicines

Medicines for which Bodies, when? Feeding the Body Multiple

SJ ZANOLINI

A range of contingencies shaped late imperial Chinese diets: geography, ethnicity, household wealth, and individual status within the household. Personal health goals further shaped dietary discourse, with the Ming "bodies of generation and longevity" described by Charlotte Furth each giving rise to distinctive kinds of nutritional prescriptions and prohibitions. Ideas about cultivating spiritual refinement and physical longevity shaped food prohibitions among ordained and lay practitioners alike. Similarly, ideas about the distinctly gendered requirements of women's bodies (be they pregnant or simply of reproductive age) shaped the prescription of specific foods as drugs. By examining various textual prescriptions and prohibitions of several common food-medicines, including scallions, porridge, and mushrooms, this paper will illustrate the multiplicities of late imperial Chinese understandings of embodiment, health, and illness.

The limits of the Ming cosmological body

Leslie DE VRIES

In One Thread through Medicine (ca. 1617), Zhao Xianke (late Ming) famously argued that not the heart (⺗心) but the gate of vitality (命門) rules the body. Zhao radically revised hierarchies in the inner landscape of the body building on cosmological speculations, Three Teachings influences as well as therapeutic considerations. After

discussing specific entanglements of the one and the multiple in Zhao's vision of the body, I will show how his vision provoked conceptual challenges to the early Qing scholar Lü Liuliang (1629–1683). In a period of crisis after the fall of the Ming, Lü not only became one of the fiercest critics of the new regime, but also started practicing medicine in the style of Zhao Xianke. Based on Lü's intellectual engagement with Zhao's body in his annotated edition of One Thread through Medicine and his encounters with patients' bodies in his medical case records, I examine the legacy of the late Ming cosmological body in changed philosophical, political and clinical contexts.

The bodies of popular pharmacology

Nalini KIRK

Pharmaceutical recipes that were recorded and applied by medical practitioners lacking a background of extensive literary studies show distinctive characteristics with regard to composition, application, and effect. These recipes and their ingredients form a window to understanding the multiple bodies of popular pharmacology. This paper explores recipes from late Qing medical manuscripts and a small number of printed sources, to how bodies were imagined, treated, and enacted by pharmaceutical practice.

Korean Physicians Centering the Heart/Mind-the Body as agent of Confucian self-cultivation

James FLOWERS

In response to a wave of epidemics in eighteenth century Korea, court doctors as a group moved from a mostly Daoist conceptualization of the body to a mostly Confucian one. Inspired by Daoist texts from China as well as the Korean text, the Treasured Mirror Eastern Medicine, Korean doctors had previously understood the body as a location where a host of divinities performed roles such as digestion and reproduction while at the same time, playing a role in the emotional life of the body. The turn to conceptualizing a consciously Confucian body meant that doctors saw the body itself as an agent of ki that could, through self-cultivation, focusing on the heart/mind, then in turn exert agency on the world through the force of ki. In thinking of the body multiple, scholars of medicine in China have argued for the importance of religions such as Daoism and Buddhism. In this paper, I argue that physicians in Korea from the eighteenth century to the present-day continued to understand the body in terms of spiritual/religious agency in which Confucian ritual practice as well as the physical practice of performing mundane tasks in daily life contributed to both health and building a world of ki. Thus, for most Koreans, the heart/mind continued as the primary organ system in maintaining health of both the body and the world.

Restoring the broken body in Ming-Qing medicine for injuries (shang ke 傷科)

Yi-Li WU

This paper examines the medical category of "injuries from falling and striking" （dieda sunshang 跌打損傷) to show how models of bodily process were historically influenced by observations of injured bodies and particularly the observable changes in an injured body as it healed (or failed to heal). Using selected case studies from Ming and Qing medical texts, I show how doctors viewed bodily processes and bodily anatomy as inextricably intertwined. Physical damage to the body's structures caused channels of flow to be deformed and vital essences to be consumed and corrupted. Impairment of vital essences in turn would inhibit the regeneration of skin, flesh, and bone. Successful treatment required

doctors to simultaneously stabilize and restore damaged structures while reviving impaired or destabilized bodily processes.

Re-imagining Bodily Landscapes in 17th-century China

Volker SCHEID

Physicians in 17th-century China confronted a multitude of challenges to established conceptions of the body: devastating epidemics that failed to respond to existing therapeutic regimes, new humoral models of the body imported via the Jesuits but also Tibet, newly critical attitudes regarding the explanatory power of cosmological models of resonance, changing conceptions of the self and the power of emotions. In response, physicians in the Jiangzi river delta conceived new models of the body that focused on the body′s territorial landscape imagined through metaphors of geography and networked flows. These physicians drew their inspiration from new readings of ancient texts while simultaneously extending the range of meaningful sources on which they drew. They responded to the increased presence in everyday life of physical violence as much new possibilities for self-expression. My presentation will describe the emergence of these new bodily landscapes and explore how they were tied to each other but also to already existing bodies in the domains of medicine and healing.

P64: Ferdinand Verbiest (南懷仁 Nan Huairen), impact of Western knowledge as a framework for observing, understanding and predicting the Chinese Heaven

Ferdinand Verbiest's Armillary Sphere：Emperor Kang xi's Cosmic Model in the 17th Century

Nan ZHANG

In the Palace Museum, Beijing, there is a silver and gold-plated Ferdinand Verbiest's Armillary Sphere. This instrument is a fusion of the European two-sphere model of the universe and the Chinese Huntian model of the universe, and is actually a visualization of the European geocentric cosmic system by missionaries who were working in the Astronomical Bureau. The instrument was completed by Verbiest in June 1669 and presented to the Emperor Kangxi. This instrument presents Chinese characters, Manchu characters and European astronomical knowledge. This report will place the instrument in its historical context, examining how it was made and used, the functions it carried, and the impact it had. Most importantly, the exchange and integration of European, Chinese and Manchu cultures will be explored in this case.

The Emperor’s Astronomical Realia: Verbiest’s Introduction of the Planiglobe into China

Yunli SHI

In the Palace Museum in Beijing, there are two pieces of the so-called Jianping yi 简平仪 （Simplified Planar Instrument, literally) and one of them bears an inscription clearly indicating that the instrument was “imperially constructed in the mid-summer of the 20th year of Kangixi’s reign”(1681). Another piece of the same instrument can be found in the collection of Paris Observatory, which is inscribed as “imperially constructed in the early-summer of the 19th year of the Kangxi reign”(1680). The instrument is different from the device that Sabbatino de Ursis （1575-1620） described in his 1611 booklet Jianpingyi shuo 简平仪说 (An Explanation of the Simplified Planar Instrument), although both of them have the same Chinese name

and are based on the similar principle of planispheric projection. The instrument was designed by Ferdinand Verbiest after 1674 when he began to teach astronomy to the young Emperor Kangxi. Combining the functions of a celestial globe, a starmap and an astrolabe into a single body, the instrument is basically an adaptation of the planiglobe invented by Isaac Habrecht II (1589-1633) in his Planiglobium coeleste et terrestre (1628) and was used by Verbiest in his education of the Manchu emperor. The fact that Emperor Kangxi eventually had several copies of the instrument constructed in the name of the emperor is a clear indication of the influence that the instrument exerted on this special student in astronomy.

Calculating and Mapping the Disposition of Future Heavens: Ferdinand Verbiest's Weather Forecasting and Its Termination During the Qing Court (1669–1680)

Yejing GE

After the resurgence of Jesuit astronomy in 1669, Flemish Jesuit missionary Ferdinand Verbiest became the virtual head of the Astronomical Bureau in Qing, China. Following the actions of Italian priest Matteo Ricci and German astronomer Johann Adam Schall von Bell, Verbiest mainly focused on weather forecasting to substitute Chinese traditional astrology with European natural astrology, thereby disseminating the religious beliefs of the time via Western mathematical science. Meanwhile, a series of strategies were mobilized to boost the credibility of this craft, including claiming its technical superiority based on actual celestial positions and calculations, masking the uncertainties with "approximate agreement", and dedicating scientific instruments for a deep understanding. However, due to sudden political changes and Emperor Kangxi's criticism, Verbiest was forced to compromise on the public astrological discourse. Eventually, as the very speculative nature of his craft became apparent, the authorities declared the end of natural astrology and fully restored Chinese astrology. Verbiest's story broadens the current picture of the calendrical and astrological reforms led by Jesuit scientists in China and provides a wider framework to analyze the global spread of Jesuit science and belief.

Studying calendrical astronomy in a time of COVID, or 一麟半爪 [reconstructing] the mythical Lin beast from half a claw]

Christopher CULLEN

As part of a joint research project with Catherine Jami on Sino-European astronomical contacts in the early Qing dynasty (1644-1911), I have been investigating certain technical aspects of early modern mathematical calendrical astronomy – as practised by Western Jesuit missionaries following Tychonic models, and by their competitors and opponents who practised within the indigenous Han tradition, and the Muslim (Huihui) tradition as it had been established in China for several centuries. We have already published a number of joint articles on this topic, and our research continues. In this talk, I shall report on two examples of problems that we have encountered in dealing with the technical background of a number of conflicts involving the Jesuits and others during this period, both of which hinge on difficulties in accessing certain original documents that are known to exist but are not easily available in full, especially given travel difficulties and the closure of libraries and archives during the COVID pandemic.

One of these examples relates to the final conflict between the Jesuit astronomer Ferdinand Verbiest (1623-1688) and his Han and Muslim opponents in late 1668 to

early 1669, and the other relates to a conflict earlier in the dynasty, between the Jesuit Adam Schall von Bell (1592-1666, who had been given charge of the Astronomical Bureau Qin Tian Jian 欽天監 not long after the arrival of the Qing in Beijing) and a Muslim astronomer. In the first example it has been possible to reconstruct with some confidence the content of missing material by mathematical deduction from the contents of a fragmentary document. In the other case, less confidence can be reposed in such a process of reconstruction until it is possible to see certain hitherto inaccessible portions of the relevant document.

IP31: Scientific exchanges and transnational images

Supporting Science, Exporting Revolution: The Cuban Soil Institute and the Chinese Academy of Science 1960-1969

Li ZHANG
Yu LEI

In the 1960s, the shift in Chinese foreign policy aimed at exporting revolution was also expressed in a dramatic increase in science and technology aid to allied countries. Through the example of the assistance of the Chinese Academy of Sciences to the Cuban Soil Institute, this article reveals how a science and technology aid project sustained and realized a diplomatic and political mission in the context of the Cold War. With this in mind, it analyzes the many facets of China's foreign relations from top leaders to specific science and technology workers, and discusses the historical role of science and technology aid China’s revolutionary diplomacy.

Cuba was the first Latin American country to establish diplomatic relations with the People’s Republic of China in 1960 and was the only recipient of Chinese aid in the subsequent decade. Aid has always been an integral part of this foreign policy, an important tool to promote the development of Sino-foreign relations. A case in point is the aid provided by the Chinese Academy of Sciences to the Cuban Soil Institute, which was conceived after the success of the Cuban Revolution in 1960 and ended in 1969. At a time when few Chinese industrial project were being successfully launched, this scientific and technological assistance project had multiple ideological, political and diplomatic symbolic meanings.

On the basis of the above-mentioned multidisciplinary research, facilitated by the cooperative exchange between the Chinese and Cuban academies of sciences, this paper improves our historical understanding of the Cuban Soil Institute through the discovery of new historical materials and the reinterpretation of extant archives. It analyzes the implications of this historical event in three dimensions: the decisions and attitudes of the top leaders of China and Cuba, the different demands of the Chinese and Cuban academies of science, and the construction work of Chinese and Cuban scientists.

The paper points out that the aid to the Cuban Soil Institute was an effort with a political and diplomatic mission, but not without its scientific significance. Through a rigorous and systematic investigation of the geography of Cuban soils, Chinese scientists were able to recognize and study a soil very different from those of China for the first time, and to make many new academic insights. The future trends of its land resources and soil environment, and their impact on agriculture, were systematically discussed and summarized.

The Restart of the Alexander von Humboldt Foundation's Funding Program in China in the 1970s

Yinzhen ZHU
Weimin XIONG

In June 1978, Chinese communist leader Deng Xiaoping made a strategic decision to expand the dispatch of overseas students. In the next year, the Alexander von Humboldt Foundation, with which the People's Republic of China had been out of contact for many years, first sponsored thirty-two Chinese scholars to go to the Federal Republic of Germany for further studies. After returning to their homeland, most of these Humboldt scholars succeeded in their scientific research and became discipline leaders. Six of them were elected as academicians of the Chinese Academy of Sciences (CAS) or the Chinese Academy of Engineering (CAE), and many others took up leading positions in government agencies or research management institutions.

In 1972, China and Germany established diplomatic relations, whereas the first Humboldt scholars were sent seven years later. An intriguing historical theme is provided by the negotiations and changes during this period. The Humboldt Foundation sponsors scholars regardless of their areas, races, and nationalities. Under these principles, applicants from Taiwan have been treated openly by it, which, as a result, hampered its relationship with Mainland China. Besides, domestic factors including the Cultural Revolution, which kept China in a relatively closed situation, led Chinese scholars to have no way to publish their papers in journals overseas. Thus, scientists in Western Countries hardly knew anything about Chinese scholars and their progress. Meanwhile, financial concerns were one of the essential factors influencing the co-operations.

The process of cooperation in science and technology and the various official and private forces that broke through the conservative barriers of the Cultural Revolution are reviewed and summarized in this paper. Although improving formal diplomatic ties between countries was a requirement, private sector attempts, exchanges, and consultations were also significant. Chinese scholars, who had studied in Germany before the establishment of the People's Republic of China, played an essential role in the process. Also, this process offers more opportunities for enhancing scientific and technical contacts between China, Germany, and other Western Countries.

Chinese and European maps of the Far West (or East)

Harald GROPP

This paper will discuss how in the period of European expeditions conquering the world it was the cooperation of actors of different origins which contributed to the changed world view in the spirit of geography. After early activities of Portuguese and Spanish explorations it was the socalled circumnavigation of Magellan which further opened up the new geographical view of the world. The truth is that Magellan was murdered on the island of Mactan in 1521 and hence could not reach Europe again. Maybe the first circumnavigator was his slave Enrique, but the celebrated man who brought back only a few of the crew was the Basque Elkano.

However, this is just one side of the coin. There are two other aspects who have to be taken into account, i.e. the Far Eastern one (or the Chinese one) and, of course, the American one, i.e. the view of the peoples who were „discovered“ by Europeans.

First of all, it has to be clarified how the diplomatic and scientific exchange of knowledge between China and Europe was established between these two world regions. Were there mainly people like Marco Polo who traveled to the East? What about Chinese interest in and knowledge

about the West and travel activities as consequences? And, of course, the Indian Ocean and other seas in between, which intermediate roles did they play?

At the other edge of the Ocean Sea, the western one, the question is about American peoples involved in voyages along the coast of America.

Altogether it is the task to explain many maps which were produced in those centuries. We can put aside these questions, but it should be our challenge to address related problems and try to answer them.

In this sense some existing maps in comparison with our knowledge of European expeditions have to be confronted with existing and possible other ideas when and how these maps have been produced and what were the possible sources and roots of information. It is not so easy to get from an existing coastline and its surveying to a line on a map.

IP14: Mathematical Traditions of East Asia (II)

The development of the classical Chinese algebra of polynomials

Donald B. WAGNER

The square- and cube-root algorithms in the Jiuzhang suanshu 九章算術 (perhaps 1st century CE) were probably derived through geometric dissections, as Liu Hui 劉徽 (3rd century CE) writes in his commentary. One problem in the Jiuzhang requires the numerical solution of a quadratic equation, and that problem can be interpreted as an extension of the geometric interpretation of the square-root algorithm.

In the 7th century Wang Xiaotong 王孝通 in his Jigu suanjing 緝古算經 gives 18 problems that require the numerical solution of a cubic equation. He uses here the Chinese version of Horner's Method, which is an extension of the earlier root-extraction methods. In his discussions of the problems it becomes clear that he sees the arrangement of numbers on the counting board in the extraction of a root as what we would call an equation. It is a statement that certain operations applied to an unknown quantity result in a certain quantity. He uses ad hoc volume dissections to arrive at such a polynomial equation.

Mathematical texts from the Song and Yuan periods take this insight further and describe manipulations of 'polynomial equations' to arrive at solutions of geometric problems in much the same way that we would solve them. Zhu Shijie 朱世傑 in his Siyuan yujian 四元玉鑑 (1303 CE) extends the system to problems with up to four unknowns. No more is seen of this algebra of polynomials after the Yuan period until the revival of the classical mathematical tradition in the 19th century under the influence of Western mathematics.

The mathematics of the Jiuzhang, Liu Hui, and Wang Xiaotong was definitely 'applied mathematics', used in astronomy, public works planning, taxation, and other fields. The later developments are more difficult to categorize. Some of the methods were definitely used in astronomy and public works, but many problems in Song and Yuan mathematical works may reasonably be classified as 'pure' or 'recreational' mathematics.

It is difficult to explain the disappearance of the algebra of polynomials after the Yuan. The introduction of the abacus may be part of the explanation, together with revised administrative practices in public works. It may also be that 'pure mathematicians' had developed the system as far as it could go without a radical paradigm change, and therefore turned to other interests.

The Mathematical Study of Arima Yoriyuki

Yasufumi TAKEMASA

Japanese mathematics in the Edo period, or wasan, basically started with the mathematical achievements of Seki Takakazu (? –1708) which were further developed by his students and followers. Their mathematical theories and methods were later compiled by the mathematician and Kurume-domain lord Arima Yoriyuki (1714–1783) in his Shūki-sanpō. Arima wrote more than 30 mathematical treatises, of which the Shūki-sanpō was his main work and only published book. It contained various mathematical topics, such as equations, progressions, indeterminate equations, and measurements. It also explained the calculational technique called "tenzan", which had been known only to Seki's followers. Its publication allowed many other mathematicians to learn mathematical techniques hitherto unknown to them.

After briefly explaining Arima's life and the contents of his main work, the present paper will attempt to indicate the possible sources of Arima's mathematical works and outline the characteristics of his mathematical study. To do so, I will look at contemporary mathematicians and Arima's treatises.

Two mathematicians influenced Arima. One was Yamaji Nushizumi (1704–1773). Arima stated in some prefaces of his treatises that Yamaji was his teacher. They exchanged their treatises, so Arima might have acquired the achievements of Seki and his followers from Yamaji. The other was Irie Shūkei (1699–1773) who was employed as a retainer of the Kurume domain in 1749. A close comparison of Irie's and Arima's writings shows their exchange of mathematical information, through which Arima likely learned mathematical techniques from Irie. Thus, Arima had multiple sources of mathematical knowledge.

Yamaji and Irie both had expertise in astronomical and calendrical studies. After participating in the calendrical reform project in the Hōreki era, Yamaji was appointed the Shogunate's official astronomer in 1764. Irie annotated the Chinese astronomical treatise, the Tianjing huowen. Irie further thought that mathematics and astronomy should complement each other. In contrast, Arima seemed to show no interest in astronomy. Although Arima studied the kinds of mathematical techniques that could apply to astronomical calculation, such as the interpolation method, he composed neither astronomical nor calendrical treatises. Arima's mathematical studies did not enter into the field of astronomy. It seems that Arima did not intend to study mathematics for the sake of practical goals; he apparently studied it primarily as a hobby of his life.

IP9: Epistemic Genre as Conceptual Tool in Chinese Medical History (II)

Standardization vs. multiplicity of medical recipe compositions – a computational reconstruction of the genealogy of TCM recipes

Joachim PRACKWIESER

Standardization of medical recipes plays an important role in present day Traditional Chinese Medicine (TCM) research as part of an effort to promote TCM as a reliable medicine in China and worldwide. To this end, not only necessary quality and safety control standards of recipe ingredients are implemented, but also historically varying compositions of recipes need to be reduced to one standardized sequence of ingredients and dosages. This paper draws on the notion of recipes as an "epistemic genre" to look at recipes not just as a sequence of ingredients

but as vehicles of knowledge transmission. Recipes seen as a genre connect the rich past of Chinese medicine with modern day standardized TCM, thus representing continuity and change at once. By focusing specifically on established recipes in Chinese medical history that are still in use today, this paper will analyze how these recipes have changed in their composition over time through computational comparison. By grouping similar recipes through clustering algorithms, influences from lineages of medical thought as well as from different societal strata may become apparent. This computational approach is based on two only recently accessible datasets. The Polyglot Asian Medicine China corpus contains 392 digital editions of early medical printed texts from 200 CE to the Republican Era in the 20th century. While this dataset covers knowledge transmission within the official discourse, the second dataset represents the recipes collected and used in the local context. This Chinese Historical Healthcare Manuscripts corpus comprises 41,000 digitized and annotated medical recipes from 227 handwritten volumes of local/ rural physicians, itinerant doctors, family households, and medical students for their own use. By looking at what has been "lost" through standardization, an integral part of the recipes as epistemic genre can be recovered - its multiplicity. The tracing of changes in recipe composition over time and their clustering based on a large amount of data allows to review the selection processes leading to the standard recipe in modern TCM and may be a starting point to rethink strict standardization.

The Creation of Chinese Medicine's Basic Theory Textbooks in Maoist China

Shanshan GAO

In the early 20th century, the rise of scientism, nationalism, and socialism in China led to the transformation of Chinese medicine from a nonscientific practice to a scientific discipline. Chinese medicine was criticized by Peoples' Daily in 1954, saying: "the biggest weakness of Chinese medicine is its lack of a systematic scientific theory". This prompted Mao Zedong to launch a movement where Western medicine doctors should study Chinese medicine. This movement aimed to transform Chinese medicine into a scientific discipline by providing it with a scientific theoretical foundation through the creation of standardized textbooks. This paper investigates this creation from three perspectives: 1. the social background that led up to this creation; 2. the creation process itself; 3. the significance and implications of it.

The creation process involved three steps. Firstly, the standardization of Chinese medicine can be traced back to Neijing zhiyao, a popular Ming Dynasty medical booklet associated especially with the Jiangnan school. Secondly, in 1958, under the supervision of inheritors of the Jiangnan school, the first national Chinese medicine textbook, the Outline of Chinese Medicine, was produced. This textbook followed the structural framework of Neijing zhiyao and became the blueprint for subsequent Chinese medical textbooks. Finally, in 1960, contributors to the Outline of Chinese Medicine were reassigned to Beijing College of Chinese Medicine, where they created most of the standardized basic theory textbooks during the Cultural Revolution.

This study compared and analyzed 214 textbooks containing basic theories of Chinese medicine published in the PRC during 1949–2019. The findings showed that 41 of them shared the same cataloguing system as Neijing zhiyao, with an overall mean value of catalogue similarity between the 214 textbooks and Neijing zhiyao

amounting to 72.78%. This indicates that the Huangdi neijing was used as the basic theory of Chinese medicine with the structural framework of Neijing zhiyao. While this creation standardized Chinese medical theory, its reliance on classical texts still made it difficult to fully transform Chinese medicine into a scientific discipline.

Image-Form (tuxing) as didactic, epistemic, and predictive: Chen Shigong's empirical knowledge in Orthodoxy of External Medicine (Waike zhengzong, 1619)

Ruixuan DU

Representations of human body differ cross time and space, especially in medicine. This article focuses on the thirty-six images and the related texts from Waike Zhengzong (Orthodoxy Of External Medicine 外科正宗, 1617) by a Chinese physician Chen Shigong 陳實功 (1555-1636), who specialized in external medicine (waike 外科). Instead of ahistorically evaluating the images in terms of locations according to modern anatomy, I argue that Chen's depictions of the human body resonated with contemporary theories of the body. Chen stated a correlation between the internal and external of the human body, which was established through the flowing blood and qi. Based on a close analysis on the usage of the two terms Tu (image) and Xing (form) in the book, Chen's visualization of his theories and clinical experiences illustrates his perceptive of the body. His images, each containing a chart for diagnosis and a short text for observations and prognosis, were not only used as educational guide to the readers. More importantly, the images didactically visualized Chen's medical theory, functioned epistemologically to record his new clinical experiences, and were intended to aid readers in making prognoses.

P47: Transnational Flows of Scientific Knowledge Between Japan, Asia, Europe, and North America

Asian Women's Study at Japanese Medical Schools, 1900–1945

Hiro FUJIMOTO

In 1885, Ogino Ginko passed the national medical exam and became the first licensed woman doctor in Japan, but there were limited opportunities for Japanese women to study medicine by the late 19th century. In 1900, Yoshioka Yayoi established Tokyo Women's Medical School to educate women in medicine. In the following decades, more and more women wanted to become doctors and studied at Yoshioka's school or other women's medical schools.

The increasing opportunities for women to study medicine attracted not only Japanese women but also Asian women. While the Japanese Empire gradually expanded its territories to Asia, women from Taiwan, Korea, and China wanted to receive women's education in mainland Japan. These women were often interested in professions such as doctors, nurses, or teachers, and several Asian women studied medicine at Yoshioka's school or other medical schools. For example, Taiwanese woman Tsai Ah-hsin entered Yoshioka's school in 1917 and became one of the first Western-style women doctors in Taiwan.

The existing scholarship mainly focused on these pioneering Asian women doctors such as Tsai Ah-hsin, but my paper aims to show the comprehensive research on international female medical students in Japan before 1945. How many international students were enrolled at Yoshioka's school? What were their school days like? What type of hardships did they encounter? What was Yoshioka's intention to admit international women to her medical school?

Indian Mathematics and Imperial Japan: from one-sided discourse to collaboration

Francesco P CIOFFO

The history of Japanese interest in mathematical practices and ideas from South Asia is a long story connecting religion, science, and trans-imperial collaboration. “Indian” science have in fact been studied in Japan since the late 19th century but the revolution of international travel and the growing socio-economic entanglement between Japan and the subcontinent that began in the late 19th century and continued until the mid-20th century, significantly increased interest in the subject. While traditional narratives regarding Japanese interest in Indian Mathematics has stressed only the textual dimension of their interaction, this paper aims to also highlight the rare instances of scientific collaboration that emerged between Indian and Japanese mathematicians between 1911 and 1940. For a good section of the historiography of Indian mathematics in Japan has focused on the translations from Sanskrit or other South Asian languages of ancient treaties of early trigonometry, algebra, or astronomy. In this paper instead, I will discuss the history of the Tohoku Mathematical Journal, one of the foremost academic journals in the field still active today, and its emergence as an international platform for Indian scientists to publish their original works and participate in the global scientific discussions of the time.

Central to my talk will be the trans-imperial network of academic and personal connections that Japanese and Indian scholars were able to build during the first decades of the 20th century. As far as Japan is concerned, the key figure was Tsuruichi Hayashi (林 鶴一, 1873-1935), founder and first editor of the Tohoku Mathematical Journal and the men at the centre of this Indo-Japanese network in Japan. My goal is to locate Tsuruichi's efforts to involve Indians in the TMJ in a broader context of Japanese scholars studying Indian mathematics such as Mikami Yoshio (三上義夫、1875-1950), and Indian science in general. These scientist were connected with Indian mathematicians as well, mainly based in Bengal and with connection with the University of Calcutta, such as Bibhutibhushan Datta (1888-1958) author of the famous “History of Hindu Mathematics”.

International Mobility of Medical Experts between War and Peace in Early Twentieth Century Japan: A Prosopographical study

Ken Daimaru

The study of the mobility of medical experts in East Asia at the turn of the twentieth century—a period of bureaucratic reforms and of scientific paradigm changes—offers a contribution to better understand not only the evolution of medical knowledge, and the political expectations attached to them, but also the role of national training and research institutions in the formation of a new medical elite. It questions individual choices in terms of economic or social opportunities, as well as strategies adopted by national professional organizations and communities.

This paper focuses on the role of Japanese doctors in the Russo-Japanese war (1904-1905) and their after-war careers through the lens of diaries and other sources. Although some prominent doctors already had rich international experience in the pre-war period, many veterans of the Russo-Japanese war became major actors of health governance in colonial Taiwan and Korea in the 1900s and 1910s. Being a doctor in a foreign country raises questions related to medical practice and research methods employed in conflict-, and later colonial,

settings, where the necessity often determines the rules. This presentation also explores the attitudes of Japanese army doctors toward the transition from war to peace as actors of an expanding colonial empire.

People's Science: Anarchist translations of science in early 20th century Japan

Ruselle MEADE

Socialists and anarchists were at the forefront of popular scientific publishing in Japan in the early 20th century. Having formed to oppose the Russo-Japanese War (1904-05), in the War's aftermath the Heiminsha (the People's Society) turned to the sciences to advance their vision of an anti-imperialist anti-militarist movement unbounded by the nation state. The further this mission, from 1907 to 1908 they produced "Heimin Kagaku" (People's Science), a series of six science books comprising translations of works in the natural, physical and human sciences. Underpinning this project was an optimism – shared by anarchists worldwide – in the potential of science to release peoples from the coercive power of the state, and usher in a future characterized by cooperation.

The "Heimin Kagaku" series included excerpts from "The Descent of Man" by Wilhelm Bölsche, "Germs of Mind in Plants" by Raoul Heinrich Francé, "Ancient Society" by Lewis Henry Morgan, "Mutual Aid" by Peter Kropotkin, "The Making of the World" and "The End of the World" by Max Wilhelm Meyer, and "The Universal Kinship" by J. Howard Moore. Although some of these works were not written by socialists or with socialist aims in mind, in the "Heimin Kagaku" series they were interpreted through a socialist lens and reshaped for a Japanese context in which filial piety and loyalty to the nation were priorities of the state.

This paper examines how science was used in the "Heimin Kagaku" series to further the Heiminsha's critique of militarism and imperialism. It explores why these particular books were chosen, and how their publication fit into the Heiminsha's wider publication strategy, which included, among other works, the daily newspaper Heimin Shimbun. This paper will pay particular attention to the appropriation of Lewis Henry Morgan's nineteenth-century anthropological writings, asking how these were meshed with writings on the natural and physical sciences to challenge imperial authority. Lewis Henry Morgan's account of the development of male-female relations in "Ancient Society" provided an alternative vision of the family, which would have profound implications for gender relations in Japan.

One Body for Two: Autopsy Program of ABCC and Nagasaki University in the Mid-20th Century

Maika NAKAO

After World War II, the U.S. collected pathology specimens of atomic bomb survivors in Hiroshima and Nagasaki through the U.S. Armed Forces Joint Commission for Investigating Effects of the Atomic Bomb and the Atomic Bomb Casualty Commission (ABCC), and sent them to the U.S. mainland. They were collected by the Armed Forces Institute of Pathology and returned to Hiroshima and Nagasaki in the late 1960s and early 1970s. How was the collection of human tissue from atomic bomb survivors by the countries that dropped the bombs possible? As pointed out in previous studies, the hibakusha survey would not have been possible without the cooperation of the Japanese side. In Nagasaki, the Nagasaki University School of Medicine systematically cooperated with the U.S.

hibakusha survey. This paper focuses on the autopsy program in Nagasaki from in the 1950s, examining the collection and distribution process of human tissue from atomic bomb survivors and the way of cooperation between Nagasaki University and ABCC. In the 1950s, Nagasaki University and ABCC began to share the dissection of corpses, but there was friction between the medical scientists of both institutions over the method of distribution. On the other hand, young doctors from Nagasaki University were dispatched to ABCC and learned medical knowledge and techniques, and the two institutions were almost blended together. Nagasaki University and ABCC also cooperated in obtaining corpses, and began to hold joint memorial services for autopsied bodies. Thus, the autopsy program in Nagasaki was a cooperative, sometimes conflicting relationship between Nagasaki University and ABCC, but differences in interests and research methods led to differences in research results. By paying attention to the autopsy program, this paper will examine the production of scientific knowledge within the delicate relationship between competition and cooperation across countries.

Agents of Development: The Role of Japanese Sericulture in the Global South

Lisa ONAGA

This paper addresses the topic of Japanese sericultural know-how in the context of technical aid in the Global South. Sericulture offers a means to trace a material-centered analysis of Japanese international cooperation with a wide array of countries. Building upon the history of Japanese sericultural experts invited at the behest of the Siamese government to help establish a silk industry during the early 1900s, this presentation examines how sericultural know-how was situated in the extension of Japanese overseas development assistance during the postwar era. The history of sericulture in Southeast Asia during the 1960s and 1970s clears a path for comprehending how Japanese developmentalists regarded silk production as a critical strategy for engaging with emergent national economies in Southeast Asia, South Asia, and Africa. The collaborative and cooperative relationships required to ensure the lasting success of sericultural enterprises (employing the cocoons of a variety of silk moth species) are surveyed to show how these various bilateral projects afforded the exchange of know-how or information about resources. The analysis also shows how the material of silk and Japan's historical experience in using sericulture to its sovereign advantage facilitated a strategy to proactively establish Japanese technoscientific expertise in different regions.

P39: Gender and Science, Technology and Medicine in Modern China

Ideology and Scientific discourse: Re-interpreting the Effects of Modern Birth Control Movement on Chinese Women

Xinyu ZHANG

The concept of birth control and related science and technology had been introduced into China since the beginning of the 20th century, which completely changed the Chinese traditional concepts on population, health, maternal and infant health, as well as many other aspects in less than a century. It was uncritically considered the essence of this concept was liberating women at the very beginning of introduction to China because of related progressive ideology. While the birth control technology failed to entirely control and regulate female fertility in practice in the first half of 20th century of

China, a nationalist trend of thought urgently sought for reform in this period, this trend widely promoted the concept of birth control. The birth control movement indirectly prompted women into the camp of nationalist construction although no good effect on birth control was realized. The current study argues that the birth control movement in the Republic of China was driven by modern scientific discourse, such as evolution and eugenics, and also involved in modern ideologies like strengthen the nation by optimizing race(强国保种) and saving the nation by public health(卫生救国), the movement eventually became an important part of China modernization reform.

The Introduction of Western Obstetrical Pain Relief Technologies and Their Influences in Modern China

Miao WU

In the middle of the 19th century, western obstetrical pain relief technology was introduced into China with the translation of medical books and newspapers. The Chinese medical community has debated the safety and effectiveness of pain relief technology, the significance of labor pain and women's need, Under the preaching of female newspapers, a small number of upper-class women awakened and actively sought pain relief, but most women still took the pain for granted. This article uses original materials such as books, newspapers and periodicals to trace the history of the introduction of modern western obstetrical pain relief technology, and discuss its relevant influences. It is believed that whether pain should be relieved during childbirth is not only related to the safety and effectiveness of the pain relief technology itself, but also depends on the medical profession and society's consideration of the significance of pain and whether women's own pain relief awareness is awakened. In modern China, although there are many translations and introductions of pain relief technology, the overall practice is still rare. On the one hand, the safety and convenience of the technology itself are not ideal; On the other hand, it is related to China's own concept of labor pain tolerance and unawakened pain relief awareness of women.

Research on Antenatal and Postnatal Examination in the View of Pregnancy Medicalization during the Republic of China

Yaohua WANG

Medicalization is one of the core concepts of medical sociology, and the process of pregnancy and childbirth is an important research object in the field of body medicalization. This article investigates the antenatal and postnatal examinations in the view of pregnancy medicalization during the Republic of China. It included three aspects: construction of "abnormal" body, check items and content change, time monitoring, inspectors and site change. This article holds that the medical construction of pregnancy as an "abnormal" body during the Republic of China was realized through the obstetric technical means of Western Medicine. While having a positive role in preventing dystocia and reducing maternal and infant mortality, the examination had also strengthened the control of doctors and the state over the process of pregnancy and childbirth, taking over the self-awareness and management power originally belonging to pregnant women. It is embodied on the historical stage of building a modern country together with the words of building a rich country and a healthy mother.

"Iron girls" and the "gendering" of technology: A case study on Karamay Sanba women drilling team and Sanba oil production team in Great Leap Forward Movement

Meifang ZHANG

For the "iron girls" who is highly praised by the demand of industrial construction, the "masculinity" of these women are extremely eye-catching phenomena. The case is the Karamay Sanba women drilling team（三八女子钻井队） and Sanba women oil production team（三八女子采油队） in "Great Leap Forward" period. Through in-depth interviews and archives, the paper is a detailed analysis of women's psychology of "de-gender" as a complex process, and discussed the phenomenon of complex relation between technology and gender. Karamay's "Iron Girls" experience of "masculinity" reflects the cultural characteristics of technology in material practice and symbolic meaning. "Iron Girls" is recognized in the field of technology by abandoning their femininity, which reflects a gender equality concept of "men and women are the same," and the liberation of women in the particular lens.

Research on Science Communication and its Problems of Traditional Chinese Medicine (TCM)Weight Loss

Li-yuan YUE

Female weight loss has a long history in China and is especially prevalent today, in fact, inappropriate concept and behavior about losing weight cause a series of social and personal problems. Media were found playing an important role in shaping people's weight loss concept and behavior, in which Traditional Chinese Medicine (TCM)weight loss is very popular because of its characteristics of syndrome differentiation treatment. This study took three WeChat public accounts of TCM weight Loss as examples, using the methods of content analysis and discourse analysis of media texts, combination with in-depth interviews with TCM experts, analyzed the status quo and the main problems of science communication of TCM weight loss, and pointed out the compromise of TCM to popular commercial culture.

Controversy between Breast Milk and Cow's Milk: the Construction of Scientific Discourse

Xi YANG

In Chinese traditional infant-feeding culture, the concept of breast-feeding is a significant practice. However, breast-feeding often faces the situation that mothers have insufficient breast milk or no breast milk. With the introduction of scientific ideas and concepts such as public health into China, more and more people no longer looked for wet-nursing, instead, they began looking for suitable breast milk substitute for infants, such as cow's milk. During the period of the Republic of China, some medical practitioners, scholars and governmental officials with professional knowledge of medicine, agriculture and animal husbandry began to use scientific discourse to recommend cow's milk to the public. Two camps were gradually formed for those who support breast milk and those who support cow's milk. The controversy began.

This paper focuses on the controversy. "Whether use breast milk or cow's milk to feed infant good", it was a private topic discussed within families. However, under the background of the Republic of China, Chinese intellectuals emphasized the topic of "strengthening the country and the breed", and placed the topic on the mass media for public discussion. The authors collected and sorted hundreds of articles related to breast milk and cow's milk from the national newspaper index website from the 1910s to the 1940s, and

analyzed 134 articles related to infant-feeding. By sorting out the origin, process and results of the controversy, the paper analyzed resources and standpoints of both sides' discourses. This paper focused on complexity and discussed how scientific discourse participating in the construction and shaping motherhood.

The result of controversy ended up with the side advocating breast milk. Political, economic, social and cultural, subjective factors and so on caused the above result. From the controversy, as we can see, scientific discourse was popular and instrumental. It had became convincing and penetrating into Chinese's daily life. The scientific discourse influenced gender discourse, and gender discourse complemented scientific discourse as well.

IV. 16:10 – 17:50

P9: The New Encounter of Science, East and West: Japan's Case of Relaunching Academic Exchange with the Soviet Union in the 1950s

The Impact of New Aspects of Soviet Sciences on Japanese Scientific Communities in 1950s: The Assessment of the Great Plan of Transforming Nature in Japan

Hirofumi SAITO

This conference speech will focus on the Soviet scientific knowledge that appeared in the 1950s, regarded as new development in Japanese scientific communities and how those new aspects of the Soviet science triggered Japanese scientists' interests motivating their direct communication with the Soviet scientists. Among the important factors concerning the authorization of the new aspects of Soviet sciences were Stalin's own involvement in the scientific problems. The most famous instance was his personal support to Trofim Lysenko in the 1948 VASKhNIL session. Following the decision at this session, Soviet biology was completely "reformed" in accordance with Lysenko's group. In the first half of 1950s, Japanese professional geneticists focused on Lysenko's new, but actually bizarre argument regarding the phenomenon of "transformation of species in plants," and few of them sought an opportunity to communicate face-to-face with Lysenko's followers to discuss an evidence of this phenomenon. This materialized in September 1956 during the International Genetics Symposia held in Tokyo and Kyoto. In 1955, when 15 delegates comprising the members of Science Council of Japan visited USSR Academy of Sciences, few of them conveyed a request to send the Soviet delegates, including Ivan Glushchenko (known as Lysenko's faithful pupil), to the Symposia.

The speech will also discuss the Great Stalin Plan of Transforming Nature issued in October 1948 (construction of forest belts covering the Central Asia to guard crops from hot winds). In Japan, Stalin's Plan was introduced as a significant enterprise of Soviet science by various professionals such as biologists, foresters, civil engineers, legislators, and agricultural technocrats and was reviewed by them with considerable positivity. Lysenko engaged in this Plan from 1949 to 1953 as a "supervisor," recommending his ineffective nest-sowing method that was later adapted as the only authorized measure of planting nursery tree. Regarding this point, we will specifically examine whether Japanese "supporters" of the Plan were able to pay careful attention to the fallacies of Lysenko's method that accorded novelty and dignity to the Great Plan. Based on this case, we will provide a suggestive discussion of the conditions under which a certain powerful science in one country acquires/loses popularity and

authority in other countries' scientific communities.

The Impact of the Theory of Scientific-Technical Revolution in Japan: A Case Study of the Reaction on the Tendency of the Eastern Bloc

Koji KANAYAMA

The theory of scientific-technical revolution was developed in the 1960s by Semen Shukhardin in the USSR, Radovan Richta in Czechoslovakia, and other intellectuals in the Eastern Bloc countries. Simultaneously, this theory was introduced in Japan and partly criticized by left-wing philosophers such as SHIBATA Shingo (1930-2001). My talk deals with what aspects of this theory were accepted or refused in the context of Japan's ideological/cultural relationship with socialist countries.

"Discrepant Expectation": The Delegation of the Science Council of Japan to the Soviet Union in 1955

Hiroshi ICHIKAWA

Prior to the reestablishment of diplomatic relationship between Japan and the Soviet Union, the Science Council of Japan (corresponds to the Academy of Sciences in various countries) dispatched their delegation which was headed by the President Kaya, Seiji, himself, and consisted of fifteen prominent scientists in those days. With a great fervor, they observed various Soviet scientific institutions, higher educational facilities and others for almost three weeks. They spent many days in Moscow and Leningrad, but visited also several local cities, being separated into some small groups. Their curiosity about the little-known country beyond the "Iron Curtain" strongly moved them. At the same time, then, immediately after the restoration of independence from the occupation by the Allied Powers, de facto by the United States of Amerika, the Japanese scientists were eager to reestablish their international liaisons with various scientific institutions abroad, including those in the "Socialist Block."

On the other hand, the Soviet leading scientists were also eager to make close connections with international scientific societies in the Western countries in the so-called "Thaw" after the death of the dictator, Iosif Stalin, and the arrest of Lavrentii Beriya who had dominated the Soviet secret police for a long time. The Japanese delegation was attended warmly by many Soviet scientists, first of all, Nolair Sisakyan, an eminent biochemist and an able administrator on scientific matters who enthusiastically promoted internationalization of the Soviet science.

Both sides had been suffered from the "Scientific Isolation" from the rest of the world for more than a decade. They could not, however, share values so instantly. Especially such issues on the freedom of speech, the Lysenkoism and the postwar treatments formed a gulf between them. This paper shed the light to the consequences of this Delegation on each side by tracing the documents which were classified or little know in both countries.

IP32: The New Encounter of Science, East and West: Japan's Case of Relaunching Academic Exchange with the Soviet Union in the 1950s

The Model of the Soviet Union: The Setting up of Geography Disciplines in Peking University during the Early Days of New China

Chao LIU

When New China was established, the theoretical foundations of geography theory were weak, with geography education being the weakest link in national higher education . The Department of Geology

and Geography, created by Peking University in 1952, promoted the development of geography and geography education. Initially the Department was modeled on that of the Soviet Union, combining the efforts of Department faculty and the opinions of experts from the Soviet Union. As a result, geography disciplines developed from only physical geography in 1952 to physical geography, economic geography and geomorphology in 1956, establishing the prototype for the setting up of Peking University's geography disciplines. This article analyzes the influence of learning from the Soviet union on the setting up of geography disciplines in Peking University and on the development of geography, according to oral interview records and historical data such as Peking University archives.

The Rise, Content and Value of Soil Investigation in Modern Guangdong

Zhiguo CHEN

In modern times, Guangdong, which is at the forefront of cultural exchanges between China and the West, has carried out a large number of soil investigations in order to improve and develop the soil of Guangdong, and has formed a large number of soil investigation documents. Soil investigation is not only an effective means for modern soil scientists to understand and improve soil, but also the result of modern soil science taking root in China. This paper mainly analyzes the background, subject, space-time distribution, content and value of soil investigation in modern Guangdong by systematically combing the literature of soil investigation in modern Guangdong. The study believes that the rise and development of soil investigation in modern Guangdong is the practice of modern soil scientists to improve and transform soil, and is also the product of the localization and localization of modern western soil science in China.

High-tech transfer and localization in the early stage of China's reform and opening up: Development and construction of Beijing Spectrometer (BES)

Shouchen LI

High-energy physics is a leading discipline in China's modernization of science and technology during the period of reform and opening up. In the 1980s, China established a high-energy physics experimental base, mainly the Beijing Electron-Positron Collider (BEPC) project.

The first generation of the Beijing Spectrometer (BES) was a sizeable high-energy particle detector system working at the collision site of the Beijing Electron Positron Collider. After its completion, it became the largest single large scientific experiment facility in mainland China. The prefabrication of the Beijing Spectrometer began in 1982. In 1989, it was completed and put into operation. In 1994, it was upgraded to the BES II.

Benefiting from the cooperation in basic science between China and Western countries represented by the United States, as well as the help and support of scientists such as Samuel C.C. Ting and Tsung-Dao Lee, the Beijing Spectrometer was designed and manufactured based on MARK III, the most advanced collider spectrometer at that time, which was working on the SPEAR collider at the Stanford Linear Accelerator Center (SLAC) in the United States. In addition, most of the main detectors of each part of the Beijing spectrometer were working or had learned related technologies in high-energy physics experiment centers of western developed countries.

In this study, for investigating the history of the design and construction of the

Beijing spectrometer, several scientific and technological workers involved in the design and construction of the Beijing spectrometer were interviewed, and the relevant archives were analyzed, which from the Institute of High Energy Physics, Chinese Academy of Sciences (CAS-IHEP), the builder of the Beijing spectrometer.

By studying this history, we can show the process of the transfer of particle detector manufacturing technology to China, and how China's experimental particle physicists successfully built large modern high-precision instruments with China's existing conditions and achieved innovations and breakthroughs in several individual technologies under the circumstances of weak scientific foundation and insufficient scientific resources.

IP34: Calendrical sciences and Astronomy

Lessons From Xu Guangqi: How a Technocrat Achieved His Personal Will in a Chinese Authoritarian Regime

Zhanxiang WANG

During the late Ming dynasty, from 1629 to 1633, Xu Guangqi, a technocrat (technical bureaucrat), worked to secure the support of the Chongzhen Emperor to successfully implement a calendar reform. Despite acknowledging the superiority of Western astronomy, Xu had to adopt strategic approaches to achieve his goals while accommodating the Emperor's demand for "Huayi" 畫 一(Harmonization). These approaches encompassed appealing to authority by citing the Hongwu Emperor's calendar reform as a precedent for using Western astronomy to justify his own reform, using the ambiguous Chinese philosophical concept of "Huitong" 會通 (integration) to facilitate consensus between officials and the Emperor and provide himself with room for argumentation in future debates, and establishing a new standard of "與天相合"（being in harmony with heaven）in an attempt to quell disputes with the accuracy of the new calendar predictions after the reform. Xu's case details a specific context that enhances our comprehension of how a technocrat in a Chinese authoritarian regime managed to achieve his personal will while navigating the relationship between the dictator and scientific knowledge.

Studying calendrical astronomy in a time of COVID, or 一麟半爪 [reconstructing] the mythical Lin beast from half a claw]

Christopher CULLEN

As part of a joint research project with Catherine Jami on Sino-European astronomical contacts in the early Qing dynasty (1644-1911), I have been investigating certain technical aspects of early modern mathematical calendrical astronomy – as practised by Western Jesuit missionaries following Tychonic models, and by their competitors and opponents who practised within the indigenous Han tradition, and the Muslim (Huihui) tradition as it had been established in China for several centuries. We have already published a number of joint articles on this topic, and our research continues. In this talk, I shall report on two examples of problems that we have encountered in dealing with the technical background of a number of conflicts involving the Jesuits and others during this period, both of which hinge on difficulties in accessing certain original documents that are known to exist but are not easily available in full, especially given travel difficulties and the closure of libraries and archives during the COVID pandemic.

One of these examples relates to the final conflict between the Jesuit astronomer Ferdinand Verbiest (1623-1688) and his

Han and Muslim opponents in late 1668 to early 1669, and the other relates to a conflict earlier in the dynasty, between the Jesuit Adam Schall von Bell (1592-1666, who had been given charge of the Astronomical Bureau Qin Tian Jian 欽天監 not long after the arrival of the Qing in Beijing) and a Muslim astronomer. In the first example it has been possible to reconstruct with some confidence the content of missing material by mathematical deduction from the contents of a fragmentary document. In the other case, less confidence can be reposed in such a process of reconstruction until it is possible to see certain hitherto inaccessible portions of the relevant document.

Study on Guo Shoujing's gnomon shadow measurement

Yao XIAO
Niankai LIU

The gnomon is an ancient traditional astronomical measuring instrument in ancient China. Before Guo Shoujing in the Yuan Dynasty, it was usually used to measure the shadow of the sun with the eight-chi gnomon. Guo Shoujing pioneered the four-zhang gnomon with shadow definer to measure the shadow, which greatly improved the accuracy of the shadow measurement. We made a simulation measurement on the eight-chi gnomon of Beijing Ancient Observatory and the four-zhang gnomon of Dengfeng Ancient Observatory, and analyzed the error of the measurement data. The results are consistent with the theoretical analysis results, and it can be inferred that the error of Guo Shoujing's four-zhang gnomon in winter is about 5 mm. At the same time, through the analysis of the original data of Guo Shoujing's shadow measurement at that time, it is inferred that Guo Shoujing actually measured gnomon shadow lengths at two locations.

Cultural Entanglement and Global translation of Euclid's Elements in late imperial China

Uganda Kwan

In 1988, Deleuze and Guattari expounded the idea of Rhizomatic connection of cultural transmissions and disseminations in their seminal book A Thousand Plateaus (Deleuze and Guattari, 1988). A rhizome is a mass root system where the subterranean plant stems out its roots from its nodes, instead of relying its strength from a centralised, lineage and upshoot growth where the budding of new shots can only be built from root to top. Contemporary western Translation Studies gained much strength from the deconstructionist where translation authorities should be disentangled from its source, every node is a new origin and every turn and twist in the translation directions indicates a new center of cultural power.

This paper is the prequel of two academic papers in tracing the global translation of Euclid's Elements in late imperial China, and will argue that global translation pattern of Euclid's Elements is a rhizomatic pattern where the translation trajectory and source are sporadic, sprawling and decentralised across time-space. My decade-long tracing of an obscure Irish missionary named Edward Theophilus Russell (E.T. R.) Moncrieff (1824–1857) has provided a revisit account of the translation history of Euclid's Elements in China and the pioneering role of Alexander Wylie's (1815 – 1887). Based on an astounding amount of newly unearthed archival material, the previous published paper "Hong Kong St. Paul's College's Printing Establishment and E.T. R. Moncrieff's A Treatise on Arithmetic in the Chinese Language [1850–1852] and his Translation of Euclid's The Elements" (Kwan, 2020, 1-61) has presented the academic audiences a missing episode in the transmission of Euclidean geometry in China by E. T. R Moncrieff. Moncrieff not only used Cantonese to translate the

Elements, a language that was not previously known to be a target language in the history of the global translation of Euclid 's Elements, he also engineered a Sinocentric method to help school learners digest and memorize the new mathematical knowledge. Moncrieff's method was ingenious, maybe more so than Matteo Ricci, as Moncrieff incorporated the Chinese method of writing Chinese characters into the 1 triangle shape, where learners could associate Chinese character 人 with the English alphabet A, and the shape of the top angle of an isosceles triangle by cognitive power via visual image. In a subsequent paper, I compared Moncrieff's textbook A Treatise on Arithmetic in the Chinese Language (1852) with Wylie's textbook Compendium of Arithmetic to demonstrate the emergence of the Chinese translation lexicon Arithmetic in the 1850s. (Kwan, 2023, 1-23)

This paper will trace and examine the Latin source text used by E.T.R. Moncrieff for his translation of the Elements. The focus of study is microscopic but the revelation might be magnificent. This Latin version of Euclid's Elements is rarely mentioned in the history of the global translation of Euclidean geometry. Moncrieff's translation strategy is nothing but enterprising. From Book 1 Proposition V of Moncrieff's only surviving piece of translated Euclidian geometry today, we shall see how this Irish mathematician elucidated his mathematical interpretation and his Sino-centric translation strategy for the purpose of localizing the knowledge to Chinese school learners in 1850.

IP10: Science, Medicine and Natural Philosophy in Late Imperial China

Through otherness: New Interpretation of Fang Yizhi's Comment on Western Learning of "Being bad at Tongji"

Hailin ZHU

Fang Yizhi's comment on western learning of "being bad at Tongji(philosophy)" had exerted great impact on his followers in early Qing Dynasty. It is surprising that he finally denied the western leaning introduced by Jesuits in China although he had pursued reforming knowledge of nature and was highly interested in western leaning, which leaves a question for further discussion. The answer given by the previous researchers was that he didn't accept Christian and the Western philosophy of the time. However, the explanation is too general to reveal the truth. This research attempts to review the natural philosophy in Huan Youquan, a Chinese book introducing Aristotle's philosophy by a Jesuit in 1628, through examining Fang Yizhi's philosophy as a comparison of otherness. As a result, the fact of the clear contradiction between Fang Yizhi's philosophy and the western philosophy of the time is to be found, namely, logic connection of Tongji and Zhice(science) versus logic disconnection of them, unary world of Qi versus binary world of spirit and material, Suoyi(final cause of being) versus God as the creator of all beings, dialectical logic versus formal logic. It can be concluded that these four contrasts explain academically why Fang Yizhi declined western leaning.

Classic, Diagram, and Table: Visual Representations of the Theory of the Five Phases and Six Influences (Wuyun liuqi 五運六氣) in Chinese Medical Texts

Xinyu ZHENG

This paper introduces two types of visual representation that are prominent in understanding and practicing the theory of the Five Phases and Six Influences (Wuyun liuqi 五運六氣) in Imperial China: One is the diagram (tu 圖) that uses cycles denoting circulations of influences; the

other is the table (biao 表) that segments texts in a tabular form encompassing symptoms and prognosis of the ailments caused by the transformation of influences.

By scrutinizing different treatises since the 11th century, this paper argues that visual tools work at two levels. Firstly, physicians designed diagrams to clarify the rationale of the Yunqi system. With a combination of cycles, they tended to lay out the cosmic foundation for Chinese medicine that derived from an astrocalendrical tradition, based on which they further signified the reconciliation between macrocosm, viz. heaven (tian 天), earth (di 地) and microcosm, viz. man (ren 人). A close examination of diagrams and tables with auxiliary texts from the Song to the Ming period shows that the connection and analogy between macrocosm and microcosm are closely associated with general cosmograms depicting the ideas of yin and yang, the five movements (wuxing 五行), and theories about the Book of Changes (Yijing 易經) that became prominent since the Song period. This finding indicates that visual representations of the recursive pattern in medical writings share an epistemic frame with which the Neo-Confucian school tended to situate various sorts of knowledge——medical, geographical, moral, or political——well into the overarching cosmological scheme.

Secondly, visual representation serves better in efficient learning. By identifying key sources that mark the visual innovations through a diachronic analysis from the Song to the late Qing period, this paper shows that innovations as such serve a clear purpose of teaching and practicing the theory. In doing so, a transition from using diagrams as auxiliary to integrating texts into tables becomes clear. It also raises the question whether non-textual representations prioritize pragmatic information over prudent reading of classics. By examining the motivation of the visual creations and the controversy over their epistemic value, this paper further argues that epistemic crises stimulate innovations and in turn, innovations drive historical actors to reflect on crises. This dialogical process also offers us a more nuanced observation to the general understanding of the intellectual debate about authenticity of knowledge in Imperial China.

August 22nd

I. 9:00 – 10:40

P13: Knowledge Transfer between Europe and Ming-Qing China – Science

Jesuit Geography and Chinese Knowledge of the Poles and Polar Regions

Alexander JOST

With Jesuit geography and cartography since Matteo Ricci (1552-1610) many new ideas about the Earth, its Role in the Cosmos, its shape, and the layout of its surface reached China. This also meant that for the first time in history, the poles and the polar regions were displayed in direct relation to the familiar, more temperate latitudes. Moreover, detailed explanations were provided about their functions within this new image of the world and of the astronomical, meteorological, and biological phenomena to be observed at and around them. In the 17th century, Europe itself stood at the very beginning of anything to be called "Polar Exploration" and much of the information given was imaginary or at least far from accurate. Nonetheless, with this influx of Western knowledge a new chapter in China's understanding of the Earth's extremes began. It is the purpose of this presentation to compare Chinese views of the poles and polar regions before the 16th and 17th centuries with those of the European renaissance and to illustrate, in which ways the arrival of the latter was perceived and accepted in China.

Aristotle's Theory of Knowledge in Qionglixue

Zhicong SHANG

Ferdinand Verbiest's Qionglixue (《穷理学》) is a comprehensive record of the Sino-Western intellectual exchange during the late Ming and the early Qing periods, which developed the Confucian theory of knowledge along with Aristotelian theory, including the concept of knowledge, its acquiring ways, its properties and functions, and knowledge system. This content is taken from Minglitan (《名理探》) with a few changes. The book understands Aristotelian theory of knowledge from the epistemology of Confucianism, expresses the Aristotelian concept of "Knowledge" with the concept of Confucian Art (Yi 艺), distinguishes between "Understanding" and "Knowledge", and enriches and develops the connotation of the "Six Arts" （Liu Yi 六艺）of Confucianism. Confucianism initially regarded the "Six Arts" as knowledge derived (inducted likely with fewer formal rules) from life experience, ignoring the confirmatory knowledge obtained by deductive reasoning based on assumptions. In Qionglixue, Knowledge is divided into two parts, "Knowing Art" (Ming Yi 明艺) and "Using Art" (Yong Yi 用艺). The first one is the confirmatory knowledge of deduction, i.e. scientia. Confucianism focuses on moral understanding and emphasizes the value of moral practice, without carefully examining the nature and structure of knowledge as a result of cognition, and without expounding the relationship between the method of "Obtaining Knowledge by Investigation of Things" (Gewuzhizhi 格物致知) and the "Art". Qionglixue complemented these. In particular, the division between "Knowing Art" and "Using Art" has advanced the discussion of knowledge in Confucianism

from practical skills to theoretical systems. "Knowing Art" includes Physica (Xingxingxue 形性学), Mathematica (Shenxingxue 审形学) and Metaphysica (Chaoxingxue 超性学), emphasizing knowledge about the natural things and beings by reasoning deduction. Therefore, theoretical knowledge is highlighted, and formed in Confucianism.

Thinking the material unity of the earth and the cosmos in Late Ming China; the case made by Huanyou quan (1628)

Thierry MEYNARD

Following Aristotle, Aquinas considered that sublunar matter and supralunar matter are of two kinds, substantially different. However, the scholastics continued to debate the issue until the Seventeenth century when new astronomical discoveries led progressively to the demise of the Aristotelian position of two kinds of matter. The Coimbra Jesuit commentary on Heavens published in 1593 still leaned towards the Aristotelian position, a position upheld by the Jesuits Francisco Suarez and Bartholomew Amicus. In a sharp contrast to the Coimbra commentary, the Portuguese Jesuit Francisco Furtado and the Christian literatus Li Zhizao in the Huanyou quan (1628) advocated for the uniformity of matter across the sublunar and supralunar spheres. This paper investigates the argumentation of the Huanyou quan as well as the two main reasons for their position, being the new astronomical discoveries and Chinese philosophy.

Geographical Knowledge as a Contested Field in the Jesuit China Mission

Dominic SACHSENMEIER

In academic research, the Jesuit world maps that were published in seventeenth-century China have received quite some attention. Printed during the early 1600s, these geographical works were broadly received by the educated parts of Chinese society. They generated a high degree of interest, as they provided much information on world regions like Europe or the Americas that was new to Chinese readers.

This talk will particularly focus on the instrumentalization of knowledge that have been an (under-researched) aspect of the Jesuit world maps published in seventeenth-century China. Through these mediums, the European missionaries tried to disseminate a highly idealized image of Europe as a continent that allegedly flourished in peace and harmony, under the impact of the “Learning of Heaven”, i.e. Christianity. The portraits of Europe contained in these Jesuit works were challenged by some Chinese scholars who had their own access to transregional knowledge. Unlike the Catholic Church, they could not rely on information flows of a globalizing organization, but through social groups like returning Chinese migrant workers, they were aware of European colonial practices in Southeast Asia. These sources of information were used to challenge parts of the geographical knowledge that was disseminated through the Jesuit world maps.

Jie Xuan’s Appropriation of Guilio Aleni’s Adaptation of Aristotle’s Doctrine on the Soul in his Discourse of Human Nature

Wenbin ZHENG
Yunli SHI

As an important figure in the history of science in the late Ming and early Qing Dynasties, Jie Xuan's 揭暄 achievements in cosmology have been widely studied by scholars, especially his works The Book of the Limitless（Hao Shu 昊书）and Remained Description of the Heaven (Xuanji Yishu 璇玑遗述). However, as a literati grown up in a world of Confucian ideology, Jie Xuan also paid his attention to

the widely discussed Confucian issue of the "mind and nature" （心与性）and wrote a treatise entitled the Book of Human Nature (Xing Shu 性书) . In this book, Jie Xuan appropriates a lot of topics and knowledge from A Brief Introduction to the Study of Human Nature (Xingxue Cushu 性学觕述) , a Chinese introduction to Aristotle's theory of soul by the Italian Jesuit Guilio Aleni 艾儒略, constructs his own discourse on Human Mind and Nature, and attempts to address this important issue through an integration of both Western and Chinese learnings, just as he does in his works on cosmology. In the A Brief Introduction to the Study of Human Nature, Aleni adapts Aristotle's doctrine on soul from his De Anima and Parva Naturalia by translating the concept of Soul into the Chinese concept Xing 性 (Human Nature), and largely bases his discussion on physiological and psychological causes laid out by Aristotle in his works. Jie Xuan follows Aleni's topics and approaches, but attributes the ultimate causes to the nature and function of Qi 气, and thus produces a theory of Human Nature which has clear connections to both Chinese and European traditions on one hand, but totally different from both of them on the other.

On the Manchu Translation of European Works on Human Anatomy and Pharmacy

Gong XU

The Manchu people are a distinct ethnic group in China who speak their own language and developed a writing system. Manchu's nearly three-hundred-year reign over China, beginning in the 17th century, saw the people of that region make significant contributions to the evolution of Chinese culture. In the early years of the Qing Dynasty, the Manchu rulers, personified by Emperor Kangxi, established a prosperous civilization. He was well-versed in numerous disciplines throughout his life, including astronomy, calendars, mathematics, geography, biology, medicine, art, and music. He stood out as one of China's most intellectual rulers, a rarity. Regarding health care, he was well-versed in both western medicine and Chinese traditional medicine. His efforts to have the Manchu Anatomy and Western Medicine Book translated by French Jesuit missionaries have been accomplished. These two medical books are Manchu translations, demonstrating the extent to which the Manchu people had absorbed and mastered medical knowledge in the 17th century. They also provide insight into the evolution of Manchu's technology and its role in society and history. The emergence of western medicine in China has added new content to the study of the history of science and technology of China's minority groups, making rare books of immense historical importance.

Some Reflections on Antoine Thomas's Scientific Activity at the Kangxi Court

Han QI

Because of the Kangxi emperor's personal interest in science and his use of science in governing the empire, the European mathematical knowledge was introduced into China. Based on Chinese and European sources, this paper examines the role of Flemish Jesuit Antoine Thomas (1644-1709), an imperial tutor of the Kangxi emperor, in the compilation of mathematical works and cartographic surveying, especially his contribution in the measurement of the length of meridian line in one degree. In order to meet the need of the Kangxi emperor, Antoine Thomas also compiled Celiang gaoyuan yiqi yongfa, which represents the practical orientation of mathematics at the imperial court during the

Kangxi reign. This paper will analyse his influence on the Kangxi emperor and Mei Wending in their writings of mathematical works.

Reading Aristotle in Late Ming China: The Reception and Rejection of Aristotelian Cosmology by Chinese Scholars

Anna K STROB

Building on the rediscovery of the importance of the physical world in the writings and the intellectual discourse among late Ming scholars, Jesuit missionaries undertook to translate the Aristotelian corpus into Chinese at the beginning of the seventeenth century. This extensive effort had the potential to create a systematic, coherent, and unified body of Renaissance science translated into Chinese. My presentation will examine one result from this attempt, the Kongji gezhi 空際格致 (Investigation into Phenomena in the Atmosphere), a treatise written by the Jesuit missionary Alfonso Vagnone (c. 1568-1640) around 1633 as a Chinese adaption of the Coimbra commentaries on Aristotle's natural philosophy. With my analysis of selected passages from the text, I will propose a nuanced evaluation of the process of knowledge transmission, focusing not only on the Jesuits' translation efforts but also on the history of reception. In particular, I will trace how the idea of a material composition of the cosmos has been received by the Chinese cultured elite and found its way into the intellectual discourse of late Ming and early Qing scholars.

P8: Postwar Networks of Knowledge, Material, and Marketplace within and beyond East Asia

Sellers of Knowledge Service: Fertilizer Plant Constructions and the Commercial Network of Engineers in 1950s East Asia

Juyoung LEE

During the postwar development boom in East Asia, the contract construction industry in the region created a large market for both local and foreign companies. This presentation traces American companies that entered this knowledge service market, serving as the transnational conveyors of knowledge, experience, and human network around Cold War East Asia's infrastructure projects. To win contracts, American engineering firms had to prove that they held suitable expertise in not only engineering but also in overseas development. For example, the Chemical Construction Corporation (CCC) was able to sign contracts for Taiwan's fertilizer plant construction projects under the consortium by Wah Chang Corporation. Wah Chang was an American engineering firm established by a Chinese American, Kuo Ching Li, and was already renowned for its business between the US and China. After coming to Taiwan through the Wah Chang connection, the CCC then used its experience in Taiwan to win the initial planning contract for South Korea's fertilizer plant construction. By doing so, the CCC could reidentify itself as the expert of engineering in East Asia.

Expanding knowledge service market in East Asia during the 1950s created higher competition within this commercial network around infrastructure construction. As the network grew, engineers, businesspeople, bureaucrats, and politicians from diverse backgrounds got involved, and conflicting interests created new tensions. Through the network, multinational engineers carried and coped with personal, social, and political baggage attached to their identities along with their expertise across countries for different

state-led projects. I rediscover the human interactions between these diverse actors whose roles were diminished in the narrative of infrastructure for national development. By doing so, I argue that these micro-level transnational tensions dwelled in East Asia's infrastructure projects that would later become symbols of national economic success.

Transnational Intermediaries: The Cold War Origins of the Korea Development Model

Hyungsub CHOI

By the late 1960s, South Korea emerged as one of the most successful examples of postwar development guided by the United States. The rise of the South Korean experience as a "model," however, was a product of a complex dynamic among transnational actors and institutions in the 1970s, each with overlapping but different aims. This presentation captures a snapshot of such dynamics through the efforts of two notable transnational intermediaries: Lee Hahn Been (1926-2004), a Harvard-educated bureaucrat-turned-academic who was appointed in 1970 as the inaugural director of the Technology and Development Institute, a new unit of the East-West Center (EWC) in Hawai'i; and Choi Hyung Sup (1920-2004), who served as the inaugural director of the Korea Institute of Science and Technology (KIST) and Korea's minister of science and technology. Using his position as director of a U.S.-based policy think tank, Lee effectively enrolled Choi and his KIST colleagues to meet the need of development planning in other underdeveloped countries in Asia. The first major "client" of the "Korea Development Model," as formulated by Lee and Choi, was Indonesia, a nation yearning for rapid technology-based development in the late 1960s. The EWC in Hawai'i and KIST in Seoul served as important stages on which the "Korea model" was shaped and packaged. This presentation is based on archival material from the USAID, Rockefeller Archives Center, and the Choi Hyung Sup papers at Jeonbuk National University.

From a Failed Experiment to a Prominent Solution? Taiwan's Wind Power Development in Retrospect

Tsaiying LU

The renewable transition has become one of the global solutions toward decarbonization. In Taiwan, increasing the percentage of electricity generation from renewables means achieving energy independence and a critical policy response to the nuclear disputes, especially after the Fukushima Incident. However, Taiwan's pursuit has relied mainly on imported renewable energy technologies such as onshore/offshore wind turbines and their operating systems from foreign developers and manufacturers. "Localization" is, thus, a significant component in facilitating such an energy policy to create a supply chain for the green industry. With a closer look at the past, Taiwan's state-owned power company, Taipower Company (TPC), had, in fact, built Taiwan's first wind turbine at one of Taiwan's offshore islands, Penghu Island, in 1965, based on the Danish Gedser design. Although they decided to shut it down in 1972, claiming that the turbine had finished its research purpose, this presentation argues that such an experiment shows Taiwan was not unfamiliar with such technology. What purpose it serves and what caused the halt and revival deserve further understanding.

This presentation begins by exploring Taiwan's wind power harnessing history in the context of the growing international interest in alternative energy in the 1960s. Tracing the TPC engineers' efforts in transplanting the Danish model to

Taiwan, it discusses how the wind power converting technologies were tested, terminated, and relaunched over time. As the story unfolded, the engineers' practices suggested a rather discontinued course of imitation, adaptation, and divergence as Taiwan's wind turbine manufacturing industry shifted to invest in small-scale wind turbines instead. Furthermore, it presents how Taiwan started from an early adopter to a latecomer in the wind industry.

Bridging the Laboratory and Field Studies: NAMRU-2's Transnational Global Health Knowledge and Animal Trading Networks in postwar Taiwan, the Philippines, and British North Borneo, 1950s–1960

Shinyi HSIEH

Ten years after the U.S. Naval Medical Research Unit Two (NAMRU-2) started its operation in Taiwan in 1955, this U.S. military medical research facility for tropical diseases in Asia Pacific had come to be recognized as one of the world's major suppliers of animal specimens during the mid-1960s. This paper examines NAMRU-2's geographically expanded research for collecting animal species and studying Asians and their tropical diseases in postwar Taiwan, the Philippines, and British North Borneo (current Malaysia). By employing the transnational approach, this paper traces how knowledge and bio-material objects moved unevenly across territorial borders throughout the postcolonial infrastructure as well as the collaborative efforts among the indigenous communities, scientists, and technicians. In fact, the transnational approach helps us to decenter the Global North and to pay more attention to borders where the knowledge usually flows slow. To understand the momentum behind the transnational knowledge and material network, this paper analyzes three NAMRU-2 projects from the 1950s to 1960s: (1) an island-wide specimen collections in Taiwan since 1957, (2) a southbound "geomedical" expedition to Jesselton in 1960 as invited by the British colonial medical services at its colony of North Borneo (led by the NAMRU-2 commander Robert E. Kuntz, the head of parasitology), (3) the NAMRU-2 commander Robert Philips's first field-trip to Philippines during an epidemic of cholera in Manila, 1961. Throughout unfolding the fieldwork within these NAMRU-2 led-projects involved a huge amount of local Asian technical labor, this paper illustrates the ways in which imperial powers operating in NAMRU-2's field exploration and standardized laboratories agenda on the islands of Taiwan, the Philippines, and British North Borneo. Their collection and studies of animals in East and Southeast Asia contributed to the global health knowledge production in the disciplines of parasitology, virology, microbiology, and veterinary studies in the western contexts. By bringing the animal subjects into the historical narrative, I also argue that the animal species acted as a methodological bridge that connected the laboratory and field studies during NAMRU-2 operations in postwar East and Southeast Asia.

P36: Astronomical Observations and Records in Ancient East Asia

Gradations on Sphere：A New Research on the Star Observation in Chongning Period of Northern Song Dynasty

Boshun YANG
Longfei CHU

Very few was known about the details of star observation in Chongning 崇寧 period of Northern Song Dynasty. Based on the research of some newly founded positional data of stars, this paper found that there was actually a star observational activity carried

out in Chongning period, which was comparable to the Huangyou 皇祐 observation. The paper calculated the accuracy and observing time of the real data, and figured out that their accuracy was significantly better than Huangyou star catalogue, and was for now the highest level of star observation in Northern Song Dynasty. The progress of star observation in Chongning period was largely due to the usage of a new instrument (most likely to be Yuanyou celestial armillary sphere) with fine scale, which divided one degree with four gradations. The employment of fine scale on celestial armillary sphere, which proved to be an important change in the history of stellar observation in Song Dynasty, enabled the observers to discover that some star-distances of 28 lodges were not whole numbers. This discovery challenged the traditional concept that "key stars of 28 lodges must agree with the graduations of degrees", made the ancient observers to seek for more accurate astronomical coordinates.

Records of Meteors in the Ming Dynasty

Liping MA
Ciyuan LIU

A total of 2248 meteor records of the Ming Dynasty were recorded in the the Ming ShiLu (Memoir of Ming Dynasty), which had been recorded in the largest number in the Ming Dynasty and accounts for more than half of the total spaces. In the early and middle Ming Dynasty, records of meteors were intensive, especially in certain years and months; after the reign of Jiajing, few meteors were recorded. After the reign of Chenghua, local records of meteors were began to reported to the court, which became the mainstream of the Ming ShiLu meteoric records after the reign of Hongzhi. Records of meteors in the Ming ShiLu are relatively detailed, with a fairly fixed basic format and content. There are seven meteor showers recorded in the Ming ShiLu, among which three should be the Orionid and Perseid meteor shower. There were three other records, all around November 8, which confirm each other, but there is no clear modern counterpart. The annual distribution of meteors can be calculated by the date of each record in the Ming ShiLu. It can be seen that the prominent date around August 10 corresponds to the Perseids, October 16 to 21 corresponds to the Orionids, and December 11 corresponds to the Geminids. Seventy-one records from November 6 to 10 were analyzed, and 27 of them matched the radiant point of the Leonid meteor shower. There are no clear modern counterpart for the three meteors mentioned above and that the 45th year of the Jiajing meteor shower (1566) mentioned in many local journals was the Leonid meteor shower. It should be noted the large gap between the recorded date and the modern date in relation to a change in the comet's orbit.

History of Korean Star Map and 5C mural constellations

Hong-Jin YANG
Yong-Bok LEE

Korea has a long history of star maps. Notable star maps in the prehistoric age are star-like cup-marks carved on cover stones of dolmens. Korea has the greatest amounts of dolmens in the world, and some of them have constellation-like cup-marks such as the Big Dipper, Sagittarius, Corona Borealis, Pleiades, and so forth. The representative star maps of the historical era are the Goguryeo (37BC~AD668) tomb star-paintings and the stone star chart, CheonsangYeolchaBunyaJido (天象□次分野之圖), derived from Goguryeo dynasty, which was located in the northern part of the Korean Peninsula.

In December 2018, in the southern part of the Korean Peninsula, a 5C mural constellations were newly discovered. There are constellation-shaped 134 grooves with various size on the ceiling of the tomb 13 of the Ara-Gaya (42-532 CE.) polity in Haman(咸安). As a result, we identified these grooves with traditional constellations such as 房, 心, 尾, 箕, 斗, which correspond to Scorpius and Sagittarius of modern constellations near the Milky Way. It shows that advanced astronomy also existed in Ara-Gaya tomb while star charts were painted in Goguryeo tombs.

In this talk, we would like to introduce the history of Korea's star-map and the mural constellations of the 5th century.

The formation of the official astronomical instrument system and the improvement of Twenty-four solar term constants in the Eastern Han Dynasty

Tengyue XIONG

The middle star at hun and ming, the qujidu of the ecliptic, the length of eight-chi pole(Biao) at the noon and the length of Lou-ke round the clock of the Twenty-four solar terms, were established in the medieval Chinese official calendar and also the regular topics of astronomers.The accuracy of these four items successively made a major breakthrough in the Eastern Han Dynasty, which was closely related to the new progress of instruments at that time. In the Eastern Han Dynasty, astronomical instruments such as star maps, armillary sphere (Hunyi), gnomon(Gui-biao), and clepsydra (Lou-ke) were either newly built or improved in their use, gradually forming a system of astronomical instruments in which "star maps, armillary sphere (Hunyi), gnomon(Gui-biao)"(图仪晷漏) cooperated with each other. The four instruments in this instrument system correspond to these four data items of the Twenty-four solar terms in calendar respectively, and thus becomes the instrumental representation of the constant degree(常 度) of these calendar, symbolizing the regularity of the celestial movement, and having the function of verifying the calendar and accounting for the will of heaven. As the ancients said "Setting the instruments, determining its constant degree, if it coincides with the actual sky, it is auspicious, otherwise it is ominous." It is helpful to understand the formation of the official astronomical instrument system and its relationship with the calendar in medieval China by studying the history of the synchronous evolution of instruments and calendars.

A study on the Star Chart made by Yi Xing

Guangchao WANG

In the "Treatise on Astronomy in the New History of Tang"（新唐書·天文志）, there is a paragraph describing the method of drawing star chart which was considered to be stated by the famous astronomer Yi Xing in the Tang Dynasty. This chart was depicted according to the style of Gaitian Cosmology in which set inner, middle and outer circles, as well as twenty-eight constellations and some important star officials. The ecliptic curve, which was very close to a perfect oval, is particularly Striking. The method once draw attention of Professor Bo Shuren and Mr. Pan Nai who praised the method of drawing the ecliptic line. They deeply regretted that the plotting ecliptic method was not been inherited by Yixing’s later generations. In this article, I try to reconstruct this star chart based on the text in Treatise on Astronomy in the New History of Tang, and to analysis the method of curving the ecliptic. Furthermore, I will examine the method and accuracy of star observation in the Mid-Tang Dynasty, as well as the cosmological theory in the method of star-chart. We consider that Yi

Xing did not make clear which one is better between Gaitian theory and Huntian theory. The two models are not either one or the other, but cosmological models that can coexist and even complement to each other.

A Study on the Definition of Terms Related to Approach and Angular Distance between Celestial Bodies in Korean Historical Astronomical Records

Hyojun LEE
Hong-Jin YANG

We examine the terms describing the approach between celestial bodies used in Korean historical astronomical records using over 2,300 records from Goryeosa (高麗史), Joseonwangjosillok (Sillok, the Annals of the Joseon Dynasty, 朝鮮王朝實錄) and Cheonbyeondeungrok (Deungrok, 天變謄錄). First, we analyze the following four terms: Entry (入, En), Invasion (犯, In), Occultation (掩, Oc), and Eclipse (食, Ec). We calculate the angular distances (ADs) at the time of observations based on modern ephemeris DE431. We find that the ADs corresponding to the terms En, In, Oc, and Ec were respectively (a) , and in Goryeosa records of the Goryeo Dynasty and (b) , , and from Sillok records of the Joseon Dynasty. Second, we convert another common AD unit Chi (尺) to modern AD unit degree(). From historical comet drawings and text records of Deungrok and records of Goryeosa and Sillok, we estimate the angular size of the tails of comets in degrees and examine the correlation between two units Chi and degree. Finally, we estimate another common AD unit, Chi, to be on average ~1.29, based on Deungrok of the Joseon Dynasty as well as Goryeosa and Sillok.

A study on the star catalogue made by Ferdinand Verbiest

Fan YANG

Ferdinand Verbiest published the Xinzhi Lingtai Yixiang Zhi (<新制灵台仪象志>) in 1673. There are series of star catalogues which contained the position of more than 1800 stars in it. This study research into the Verbiest's star catalogues and the star maps arising in the course of Chongzhen calendar reform at the end of Ming Dynasty. Through the comparison of corresponding data in star catalogues and position information extracted from the star maps, we found: Jesuits observed stars anew on the basis of western star catalogue or star map, and were modifying the data since Chongzhen calendar reform; A star catalogue contained about 500 stars is not published at the end of Ming dynasty, but it can be traced in the star maps. Verbiest publish the catalogue in his book; The data sources of Verbiest' s the star catalogue is discussed in this study.

Dating ancient star catalogues

Sang-Hyeon AHN

Dating ancient star catalogues is an important step for further analysis.

In this talk, I would like to review the dating methods used so far by researchers and discuss the problems unsolved.

I also introduce a new statistical method for dating ancient star catalogues using precessions, proper motions, and accurate astrometric data.

I have applied this method to a number of catalogues including those of Hipparchus, Ptolemy, al-Sufi, and Kusyar, as well as the Chinese ones including the oldest one in the Han dynasty.

P57: Studies on the Knowledge System and Cultural Function of Chinese Abacus

On the Computational System and Cultural Characteristics of Chinese Zhusuan（Abacus）

Shirong GUO

Chinese Zhusuan is a kind of mathematical calculating technique on the base of the calculating tool Chinese suanpan (abacus). It is not only a practical technique, but also bears an important cultural function. This paper will study Chinese zhusuan from the scientific and cultural aspects.

Scientifically, we attempt to clarify the main subject and structure of the zhusuan calculating system, show its mathematical thinking mode, and analyze the formation and evolution processes of the system. Besides the functions of each component part of the device suanpan, the procedures and rules of manipulating beads of suanpan, and various associated pithy formulas, zhusuan algorithms and their designs were the core content in the zhusuan calculating system. Chinese mathematicians built a bridge between mathematical principles and suanpan through zhusuan algorithms, by fully considering the structure of suanpan, applying the concepts of cumulative system, place value system, cyclic algorithm, programmability and mechanization to design, and pursued the diversity, simplicity, flexibility and flexible application of algorithms.

Culturally, The zhusuan culture had had a great impact on mathematical culture in China and other East Asian countries, and played a huge social role. Suanpan became an indispensable calculating tool in Chinese society and was engaged in all fields related to computations. It was very popular in the whole society of China, and almost all persons who needed computation had mastered the zhusuan technique. In the middle and late 20th century, zhusuan ability even became the basic skills and work qualifications necessary for all financial personnel. Historically, zhusuan had become an important theme in painting, poetry, literature, drama and other works, enriched the Chinese language vocabulary, changed the writing style of mathematical works, effectively promoted the popularization and dissemination of mathematical knowledge, and played an important educational role. Zhusuan also played an important role in cultural exchange and communication. Where there were Chinese, there was suanpan, which is widely spread around the world.

In a word, zhusuan as a computing technique, is of scientific, practical and unique nature, offering the world an alternative knowledge system; as a culture, it is considered by Chinese people as a cultural symbol of their identity, was transmitted from generation to generation, serving multiform socio-cultural functions.

The Zhusuan (Abacus) Culture in Edo Japan

Zelin XU

Under the influence of economic and trade ties and Chinese culture, Chinese zhusuan (abacus) culture spread and became popular in Japan during the Edo period, which not only became a basic skill of Wasan (Japanese mathematics), but also an important part of Edo commercial culture and Machi culture. Based on Wasan books, sangaku which were open mathematical wooden plaques with painted decoration and hung on buildings like temples or schools, and other Japanese historical documents, this paper examines the Japanese absorption to Chinese zhusuan and the situation of localization, especially Japanesization of pithy formulas of zhusuan and the improvement of the methods during the Edo period of Japan. At the same time, through the investigation of illustrations in Wasan books, commercial advertisements,

Buddhist materials and literary works in the Edo period, the relationship between zhusuan and primary education in the Edo period, as well as its impact on commercial development and populace life are discussed.

The Establishment of New Educational System and the Rise of New Abacus Education in the Late Qing Dynasty

Lisheng FENG
Lili BAO

At the end of the Qing Dynasty, mathematics education was gradually institutionalized and its abacus education also changed significantly with the establishment of the new educational system. "Presented School Regulation" promulgated in 1904 (Kui-mao educational system) marked the birth of modern education in China. The arrangement of "Arithmetic" subjects in the educational system was relatively systematic. Both Chinese and Western mathematics were included. In addition to the written calculation courses, "abacus should also be taught for daily business use", which had also been influenced by Japan in terms of abacus curriculum and teaching content. The abacus course was set up in primary schools, higher primary schools, middle schools, normal schools, women's schools and some industrial schools. The arrangement of the content of "Abacus" in Kui-mao educational system was the main reference for the abacus part and the abacus course in the following school system.

Based on the historical documents, this paper studies the teaching and textbooks of abacus on the background of the educational system in the late Qing Dynasty, compares the changes of abacus formula and simple algorithm, and discusses the rise of new abacus education characterized by practicality and simplicity. Abacus is an important part of Chinese traditional mathematics, which has strong practicality and vitality. It is of great historical significance to take abacus as the content of mathematics education in the new school, and to confirm and promote it from the system. It is also one of the important signs of the modernization of traditional mathematics to reorganize the knowledge and teaching content of abacus with new ideas by editing abacus textbooks. The institutionalization of abacus education in the late Qing Dynasty not only led to the revival of abacus education, but also promoted the development of abacus itself, making the knowledge system of abacus more complete and compatible with the modern education system, laying a foundation for the further development of abacus in the Republic of China.

Chinese Abacus in Russian's Mind in the 19th Century:Centered on Goshkevich's Chinese Abacus

Lili BAO
Lisheng FENG

Some parts of the Chinese zhusuan (abacus) work Sufa Tongzong (1592) was translated into European language in the first half of the19th century. Then some Europeans scholars became interested in the calculation device suanpan (abacus) and its calculation techniques and Chinese calculation culture. Some sinologists introduced Chinese zhusuan, related works and calculation techniques to Europe in different languages, and did some more in-depth research.

As a student of the Russian Orthodox Missions in Beijing, Losif Antonovich Goshkevich (1814-1875) arrived in Beijing in 1840 and worked in China for 10 years, being responsible for the library, magnetic astronomical station and magnetic observation of the Missions. He studied oriental languages such as Chinese, Manchu, Mongolian, Korean, and Japanese,

was deeply interested in Chinese science and technology, history, language, arts and philosophy, and wrote a number of papers.

Goshkevich investigated Chinese suanpan and its techniques in detail, studied some Chinese works of zhusuan, and introduced zhusuan to Russians. He wrote a paper titled Chinese Abacus which was published in Volume II of the Collected Works of Missionaries of the Russian Eastern Orthodox in Beijing in 1855.

Goshkevich's introduction of Chinese Zhusuan was based on his research and investigation of Chinese literature. It was a more comprehensive introduction to the basic contents of Chinese zhusuan, introducing the structure, calculation principle and operation method of the suanpan, examining in detail the operation processes of the addition, subtraction, multiplication and division, giving a more comprehensive introduction to the relevant pithy formulas, and studying the skills of various special algorithms. He also compared the Chinese suanpan with the Russian abacus, and noticed "before we have come up with the same convenient and feasible division algorithm applicable to our abacus, the Chinese abacus has always been in an advantage." In a word, through Goshkevich's research and introduction, the mid-19th century Russians had a certain understanding of Chinese zhusuan.

P59: The History of Disease Prevention and Control in Contemporary China

From "Peep show" and "Photographic Studio" to "Self-run Sanatorium": The Prevention and Treatment of Tuberculosis in Beijing (1949-1956)

Cong WANG

During the early period of the People's Republic of China, the dominant diagnosis method of tuberculosis was through the discovery of early-stage patients by organizing collective X-rays. However, the early-stage patients could not undergo appropriate treatment because of the lack of beds in TB sanatoriums and the high hospitalization fees. Meanwhile, medical workers lacked motivation and appreciation for the early identification method, and nicknamed X-rays as "layangpian" (peep show) and the TB sanatoriums/hospitals as "zhaoxiangguan" (photographic studio). Taking Beijing as a case study, this article examines why reliance on X-rays technology and TB sanatoriums/hospitals was ineffective in TB control in the early period of the People's Republic of China, and how the treatment and management of TB patients were integrated into the collective life of the factories. Based on relevant archival materials from the Ministry of Health of the People's Republic of China and the Beijing Municipal Health Commission, this author traces the history of the first "xuesheng liaoyangyuan", the Beijing Student TB Sanatorium, which was established by university students in 1951. Inspired by this practice, some factories and universities established "ziban liaoyangyuan" (self-run sanatoriums) in 1952. To integrate disease control into economic development, the Beijing Municipal Public Health Commission decided to promote such "ziban liaoyangyuan," especially in factories in 1953. This innovative measure proved effective. In 1954, over 3,000 to 4,000 tuberculosis patients received treatment in their workplaces. More than a thousand early-stage tuberculosis patients recovered in a short period. Self-run sanatoriums became one of the main reasons why the specific death rate of tuberculosis decreased.

How to Addressing Vaccine Hesitancy? Lessons from the National Hepatitis B Immunization Program in China

Haiting JIANG

Hepatitis B is a major threat to public health due to its high transmissibility and the high incidence of chronic persistent and adverse outcomes. China has the highest disease burden of endemic hepatitis B virus (HBV). Perinatal transmission is a major mode of HBV transmission in China. After understanding the characteristics of hepatitis B in China and putting forward scientific prevention and control strategies, the Chinese government has been effectively practicing the policy of "prevention first with combination of prevention and control".

Vaccination is considered the most cost-effective way to control hepatitis B. Therefore, China has made strong efforts to establish universal infant immunization. In 1992, China introduced the hepatitis B vaccine into routine immunization while parents had to pay for the vaccine. Since 2002, with the financial support of the Global Alliance on Vaccine and Immunization (GAVI), all newborns of must complete the vaccination without the fee of HBV vaccine. In 2005, the State Council issued the “Regulation on Management of Vaccine Circulation and Preventive”, free hepatitis B vaccination services to all infants with user fees eliminated, providing equal opportunity for all socioeconomic classes. In 2015, HBV immunoglobulin was injected into newborns within 24 hours after birth based on the HBV vaccination, and hepatitis B screening was provided free of charge to all pregnant women.

However, vaccine hesitancy, a delay in acceptance or refusal of vaccines despite availability, which is influenced by complacency, convenience and confidence, results in disease outbreaks and deaths from vaccine-preventable diseases. Over the past 40 years, China has taken effective measures and multiple strategies to promote vaccination: (1) establishing the mechanism of internal coordination among multiple government entities and international cooperation and using comprehensive strategies to improve vaccine coverage; (2) assuring immunization injection safety; (3) increasing the awareness of the importance of timely birth dose (TBD) among providers and parents by health education; (4) intensifying training for health care workers; (5) monitoring and supervision of vaccination activities; (6) improving hospital delivery rates through provision of subsidies to parents to encourage delivery of infants in hospitals and (7) subsidizing providers as an incentive for providing TBD.

China's hepatitis B immunization program has played an essential role in the HBV containment, which has effectively controlled the prevalence of chronic HBV infections and could considerably accelerate the achievement of the global “2030 Elimination Goals”.

Welfare and Risk: Collective Childcare in the 1950s and the 1958 Measles Epidemic in China

Yanan JIN

In the 1950s, with the aims of speeding up socialist construction, emancipating women’s productive forces and cultivating socialist “new children” for the country, institutional nurseries, such as factory nursery and mine nursery, were established in urban areas of China. In rural areas, nurseries were founded in busy farming seasons. The control of pediatric infectious diseases in nurseries was paid attention to in the early period. The establishment of nurseries made it easier to monitor and count vaccine-preventable infectious diseases. However, China’s fertility rate was very high in the 1950s, leading to a large increase in children who may be susceptible to infectious diseases. Meanwhile, in the context of the Great Leap

Forward, a large number of nurseries were set up quickly in both urban and rural areas. A great quantity of vulnerable children were concentrated in limited space. The densely populated environment and the lack of medical expertise of child-care workers posed the hidden danger to the outbreak of infectious disease. Therefore, in 1958, infectious diseases such as measles became epidemic in China. The importance attached by the medical community to the prevention and treatment of infectious diseases in collective childcare institutions such as nurseries, and relative disputable issues could be reflected in some remedial meetings and documents at that time. Moreover, the 1958 measles epidemic promoted the clinical observation and scientific research on measles, and enhanced the institutional cooperation in measles vaccine research, accelerating the pace of vaccine development. From the perspective of the social history of infectious disease prevention and control, this paper examines the relationship between the nurseries——originally as the welfare undertaking——and the 1958 measles epidemic——representing the risk brought by collective childcare, providing a lens for understanding the interaction between medicine, technology, and politics, economy and society.

Pap smear and early cervical cancer mass survey in China

Jiqi ZHENG

The Pap smear is one of the essential methods for early diagnosis of cervical cancer. The Pap smear was invented in 1941 when George Papanicolaou and Herbert Traut published an article in the American Journal of Obstetrics and Gynecology detailing the technique of the Pap smear and how to dye the specimen. Pap smear has also received strong support from the American Cancer Society because it is simple, cheap, and effective, and can detect the presence of abnormal cells in the early stages of cancer.

Dawang Yang, an obstetrician and gynecologist in China, introduced cytological diagnostic techniques, Pap smears, staining and grading methods into China for the first time. She took the lead in the cytological diagnosis of endocrine diseases and female genital system neoplasms. She also successfully established a set of standard examination, production, microscopic examination, registration, and filing systems suitable for China's national conditions, which provided technical support for the cervical cancer mass survey program. Chinese health workers learned from the Soviet Union's organizing model of health care and cancer prevention and have applied it to the cervical cancer mass survey pilot, showing China's unique model that integrates the United States' cytological screening technology and Soviet organizing experience. Through the pilot, the mass survey for female workers in factories and residents in the districts, the women health workers have a preliminary understanding of the incidence of cervical cancer in Chinese women and have accumulated experience in the survey of factories and districts. At the same time, the work showed characteristics of "treatment was driven by examination" which provides a reference for the popularization of mass surveys and treatment in the country. This study aims to review the history of Pap smear technology from its appearance to its introduction in China and reproduce the historical picture of the preliminary exploration of Pap smear technology in the cervical cancer mass survey in China.

P6: Vernacular Healing: Productive Entanglements between Practical Knowledge and Chinese Medicine, ca.1500-1980 A Panel in Honor of the Memory of Nathan Sivin (1931-2022)

Assembling Experimental Therapeutics for Traditional East Asian Medicine in Colonial TaiwanDr. Tsungming Tu 杜聰明 and the Rise of a Contested Program in Transnational Science

Sean Hsiang-lin LEI

This paper intends to solve a pair of salient enigmas in the history of medicine in modern Taiwan: Why did Dr. Tsungming Tu 杜聰明 (1893-1986), the widely acclaimed representative of medical modernity in Taiwan, devote himself to developing innovative programs for conducting scientific research on Traditional East Asian medicine (TEAM)? And why have popular science authors and Tu's otherwise enthusiastic admirers, past and present, downplayed this aspect of his work as a taint on his scientific record? The answers to these two questions will help develop the history of scientific research in TEAM, which culminated in the Nobel Prize in Medicine being awarded for the discovery of artemisinin in 2015.

By situating Dr. Tu in transnational contexts of scientific research, this paper argues that he endeavored to develop a novel scientific approach to assess what he saw as the under-appreciated value of TEAM. Under the banner of "experimental therapeutics" (shiyan zhiliao xue 實驗治療學), then a new development of modern pharmacological sciences that had originated at Johns Hopkins University, Dr. Tu assembled a unique research program that aimed at creating breakthroughs in the following four dimensions: First, Tu advocated for funding of "experimental therapeutics" in colonial Taiwan, which at that point was a discipline that did not exist in Japan proper. Second, he promoted the study of traditional East Asian medicine with experimental therapeutics, which constituted a break from Japanese pharmacological studies of materia medica. Third, he intended to build a research-oriented hospital of Kampo (Japanese-Chinese) medicine, which was then an unheard-of proposition in East Asia. And fourth, in studying traditional medicinals, he suggested that researchers adopt a "reverse-order protocol," which began with clinical trials on the human body and was therefore widely criticized as violating the code of research ethics. Rather than embrace a conservative, anti-scientific stance, Dr. Tu drew on several new developments to assemble a highly innovative, and therefore controversial, research program for studying traditional East Asian medicine.

By investigating Tu's innovative research design, this paper shows how he strategically selected specific branches of different science and knowledge traditions to assemble an in-between space for producing new knowledge. With this design, his research program pursued two goals at once: Realizing the under-appreciated value of TEAM and advancing the frontier of science—creating a vernacular tradition of experimental therapeutics.

Healing with Recipes in the Home: Experience, Skills, and Virtue in Late Imperial China

Ying ZHANG

The circulation of recipes in Qing dynasty vernacular texts brought about changes in the social meanings and techniques of healing knowledge in late imperial China. Healing skills and techniques appeared in recipes as part of daily household practice; experience of self-treatment became an

important criterion for validating the efficacy of recipes. This had not always been the case. During the late sixteenth and early seventeenth centuries, making medicines by oneself was a clearly articulated element of literati practice of cultivating life. Recipes and the medicines they prescribed served as culturally and socially significant artifacts. They represented a literati way of life, and circulated as gifts among scholars. This practice shifted in the eighteenth and nineteenth centuries when practice-oriented recipes became increasingly available through vernacular texts such as manuals, novels, and daily encyclopedias. These recipes present the practice of making one's own medicine as an important way to regulate one's bodily condition and secure a virtuous life in daily household practice. They offer detailed instructions for commoners to guide them in handling household substances, collecting and processing drug substances, and healing themselves with simple rituals. Qing-era vernacular recipe books presented these as skills that anyone could learn. People from all walks of life collected and circulated recipes for treating themselves in their household and accumulating merit. Within the household, these healing techniques were thus no longer the exclusive purview of physicians, but technologies with which people cultivated virtue and constructed their social identity in daily practice.

The Stuff of Life: Animating Forces in Early Modern China

Andrew SCHONEBAUM

Life itself – what animates a body—is the ultimate object of unseen inquiry. We are always gathering first-hand information about our bodies, and yet, as a natural object what makes it go is elusive. What is the difference between a body that is alive and one that is dead? What transformation takes place in the moment of death? What bodily mechanism happens in the womb to generate life? Investigating these debates requires looking at elite and popular texts and considering how common knowledge circulates and changes. Prescriptions to nourish life, rather than to cure illness, usually only occur in certain kinds of popular texts and tend to employ a sympathetic logic - urine from young boys, fine cream, chrysanthemums, gold and jade, cinnabar and mercury. But this kind of logic that relies on things that are young, beautiful, valuable, or which seem to have a life-force of their own, does not explain what it is that the medicine is nourishing. Elite medicine, by contrast, identified "minister fire" as the very root of life, and its generation in the "gate of life," but doctors could not agree what it was or where it was, or even if it was a material structure in the body or a formless one. In this paper, I consider contending conceptions of the animating force by looking at inquiries into death, souls, the gate of life, zombies, and the many ways people are returned to life in entertainment literature, medical handbooks, pharmaceutical texts, histories, and newspapers.

Sudden Turmoil: Cholera and the Common Reader in Early Twentieth-Century China

Joan JUDGE

The entry of cholera into China in 1820 provoked intense debate over whether this new epidemic disease was distinct from, or a more virulent version of "sudden turmoil" (huòluàn), an ancient Chinese illness concept. At a time when biomedical treatments remained elusive, such debate did little to alleviate the suffering of those who lived through fourteen major surges of this fearful disease in the first fifty years of the twentieth century.

This presentation is based on a corpus of vernacular texts—including daily-use compendia, household manuals, and recipe collections—that were created to help common readers confront the lived experience of huòluàn/cholera. I approach these texts as both how-to manuals and epistemic genres, as guides to disease prevention and treatment, and as sources of knowledge. I first track the uneasy mapping of the new disease concept, cholera, onto the more capacious historical concept huòluàn, and question what it reveals about the commoner encounter with new notions of illness. I then examine the expanding repertoire of accessible, practice-oriented recipes for the prevention and treatment of disease that these texts offered their readers. Finally, I explore the ways the compendia created new assemblages of "Sino-Western medicine" by both vernacularizing foreign scientific knowledge and scientizing age-old cures in a new global disease context. The presentation demonstrates that the diverse forms of knowledge that circulated in and out of these vernacular materials were integral to the broader history of the era: to the unfolding social meanings of illness and the material circuits of knowledge.

P54: Articulating Agricultural Knowledge in Premodern China and Korea

"Use Manure Like Medicine" –Ideas on Fertilizers in Late Imperial Farming Manuals

Joerg Henning HUESEMANN

In the 19th century, many innovative techniques were introduced to improve Western agriculture. Among these, the so-called "fertilizer revolution" was an important step in increasing the farmers' yields. Particularly the research by German chemist Justus von Liebig (1803–1873) influenced the development of agriculture from an empirical into a laboratory agriculture. Liebig proved that plants consume minerals contained in the soil during their growth and that this loss must be compensated by fertilization. Although Liebig highly valued Chinese agricultural practice, he also believed that Chinese agronomists had developed their knowledge solely empirical and without any scientific or theoretical ideas. Even 20th century scholars of Chinese agricultural history, widely regard premodern Chinese agriculture as being solely practice-centered and mainly empirical. However, in my presentation, I will show that Chinese agronomists began to explain agriculture "on their own terms" quite early, using various concepts of nature and based on their own knowledge and perceptions. Moreover, I will demonstrate that descriptions of soil and fertilizers are a perfect lens though which to examine these theoretical considerations of agronomists. In fact, their writings reveal that agronomists regarded a thorough understanding of the principles of nature as a foundation for an efficient agriculture, much needed to feed a growing population. Based on farming manuals from late imperial China, I will discuss the basis on which the agronomists of imperial China developed their understanding of soil and fertilization. I will argue that apart from possessing practical knowledge of agriculture, several agronomists were heavily influenced by medical concepts. Their accounts were thus not only based on empirical knowledge, but also contained a considerable number of theoretical concepts and considerations. My contribution therefore presents agricultural manuals as a good example of how Chinese agronomy developed from an empirical to a theory-

driven agronomy during the Ming and Qing dynasties.

Farming progress and weather reports in late Chosŏn administrative practices

Kyonghee LEE

A subtype of official reports that provincial governors and county magistrates submitted in regular intervals in late Chosŏn Korea was the dispatches on the local 'farming situation (nong'hyŏng)' and 'rainfall benefits (ut'aek)'. The dispatches, to be submitted every ten days during the farming season as a rule, established themselves as an administrative practice over the course of the eighteenth century. They were an element of the monarchical system in which the sovereign and the central government made decisions based on the assumedly all-encompassing knowledge about all corners of the eight provinces. They were also a cultural and epistemic field on which Chinese norms and Korean practices contested and negotiated with each other.

What was their purpose? What kind of decisions did they make possible? If they were perceived as part of the political and administrative ideal of "encouraging agriculture (kwŏnnong)", which concrete steps connected the knowing to the act of encouraging?

Francesca Bray has underscored how knowledge production is not only innovation, i.e., the discovery and creation of something new and novel, but also management, the act of maintaining the innovation (Bray 2017). The implementation of farming and weather reports as a regular practice was an innovation, but at the same time, it was an innovation that built on an awareness of the importance of maintaining the status of knowing. This status, in turn, was to be achieved by a conscientious local tracking of how skills and practices were being deployed under which natural and social conditions.

Harvest, famine, flood, drought or warfare? Prognosticating the weather in Late Imperial China

Erling AGOEY

Weather is of key importance to agriculture, and yet it is something we have a very limited ability to predict. From the earliest agricultural societies onwards, people have sought ways to foretell weather conditions. Such weather prognostications have been adapted to local cultures but also express common fears and hopes. In China, weather prognostication, known from the earliest writings, came to be called "farmer's prognostications 農占 (nongzhan)." Through such divination, people could use the weather conditions at particular times to foretell harvests, grain prices, calamities and weather. By China's Late Imperial era, complex weather prognostication systems had developed, based on old traditions and adapted to the climate and cultural character of each region. This paper will summarise my research on Early Qing weather prognostication from the perspective of its use in agriculture. It will address these questions: Which role did weather prognostication play in Late Imperial agriculture (centred on late 17th-early 18th century sources). Did that people adapt their agricultural practices according to prognostication outcomes? How did weather prognostication vary in different agricultural zones across the Qing empire? And who used weather prognostication anyway?

Weather prognostication was most prominently recorded in local gazetteers, agricultural literature and related works. An important part of local farmers' culture, it was closely related to local customs, with prognostications serving as both a psychological means to handle calamities

and a popular pastime most often practiced during festivals. Prognostication certainly existed practically everywhere, though the most interest in recording it was in South China. The prognostication systems can be divided into regional groups, where neighbouring prefectures often recorded similar practices due to both local geography, agricultural practices and textual traditions. Finally, I will give some indications as to how the prognostications tradition fared when faced with modern meteorology in the 19th-20th century transition to modernity.

The Epistemic and Technological Underpinnings of Political Reform in Eleventh-century China

Chun XU

Much of the discussion of the Qingli and Xifeng reforms in China during the eleventh century has thus far centered on their economic and intellectual components. This paper examines the epistemic and technological underpinnings of the reforms. With an emphasis on the notion of shuili, or "benefits of water," it is argued that the debates between conservative and reformist factions over moral and fiscal issues reveal a discrepancy in their conceptions of legitimate political action. Emerging technologies in surveying, cartography, and agronomy expanded venues and opportunities for governance, compelling the local state in certain regions to gather new data, seek new forms of expertise, and mobilize labor for new purposes. The agro-ecological expectations of the rice-growing South inspired the reformists' notion that the state should actively harvest the benefits of water and other resources Heaven and Earth could provide. It represented a rearticulation of statecraft since the beginning of the Song dynasty. The conservatives, informed by the entrepreneurial experience of the Hebei military-physiocratic tradition, contested shuili's legitimacy as a category of knowledge and acceptable political action. Nevertheless, the vocabularies and technologies of shuili created a domain of statecraft in which state intervention was warranted and could be undertaken.

P49: History and Data: Mathematical Archaeology & Digital Humanities

An astronomical meaning of the structure of the Heaven-well pit

Anjing QU
Qingbo DUAN
Yiwen CHEN

The heaven-well pit (34.71º N, 108.875º E) located in Sanyuan County, Shaanxi Province, is a historical vestige of the Han Dynasty. According to the data of a preliminary archeological investigation, this huge bowl-like deep pit with complex structure could be designed as a national ceremonial architecture. The bottom of the pit was buried with soil when it was nearing to complete. The paper reveals the following result: The fan-shaped area at the bottom of the pit forms a huge model of the horizontal sundial. The astronomical significance of this structures reveals the function of the heaven-well pit as a place for the emperor to sacrifice to the Heaven.

Link Visions Together: Visualizing Geographies of Late Qing and Republican China

Qun CHE

Since the late 19th century, the Qing, the Beiyang, and the subsequent Nanjing Nationalist government of China began systematically conducting land surveying and mapping across the state. This paper will first explain the origin of these maps and the digitization work. Then introduce

the user interface from two aspects: CHMap as a carrier of land survey maps and as a tool for linking maps and images from different eras and sources.

1 The origin and digitization process of land surveying maps

What has been digitized is the Chinese Mainland Atlases (1:50,000). This atlas contains 4088 maps with metadata including when and who conducted the survey and platemaking. This set of maps records in detail the landforms and features of parts of mainland China from 1895 to 1944, including mountains and lakes, traffic routes, administrative boundaries, crops, windmills, soil worship, ancestral halls, temples.

3 CHMap as the Carrier of Land Survey Maps

The architecture of CHMap provides data-to-software and data-to-web connectivity, which can not only achieve efficient, cross-platform, and barrier-free sharing of these maps but also provide a digital ecosystem to help users connect to more external data and share the data with third-party platforms or software, to realize the use of geography as a bridge to communicate images of different sources.

5 CHMap as a Tool for Linking Visions Together

By opening up to mainstream standard images, maps, and application interoperability frameworks, CHMap enables users to place images, maps, and personal data scattered in various collection institutions worldwide on one platform for comparative research. While, CHMap supports data transfer with other software or related platforms. In this way, we expect CHMap to serve as a link in the interoperability of distributed image and geographic information data.

6 Spatial Epistemology: A Case of Local Gazetteer Imagery Research

CHMap's incorporation of local gazetteer images differs from the typical historical image display method. First, due to the inherent regional characteristics of local gazetteers, these images naturally have coordinates information to be geolocated and generate geographic visualization. In addition, CHMap is equipped with 4088 Land Survey Maps, which can serve as a control group or baseline for scholars to comparatively observe these images of different periods and social and cultural backgrounds and explore people's understanding and presentation of their own living spaces in different periods.

Multi-view 3D recording of Jiangjunya rock art

Jie YIN
Shuang WU
Kaiyue ZHANG
Tao WANG

The Jiangjunya rock art is situated on the eastern coast of China, on Mount Jinping in Lianyungang, Jiangsu Province. Due to the littoral nature of its geographical location and its unique pictorial contents, Jiangjunya rock art bears significant meaning for the historical and archaeological research on the pre-Historic Dongyi people in East China, especially on their living patterns and religious culture. However, due to weathering effects of the adjacent Jinping phosphate mine, the physical preservation of Jiangjunya rock art is now under severe threat. To facilitate the preservation and research of Jiangjunya rock art, we decided to build 3D models for the Jiangjunya petroglyphs, aiming to produce high-quality 3D models for the petroglyphs as well as their natural surroundings. In this project, we also aim to produce high-resolution orthophotos, aerial images and digital drawings for the petroglyphs.

The practice introduced has proved the convenience, feasibility and accuracy of multi-view 3D modelling, which we think is highly compatible with the digital reconstruction of large immovable cultural heritage sites. 3D modelling would also exhibit previously invisible or inaccessible attributes of the petroglyph panels, such as blurred lines or contours, while allowing scholars to conduct quantitative studies on the digital data.

The application and end-result of 3D modelling should also never be confined within one institution, used only for its archaeological survey and research. The promotion of 3D archaeological models and how to expand their public access beyond our discipline is still a worthwhile topic for discussion. Digital databases for rock art materials, including 3D models, can no doubt establish a relatively secure information-sharing system, providing data support to archaeological research, cultural heritage management and the virtual displays of digital museums. In the future, we hope to develop a multi-media interaction platform for the public display of Jiangjunya rock arts, even launching an online virtual tour of the site through virtual reality techniques. Such works have the prospect of breaking geographical limits, allowing for public access to relatively remote rock art sites while promoting public awareness of their preservation through virtual engagements.

Network Analysis of the Names of Animals, Plants and Minerals in Glossaries and Dictionaries Across Medieval Eurasia

Che JIANG

The flourishing of bilingual or multilingual wordbooks, glossaries and dictionaries is a significant cultural phenomenon in Medieval Eurasia. These highly dynamic texts act as important vehicles for transmitting knowledge across geographical, cultural and epistemic boundaries. In these sources, the names of many animals, plants and minerals were recorded, reflecting the philological efforts in plural contexts and constituting a part of natural history knowledge. A network analysis of these names will map the structure of the flows of natural knowledge across different borders in Medieval Eurasia. This study also intends to examine the validity of the historiographical framework of the "Global Middle Ages" by assessing the dynamics of knowledge transmission and rejection in a spectrum of various premodern written cultures.

P27: A Look Beyond Scientific Metropolis: Keijō Imperial University as a Transnational Node

Beyond the Locality: Demography and Transnational Network of Keijō Imperial University

Jiyoung PARK

Previous studies in history of colonial science have emphasized the locality of scientific knowledge produced in colonized regions. Although achieving fruitful outcomes for understanding scientific activities in colonies, that approach tends to limit interests and activities of scientific researchers at colonial institutes within geographical boundaries of the colonies. This paper aims to break the geographic compartmentation toward colony-based knowledge production and highlight the transnational academic network of the colonial institutes. To do that, it takes demographic research at Keijō Imperial University as a case. Mizushima Haruo, a professor of the university, is the key actor in this story. He started his demographic

career at Johns Hopkins University in the late 1920s with the support of the Keijō Imperial University. The support was in line with the Keijō Imperial University's strategy to improve its academic prestige in a league of Japanese imperial universities by accepting cutting-edge knowledge from the United States. Meeting the demands of the university authorities, Mizushima studied population phenomena across the entire Japanese empire after returning to Korea, while keeping intensive interactions with demographers in mainland Japan, Manchuria, Taiwan, and the United States. Based on these activities, he became one of the leading figures in the Japanese demographic community. This story shows that the knowledge production in the colonized region was the result of the transnational academic exchange, and the knowledge itself reflected not only the locality but also the university at the imperial level.

Imperial Nostalgia and Postcolonial Nation-Building: Keijo Imperial University (1926-1945) and its Impact upon early South Korean medical practice, 1946-1970

John P DIMOIA

The celebration of Seoul National University (1946-present) as a South Korean institution contrasts nicely with its explicit rejection of prewar imperial connection (1920s-1945), even though graduates of the university dominated Korean medicine for at least several decades.

This paper considers the symbolic and material implications of this uncomfortable relationship, beginning with the attitudes held by alumni. Both Korean and Japanese graduates continued to recall the former university in shaping post-war memory, and the latter group holds particular interest, as they have been until recently left out of the story almost entirely.

Materially, too, the relationship continued to inform the practice of formative South Korean medical institutions, especially preceding the establishment of restored relations with Japan in 1965, following normalization. In particular, many of the public health campaigns of the late 1950s and early 1960s were led by Keijo graduates, including Seo Byung Seol, one of the major figures in public health / parasitology. In effect, Korean medicine represents a hybrid set of influences—German, Japanese, American—with its practitioners using the language and models of their wartime training, along with newer language adopted from their postdoctoral positions and participation in international networks.

Constructing Colonial Knowledge of Space and Place in Mengjiang: In the Field with Keijō Imperial University's Man-Mong Research Group and Tada Fumio

Robert WINSTANLEY-CHESTERS

This paper examines the place and function of Geography as an academic and research discipline at Keijō Imperial University, the primary higher education institution of Korea during the Japanese occupation of 1910-1945. It does this firstly through the prism of the work and field research of Tada Fumio (多田文男), a leading geographer connected to the university, and secondly through the writings of the university's Man-Mong Research Group, focused on researching Manchurian and Mongolian spaces and places. Both the work of Tada Fumio and the work of the research group at Keijo Imperial represent Geography and geopolitics role in the processes of colonial expansion and the co-option and appropriation of knowledge through

research collaborations between institutions of the Empire. In particular the paper considers the research newsletters produced by the Man-Mong Research Group, and the research reports of field trips to Mengjiang/Inner Mongolia after its conquest in 1939/1940, by the collaborative team of Korean and Japanese Geographers, led by Professor Tada Fumio. These documents were collected through archival study at the Janggseogak archive in Seoul and other institutions, and shed light on forms of knowledge construction and analysis during the colonial period as well as on the relational and collaborative processes of academic exchange, specifically in the field of Geography, between Korean and Japanese academics during the Korean colonial period.

P44: Science and Civilization in Korea: Socio-Cultural Changes in State-Centered Technology in the Late Joseon

The Encyclopedia of Joseon and the Daily Technology of 'Imwon Geongjeji (□園經濟志)- Records of Managing Rural Life'

Jongwook JEON

Following Goryeo, a country of Buddhism, Joseon was founded with Neo-Confucianism as its national policy. Goryeo left a legacy of knowledge systematization by organizing huge Buddhist scriptures such as the Tripitaka Koreana. What was the Joseon method comparable to this? There will be Confucian scriptures and the Annals of the Dynasty. However, the 'Economic Book', which summarizes daily technology in Joseon, is also drawing attention. Among them, 'Imwon Geongjeji - Records of Managing Rural Life' in the first half of the 19th century is very unique in that it pursued organic integration with 16 fields of knowledge as one living knowledge.

Moreover, this book integrates both enriching material life and cultivating one's great mind into one. In other words, it is considered that agriculture, manufacture, food cooking, medicine, rituals and arts are things that deserve to be enjoyed as humans, and they all deserve to be respected and skilled equally. This raises different views of Joseon such as China's Sancaituhui (三才圖會), Complete Book of Agricultural Administration(農政全書) and Japan's Wakan-sansaizue(和漢三才圖會). We can see the methods and patterns of knowledge systemization by era. In addition, it will be possible to grasp the dynamic changes in Korean civilization and interactions with the world that took place during the Joseon Dynasty.

Development of Defense Technology and Social Change in the Late Joseon Period

Youngkoo ROH

The Japanese Invasion of Joseon, the East Asian World War that broke out at the end of the 16th century, was the first war in which all participating countries used gunpowder weapons. In the wake of the war, Japan's musket manufacturing technology and Ming's various gun manufacturing technologies were introduced to Korea, and the development of gunpowder manufacturing technology with the heavy use of gunpowder emerged. In addition, technology related to the materials of gunpowder weapons will be developed to withstand the high pressure of gunpowder. In particular, since the early 17th century, Joseon has made efforts to develop gunpowder weapons, such as guns, to prevent the attack of Jurchen's cavalry, accelerating the development of related technologies. At the beginning of the 17th century, Joseon was transformed into a

country with the best guns in East Asia and a large number of guns. This naturally emerged as a result of the development of metal products such as type, pottery, and coins.

The development of new gunpowder weapons required an increase in defense spending as well as the strengthening of standing soldiers to operate them. This was caused by state-centered fiscal structural reforms, the improvement of the central military camp, and the emergence of large-scale weapons manufacturing plants. From the 17th century onward, Joseon was transformed into a powerful centralized country unlike before. Changes in the 18th century, such as the transition to the era of absolute sovereignty and the population growth of major cities, were due to the development of defense technology in Joseon.

The expansion of calendar circulation and the spread of fortunetelling culture in the late Joseon period

Kwonsoo PARK

Since the 18th century, the circulation numbers of the calendar increased explosively up to about four hundred of thousand in Joseon Korea. The Joseon government made every effort to cope with the soaring demands for calendars actively by monitoring the trading situation of calendars in marketplaces, adjusting the price of calendars with additional supply, and reorganizing the calendar production system of Gwansang'gam institution (Bureau of Astronomy). With these governmental efforts, Joseon calendars began to be spread in civil society and used in people's lives. The calendar expansion also made it possible that civilian people could use fortune-telling knowledge in every phase of life because the calendar provided much information on fortune-telling and selecting the auspicious times. In this presentation, I will describe the process of expanding calendar circulation and the spread of fortune-telling culture in the late Joseon period.

P37: Exploring alternative frameworks for the historiography of astronomy in premodern Asia

Astronomy as a Science of the Archive: Crisis of Astronomical Records in 13th Century China

Qiao YANG

Historians of astronomy typically marvel at the systematic and uninterrupted astronomical records kept throughout imperial China, and yet rare is the discussion of Chinese astronomy as one of the "sciences of the archive" (Lorrian Daston). Indeed, our subjects not only make extensive use of such records, their historical consciousness encouraged the systematic preservation of such records for future generations. Given its centrality to historical practice over the longue durée, what might we stand to learn about the history of astronomy in China if viewed through the history of archival work? This paper focuses on the last quarter of the thirteenth century, the heyday of Chinese astronomy if we consider the innovations in instrumentation, empire-wide astrogeodetic survey, and computational modelling surrounding the Granting the Seasons calendrical reform. I argue that in the same period, Yuan astronomers experienced a crisis regarding the preservation of astronomical records. After the initial stage of the calendrical reform, Yuan astronomers had limited access to previous astronomical records. Worse still, as the Mongol rulers were not keen to compose histories of previous dynasties, there was little hope of preserving these historical records, as well as the astronomical records of the Yuan.

This paper brings to light the overlooked efforts that Chinese astronomers made to preserve astronomical records for future use.

"Great Unity": the Constellations of the New Imperial Sky, from Sima Qian to Chen Zhuo

Chuanyi LÜ
Mengting SUN

Astrology—i.e., military- and state-oriented omenology—was at the heart of the astral sciences in China and of its intersection with military affairs, imperial politics, and classical studies. Where once different systems of astrology circulated and served independent states, political unification under the Qin (221–206 B.C.) and Han (206 B.C.–A.D. 220) saw the imperial throne become the sole intended benefactor of this knowledge, especially from the reign of Han Wudi (r. 140–87 B.C.) on. And with this newfound political monopoly, and an increasing demand for accuracy, the pressure was on for astrologers to weigh, integrate, and systematize the various systems that they had inherited from the past. Notably, the stars provide both the signs (xiang 象) and coordinate system through which to interpret celestial phenomena in astrology, and there was no one unified school as to the constellations that they formed. Sima Qian (145–86 B.C.) was the first to bring a unified, imperial order to the constellations, synthesizing those of his forebearers, organizing them into the "five palaces" 五宮, and "creating a philosophy of his own," but his vision omits critical details as to the number and position of stars. It was by joint effort, over the following four centuries, by astronomers such as Liu Xin (49 B.C.–A.D. 23), Zhang Heng (78–139), and Chen Zhuo (4th century) that the mature imperial synthesis would come together and that such details would be hammered out. Based on a unified set of constellations and lunar lodges, it is this new imperial sky that would serve as the grounds moving forward for assessing and applying ancient omens.

A tale of seven cities: a new framework for the historiography of Chinese astronomy in the Period of Disunion (220–589)

Daniel MORGAN

Since the time of Sima Qian (c.145–c.86 B.C.), historiographers have organised the individual people, works, and events comprising the history of astronomy in early imperial China within a framework of political dynasties and policy reforms. In search of alternative structures, I have reconstructed the social networks of those involved with computation and computational astronomy from the Han (206 B.C.–A.D. 220), through the Period of Division (220–589), to the early Tang (618–907), discerning distinct expert communities at rival courts and transmission lines within and between communities, revealing that certain methods and controversies map on to differences of regional tradition (Morgan 2021, 'Regional Networks in Chinese Mathematics...'). This paper will add to this some initial findings of my project to translate the astronomical procedure texts of the Period of Disunion into Python. Namely, after presenting reconstructions of several additional lineages linking key historical figures through a combination of academic and family ties, this paper will discuss how we can expand this approach—the analysis of relations between people—to include the constituent elements of the procedure texts that they produced and referenced. One such element is procedures (shu 術) as translated into concrete, reproducible practice in the form of Python functions: most of the text and procedures of the average procedure text is recycled from earlier works, and the modular

approach that is most efficient for translating individual texts into automated tools for generating ephemerides allows us to easily map patterns of borrowing at the granular level of individual procedures and sub-procedures. Another element is astronomical constants, which are expressed in sets of mostly interlocking integer-ratio resonance periods resulting in complex numbers unique to each text: using a brute force approach, one can rapidly compare fractional constants to determine whether they were effectively translated from one system of pre-determined denominators to another and, from there, map a second network of intertextual borrowing. As it turns out, these three independently reconstructed networks overlap, revealing how distinct practices and values passed through the hands of distinct expert communities active within the same period, which leads me to the conclusion that the history and sociology of astronomy in medieval China is probably best organised by city.

Fiction in the Archives: The Making of Astronomical "Records" in Medieval China

Jinsong GUO

The continuity and general authenticity of the historical records of celestial events have been one of the cornerstones for the modern historiography of Chinese astronomy. Even as debates broke out in the last few decades over whether certain reported celestial events were fabricated by contemporary political actors, previous scholarship has never seriously questioned the nature of these accounts as being "records," i.e., as being information that had been kept intuitionally and handed down from the time that they were each dated to. But this paper does. It tests the unobservable and other suspicious solar eclipse jottings dated to the third through fifth centuries in the "Monograph on the Five Agents" of the Songshu against reenacted calculations using procedures found the in the three major calendrical canons in the same period. The results show that these eclipses were most probably calculated with the Daming Calendar composed around 462, suggesting that they came out of backward computation and were intentionally interpolated into received records by astronomers and historians in the late fifth century. The accounts of celestial events and the astrological commentaries that accompany them in medieval Chinese histories should not be read uncritically as sources of evidence for observational and prognostic activities, but should be studied as complex textual products that involve multiple layers of creative editing and multiple kinds of skilled practices. The paper further argues that historiography was a significant arena for astronomers/astrologers to exercise the power of their knowledge in medieval China.

Who has rights over the calendar? Problems of authority and legitimacy in the production and study of calendrics in late seventeenth-early eighteenth-century Japan

Matthias HAYEK

Historians of the calendar and astronomy in Japan have often put a great emphasis on the late seventeenth century as an important turning point for the development of 'modern science'. The main event behind this well-established narrative is the calendar reform of 1685 (Jōkyō 2), the first major change in calendar calculation since the adoption of the Chinese Xuanming li in 862 (Jōgan 5). One of the leading figures of the reform, a professional go-player and literati named Shibukawa Harumi, is known for having engaged with You Yi's Tianjing huowen (Jp. Tenkei wakumon), a book on

natural philosophy strongly influenced by Jesuit knowledge that was officially banned at the time. Recent research on early modern onmyōdō (the way of yinyang) has cast a new light on this calendar reform, Shibukawa's intent and its reception. The adequacy of the calculation method aside, the calendar, in the form of annotated guchūreki that were circulating extensively, was the object of an entanglement of authorities regarding its production and diffusion. As a matter of fact, calendrical and astronomical knowledge, including their divinatory aspects, had not been kept well secluded by traditional lineages. Rather, it was taken up by specialists of other, connected fields, such as Confucian classics, calculation, as well as by, most prominently, Buddhist monks. This alternative line of transmission is epitomized in a hybrid text, the Hoki naiden, which compiles many different type of calendar annotations allegedly based on the Xuanming li system. Although it was attributed to a famous astronomer of the court lineage, it was extensively studied in some Buddhist circles, and served as a basis for the production of pre- Jōkyō annotated calendars. In this presentation, I will try to show how commentaries of this text published around the Jōkyō reform exemplify the tensions between competing authorities regarding the 'legitimacy' to study and transmit calendar-related knowledge. More precisely, I will focus on two authors connected to Buddhist circles, Koizumi Shōtaku (?-?) and Seiten (1663-1747), who produced numerous manuals and commentaries before and after the reform. We will see how they tried to 'salvage' the original Hoki either by adapting it to the Shoushi li, rather than the new calendar, or simply to maintain the Xuanming li for divinatory purpose, while advocating their rights to discuss calendrics.

Family Prosperity versus Imperial Authority: Reconstructing a Social History of Qing Imperial Astronomy from the Viewpoint of Astronomer Families

Ping-Ying CHANG

In 1644, Jesuit missionary Johann Adam Schall (1592–1666) received the long-awaited success of calendar reform which he had been the main contributor since the early 1630s, for the new Manchu rulers of China had commissioned him to make the state calendar. After the state calendar printed with "According to the New Western Method" at its front cover was officially promulgated, Schall drew up a thorough reorganization plan of the imperial Astronomical Bureau, which for two millennia had been responsible for observing, recording, interpreting, and predicting the movements of the celestial bodies. The astronomers working at the Astronomical Bureau, however, faced difficult choices. In the previous Ming dynasty, their families were forbidden to learn other professions and indeed had worked at the Astronomical Bureau for generations. Now either these astronomers had to modify, if not abandon, a large part of their inherited technical expertise and adopt Schall's New Method, or they had to leave the Astronomical Bureau. Hereditary astronomers revolved their career crisis by staging a strong protest that forced Schall and the Qing court to switch to a milder approach to install the New Western Method as the intellectual base of the Astronomical Bureau. On the one hand, most hereditary astronomers were allowed to keep their jobs while no longer obligated to send their descendants to work for the Bureau. On the other, in addition to bringing in a small group of disciples into the Astronomical Bureau to assist his task of calendar making, Schall would use examinations to ensure that the Bureau only

hired astronomers who had learned the New Western Method. Despite the newly granted freedom to change profession, the phenomena of hereditary astronomer families continued until the end of the dynasty. Archival research has shown that many astronomer families had served at the Qing Astronomical Bureau for more than a century, and that the administration rules of the Bureau had been amended throughout the dynasty, sometimes to protect the astronomer families' interests, sometimes to prevent their overexpansion. Why did astronomers continue to send their descendants to the Astronomical Bureau and when would they stop doing so? Why did the Qing state encourage the formation of hereditary astronomer families and how did it manage them? What role did astronomer families play in the development of Qing imperial astronomy? This paper aims at reconstructing a social history of Qing imperial astronomy from the viewpoint of astronomer families.

P34: Environmental History and Climate Change in Asia: Examination of Historical Records on Weather, Climate Crisis and Analysis of Historical Entanglement

Weather balloons, Eurasian islands, and transimperial infrastructures of meteorology, 1896-1914

Robert-Jan B. WILLE

At the end of the nineteenth century, a new role for academic experts emerged: that of brokers of international cooperation and global free trade. In my talk I will focus on meteorologists who had already organized themselves internationally by then. In 1873 the International Meteorological Organization had been established. Weather maps had increasingly unified the Northern hemisphere.

After 1900, the mapping of the global upper atmosphere (including trade winds, monsoons, new layers) became an important program bringing political rivals such as Germany and France together under the aegis of empire. Their collective effort of launching weather balloons and kites lead to the discovery of the stratosphere, which created a demand for 'aerological' campaigns in the tropics, in the Arctic and at the oceanic borders of Europe.

In my talk I will zoom in on German and Dutch meteorology on European and Asian islands. Upper air sounding stations on oceanic islands such as Arctic Svalbard, Spanish Tenerife and German Samoa became key spots for German meteorologists. Here, not only scientific disputes on the exact nature of the layered atmosphere were fought and resolved, but also new geopolitical realities were created. Another important area formed Java in the Dutch Indies, where Dutch meteorologists transported German weather balloon practices to Southeast Asia.

Through studying international meteorological practices at these 'islands of atmospheric arbitration', one could ask: what was the diplomatic nature of this global atmospheric program and the transimperial meteorological infrastructure that was built as a result?

Linking Sources: Weather, Nature and Agriculture in the Netherlands Indies, 1800 – 1850

Andreas WEBER

In the first half of the nineteenth century, the former Dutch colonies in Southeast Asia witnessed various large-scale attempts to survey local nature and agriculture. Although many of these endeavors were geared towards natural history, weather observations formed an integral but understudies part of such inquiries. By following actors to the field, this paper has

three interrelated aims: first of all it contextualizes historical attempts to collect weather data in the region. This includes weather data collected on ships as well as on land, e.g. in the form of diaries and tables. Secondly, the paper reflects on whether and how these data should/could be interlinked. In a final step, the paper discusses the value of such historical data in light of present day attempts to model and understand shifts in climate from a long-term perspective.

Material to consider environmental history: Climate reconstruction by Dutch Navy ship logs

Togo TSUKUHARA

Ship logs are recently attracting attentions of historians, for that supply us various and rich information from the past. So far it is well-known, in order to decide exact location in the middle of ocean, astronomical instruments and exact time measurement by chronometer (clocks) were widely applied on board. Beside knowing exact location, good weather was essential for safe voyage. European ships were equipped with meteorological instruments like thermometer and barometer. Merits of ship log as historical documentations are primarily that they have recorded those instrumental readings concerning location and climate. We can apply them for the climate reconstruction, hence, they can be used as important material for considering environmental history.

In search for such historical material, I found more than 10000 ship log books kept at Dutch National Archive in the Hague. With my colleague both in Japan and the Netherlands, we are trying systematically working on them: namely, analyzing, digitizing and make them into further statistical treatment.

We need several methodological problems.

First one is the fact that those data from ship logs are those of moving observation, not the fixed point observation. But thanks to the advancement of digital technology, it can now be dealt with as a big-data on sea.

Second is standardization, we should compare and calibrate not only old data with contemporary meteorological/climatological observation, but also Dutch ones with, for instance, dominant British and American ones, and other local weather records.

Thirdly, Dutch Navy have a merit that they were deployed different geographical area than other commercial sailing route, and sometimes they extended their voyage to some exclusive part of the world. As a competing colonial power, Dutch ship logs can show us different spatial perspective of the world, that does not be a part of Anglo-US nor French/German geopolitics.

Lastly, some historical voyage can also be traced, and shows us specific historical relationship of the Dutch, for instance, with the Japanese. Some of those ship logs can tell us details of steam ships built by the Dutch and gifted to Japan in the end of Edo period. I also found so many Navy ships were deployed the time of Achje war, and exceptionally frequent sailings to Suriname and Caribbean, that they might give us new aspect of environmental history of the area.

Climate in social history: rainfall, floods, and epidemics

Atsushi OTA

Meteorological records created by Southeast Asian colonial states since the late nineteenth century include precious information to examine climatic impacts on the society. In our research project, meteorologists and historians collaborate to analyze social impacts of extreme weather

in colonial Southeast Asia. I introduce some results of our project to examine the rainfall patterns that induced floods and malaria outbreaks in early-twentieth century Batavia.

The 19th century meteorological records in Japan and its scientific use

Masumi ZAIKI
Takehiko MIKAMI

Imaging and digitization of old paper-based instrumental meteorological records must be carried out before these records are lost to decay. This kind of activity called “data rescue” is now taking places all over the world. We recovered instrumental temperature and pressure records for locations in Japan from the 19th century, a period for which no instrumental records were believed to exist. The recovered data were collected by Dutch, German, French, British, American and Russian visitors, by Japanese astronomers influenced by Dutch science, and by Japanese merchants. The data allow extending the beginning of the Japanese instrumental record back from 1872 to 1819. Recently, meteorological records taken at Japanese lighthouses from 1877-1882 have been recovered and digitized as a part of our data rescue project.

For scientific use of the recovered old meteorological records, the temperature and pressure data were converted to modern units and digitized into computer readable form. The pressure data were corrected for temperature, height, and gravity where needed. The temperature data were homogenized to compensate for changes in recording location. Then, both data sets were homogenized to account for varying observation schedules. The corrected and homogenized data were shown to be reasonable after further testing for homogeneity and comparison with modern data.

Based on the temperature records prepared previously, in eastern and western Japan, a warmer climate in the 1850s after a cold spell for the 1820s to 1840s which is assumed as the end of the Little Ice Age have been detected. The recovered temperature data also showed good agreement with reconstructed temperatures from weather descriptions in old diaries.

To share not only the recovered old instrumental records but also weather description data collected from Japanese historical documents, the website called the “Japan-Asia Climate Data Program” was set up. We hope that our activities will help stimulate research on past climate reconstructions using this type of data.

Various Early Historical Records of Weather in Japan: their standardization and historian’s contribution to meteorologists in order to understand climate change

Kiichiro MAEDA
Ryuichiro IWANISHI
Momoka TAKADA
Yui YAMANA
Hisayuki KUBOTA
Ikumi AKASAKA

This presentation reports about reconstruction of past climates from the end of the Edo era to the Meiji Japan. The followings are the historical materials we found for our study.

1: Ship logs of the Kanrin-maru 咸臨丸, a warship of late Edo known for its trans-Pacific voyage in 1860. These are recorded by Ono Tomogoro 小野友五郎 and Akamatsu Daizaburo 赤松大三郎, who were on board as registered surveyors.

2: A ship log of the Hakki-maru 発機丸, a warship of late Edo period used by the Kaga domain sailing from Ishikawa to Hyogo in 1864, by Yasui Kazusuke 安井和介).

3: A diary of Ikeda Giemon 池田儀右衛門, a merchant who mainly works at Hokkaido during the first half of Meiji Era. This diary coveres weather of Ohata (Shimokita Peninsula), Hakodate, Saru (Southern part of Hokkaido) and Akkeshi. This is intermittently recorded from 1862 to 1870.

4: A diary had been recorded at Iwaya-Shrine in Akashi 明石岩屋神社 in 1857 and 1858. This diary contains description of drought.

5: A weather record observed privately by Mori Mototoshi 毛利元敏, a clan ex-lord in Shimonoseki, from 1891 to 1896.

6: A series of instrumental weather observation at Sapporo Agricultural Collage 札幌農学校 in Sapporo from 1876 to1878. This observation was conducted by American advisers, such as William Wheeler and William Smith Clark.

These old descriptions have different styles of recording. They include not only precipitation, temperature, snowfall, atmospheric pressure and wind but also some notes about earthquakes, fogs and others. With careful research into meta-data, we try to standardize and digitize these weather records for further analysis with meteorologists. It would be led to such scientific representation of graphic charts of temperature changes, wind distribution maps and tables of weather occurrence rates. These results can reveal broad weather conditions around Japan in the 19th century and it would allow for research on climate change. Reconstructing old climate is cross-disciplinary.

P5: Rethinking the “hearts” in medical caring and treatments in East Asian societies

Mending the heart between Taiwan and Japan: Cross-national learning, practice and personnel training of cardiac catheterization in Taiwan, 1980s-2010s

Shu-Ching CHANG

With the increasing incidence of coronary artery disease in Taiwan and heart disease becoming the second leading cause of death in Taiwan, cardiac catheterization and interventional treatment have hence become common treatment measures in hospitals. This paper will explore the development history of how cardiac catheterization has become a diagnostic tool for coronary artery disease in Taiwan from the 1980s to the 2010s, and personnel training and the transfer and standardization of technology and knowledge of percutaneous coronary intervention (PCI). The Japanese doctor Kazuaki Mitsudo demonstrated percutaneous coronary intervention (PCI) in Taiwan and the Taiwan cardiologist went to Japan to learn the technique from him, which will be the important analysis cases of this paper. Methodologically, this paper will interview interventional cardiovascular specialists a who have worked in cardiac catheterization room with more than 5 years’ experience and will analyze data and use text analysis with reference to related literature as well. This paper will take the perspectives of "apprenticeship learning", "tacit knowledge, and "learning knowledge" to explore the knowledge constructions and practice for percutaneous coronary intervention (PCI) among Doctor Kazuaki Mitsudo and different interventional cardiovascular specialists.

The Rise and Fall of Insulin Chock Therapy in China (1930s - 1980s)

Xiaoyang GU

As one of the major somatic therapies in psychiatry in the last century, insulin shock therapy, also known as insulin coma therapy

（ICT），was quickly used worldwide after its invention in the 1930s. In the late 1950s, ICT was gradually cast out of the mainstream therapies by the medical society, since the new psychopharmacology thrived and the standard to evaluate the effectiveness of therapies changed.

In China, however, under the influence of the massive Learning-from-the-Soviet-Union Campaign, Pavlov's reflexology was regarded as the political-academic orthodoxy in psychiatry. Chinese psychiatrists conducted in-depth studies on ICT based on Pavlov's theory. ICT flourished in China in the 1950s and 1960s. Both ICT and antipsychotic drugs were used for a rather long time in China. In the 1970s and 1980s, the Chinese medical community re-examined the efficacy of ICT as they converged with the international academic community. Comparisons on the efficacy of insulin shock therapy and antipsychotic drugs yielded similar results with Western scientists. But instead of following the Western academic practice of removing ICT from textbooks, China defined it as an "effective" but no longer appropriate treatment in psychiatry textbooks, preserving it as the knowledge that is no longer used and retaining some "legitimacy" for it.

The author argues that beyond the influence of Soviet medicine and the "Pavlovian doctrine", lies the idea that there was a somatic cause of mental illness. This idea was regarded as proof of the materialism that made ICT widespread and influential in China. The rise of ICT in China was a continuation of its spread as a somatic treatment for mental illness in the early 20th century. It was not until the 1980s that ICT was no longer among the main therapeutic options of psychiatry. But it was still regarded as an effective method in textbooks. The Chinese psychiatric community defined ICT, which has been used in China for many years, as a therapy that is "not good enough". This might be seen as a respectful "suspension" of ICT, which contains respect for previous clinical studies and the psychiatrists who conducted them.

Rethinking the "hearts" in medical caring and treatments in East Asian societies

Michael Shiyung LIU

The modern medicine in East Asia, specifically China, Japan, and Taiwan since the 20th century was critical to bridge the much-researched colonial and contemporary nursing and medical treatments and contemporary STS studies in the region. This panel highlights the intense cross-national experiences of nursing and medical models, research, and studies in dealing with "heart" issues. It also juxtaposes the counter-western centered viewpoints of biomedical sciences with the geopolitical competition in health access models in various East Asian societies. By rendering cases of treatments and caring by and to "hearts", it also pays attention to continuities from the traditional practices and similarities across socio-cultural boundaries.

To the five panelists, Gu Xiaoyang discusses the transformation of insulin coma therapy (ICT) in the 1930s to 50s to contemporary psychopharmacology, highlighting many important clinical studies and the psychiatrists in China to promote it. Hsiu-Yun Wang unpacks the history of Dr. Kao Tien-Cheng's application of radioactive iodine to thyroid diseases in Taiwan, 1950s-1960s, revealing the intertwining trajectories of isotopes in which the globalization of nuclear science was built on local foundations. Shu-Ching Chang explores how cardiac catheterization has become a standard diagnostic tool for

coronary artery disease in Taiwan from the 1980s, emphasizing the perspectives of "apprenticeship learning", "tacit knowledge, and "learning knowledge" for promoting percutaneous coronary intervention (PCI) among cardiovascular specialists. Yumi Hiratai ingenuities in the comparison of U.S. nurse advisors' idealism and the rural Japanese nurses' mindset on public health work in Japan during the early post-war period, examining various facets of Japanese nurses in playing rural health project from their learning in American counterparts but with indigenous caring "heart". The last but not least, Su Jingjing and Jin Ya'nan discusses how the painless childbirth in China was developed from psycho-prophylactic method to the Lamaze method, showing how complication on the intertwined global and localization of medical technology and different cultures could influence the "heart" of pregnant women and their motherhood. In sum, all five papers will touch different definitions of cultural and biological "hearts" in patients and caregivers a long with the cultural- historical perspective to support their STS and scientific findings.

Colonial Legacy Goes Nuclear: Dr. Kao Tien-Cheng and Radioactive Iodine in Taiwan, 1950s-1960s

Hsiu-Yun WANG

Thyroid diseases, especially goiter, drew considerable attention in colonial Taiwan from epidemiologists, pathologists, and surgeons who carried out field surveys, explored etiologies and tested surgical treatments that were discussed in the medical journal, Journal of the Formosan Medical Association. In the 1950s, when isotopes were introduced as a powerful new tool and the UN and US were jointly promoting a project called "Peaceful Use of Atomic Energy," radioactive iodine (I131), used in the diagnosis and treatment of thyroid diseases, was perhaps the most notable of those isotopes. It had a significant impact on studies of thyroid diseases. This paper examines the activities of Dr. Kao Tien-Cheng (1904-1964), one of the early users of isotopes [in Taiwan], whose career began during the colonial period and continued after WWII when he served as the superintendent of the National Taiwan University (NTU) Hospital. In the age of peaceful atoms, Kao was simultaneously a surgeon, an advocate for nuclear medicine, and an architect who established nuclear medicine in Taiwan based on the previous colonial paradigm, especially in its application to thyroid diseases. Analyzing colonial medical literature, Kao's activities at NTU Hospital, his participation in international conferences (e.g., the Second World Conference on Peaceful Uses of Atomic Energy), and his exchanges with Marshall Brucer (1913-1994), chairman of the Medical Division of Oak Ridge Institute of Nuclear Studies, this paper demonstrates the dynamics at play in the development of nuclear medicine in Taiwan, between the legacy of Japanese colonial rule and the U.S.'s push to nuclearize. The intertwining trajectories of isotopes, as a new scientific and political tool, and thyroid diseases, an old problem that dated back to colonial time, demonstrates the ways in which the globalization of nuclear science was built on local foundations.

A comparative history of painless childbirth in China: from Psychoprophylactic Method to the Lamaze Method

Jingjing SU
Yanan JIN

The Soviet psychoprophylactic method (PPM) of childbirth, introduced to People's Republic of China in the 1950s, generated a great wave of enthusiasm, was widely

promoted, and scaled up from the top down, and even underwent a degree of localization intertwined with the acupuncture fever. It could be understood as a product of ideology, political discourse, international politics, and the specific health demand, including the institutionalization of childbirth. To be noted, the Soviet psychoprophylactic method was also spread to the United States, via France, whereas it was commercialized as the Lamaze method, named after the French doctor who introduced Soviet PPM to France and washed out its soviet label. In the wave of feminism, de-medicalization of childbirth and commercialism in American society, the Lamaze method was commercialized in the U.S. and reintroduced to Europe as a fashion. The so-called Lamaze method from the United States was introduced to China in the late 1970s and early 1980s, but in the context of China's market-oriented health care reform, it was a less favorable option than obstetric anesthesia in terms of performance and cost-effectiveness, and therefore met with a lukewarm reception. Therefore, the transmissions of PPM and Lamaze method experienced a distinctively different journey with "Chinese characteristics". This paper will analyze why the essentially identical Soviet PPM and the American Lamaze delivery method showed different diffusion paths and outcomes in China from the perspective of global history, considering the international and domestic political and socio-cultural contexts, to explore the glocalization of medical technology in different cultures.

The U.S. nurse advisors' idealism and the rural Japanese nurses' mindset on public health work: collision and compromise of gendered images in the 1950s

Yumi HIRATAI

The U.S. occupation of Japan that started in August 1945 changed the Japanese public health institutions dramatically. The Supreme Commander for the Allied Powers Public Health and Welfare division reorganized the Japanese public health institutions, and the U.S. nurse advisors modernized nursing education. Medical nurses, public health nurses, and midwives who were trained by the U.S. nurse advisors contributed much to the improvement of rural people's health, as the decline of infant deaths in the 1950s shows.

Rural nurses were a key to the improvement of community health. However, a gendered view of nurses that both Japanese men and women had hindered the professionalization of nurses. By investigating the nursing education in rural Kanagawa and Okinawa, I will shed light on the process how the idealism of the modern public health work that the U.S. nurse advisors presented and the gendered image of nurses that was deeply rooted in rural Japan collided, compromised, and shaped the community public health. The Japanese national health care system was not built up yet in the 1950s, nor did the vaccination mandates start. The national economy just began to recover from the war damages. Understanding the improvement of rural community health and women's social roles in this period of Japan may contribute to the health of the Global South now.

II. 11:00 – 12:40

IP47: History and historiography of technology in China

Review of Twenty-Six Volumes of History of Science and Technology in China

Xing HUANG
Xiaowu GUAN

This article reviews twenty-six volumes of History of Science and Technology in China, a collaborative scholarly work published from 1998 to 2011. That series is the first work to comprehensively and systematically study and expound the history of science and technology in ancient China from the earliest to premodern times. This article introduces the historical background, causes, the process of organization and compilation of that series, and choose those three volumes which dealing with the history of technology: Mining & Metallurgy, Machinery, Transportation as examples, argues that different from Joseph Needham's SCC, Chinese authors sought comprehensiveness as a way to value China’s rich history of technological change, beyond its relevance as a contrast to Western civilization, based on a broad empirical range of archives, objects, and written materials. This article points out that series have irreplaceable academic value for studying and understanding the history of science and technology in China, have impacted Chinese literature on the history of technology in China.

The Tieye Zhi and Iron-steel Smelting Technology at the Zunhua Ironworks during the Ming Dynasty

Xing HUANG

During the Ming Dynasty, Fu Jun (傅浚) compiled an account of the iron smelting, steelmaking and management activities of the Zunhua Ironworks (遵化铁厂). The resulting work, Tieye zhi (铁冶志，1513-1514) , is the first monograph on iron & steel industry in the world. Unfortunately, the book never came to be circulated in China. In recent years, some scholars discovered a Qing-dynasty handwritten copy of the Tieye zhi at St. Petersburg University in Russia. Combining the records of the Tieye zhi with field investigation and laboratory analysis, it was found that the horizontal section of the iron smelting shaft furnace in the Zunhua Ironworks was close to a rectangle, and inherited the shaft furnace technology of the Liao and Jin Dynasties in the Yanshan region. The reverberatory furnace was used for decarburization, developing co- fusion steel (guan' gang 灌钢) technology, and close to modern Suzhou steel technology. The Zunhua Ironworks maintained its leadership in iron and steel technology, management and operation of large-scale metallurgical activities around the world in the 15th and 16th centuries. The massive consumption of charcoal in the Zunhua Ironworks caused a fuel crisis, however, which restricted the further development of iron and steel technology and output. It's production or iron and steel was limited by the traditional knowledge system, social production system and market system, and failed to lead to breakthrough developments and drive the overall progress of social productivity. This is a microcosm of the development of traditional technology in the Ming and Qing dynasties.

Rural Electrification in the People's Commune Campaign

Huanhuan LU

In 1937 Mao Zedong proposed in his On Contradiction that "the contradiction between the working class and the peasant class in a socialist society should be solved by means of the collectivization and the mechanization of agriculture." In the 1950s, along with the Campaign of People's Commune, another campaign to run electricity was launched throughout China, i.e. People’s Electrification Campaign. Under the slogan of "struggle for the mechanization and electrification of agriculture", running electricity was no longer something that could only be done by experts and scholars; workers, peasants and

students also began to build power supply equipment and power stations with great enthusiasm. People were learning the technology and practicing building power stations. In order to run the electricity by themselves, they generally used old indigenous methods, or a combination of indigenous and foreign methods. By the end of 1959, the number of electrical power stations and power stations without generators set up by the rural masses had reached more than 1.4 million watts, including around 400,000 watts from electrical power stations and more than 1 million watts from power stations. In the 1950s and 1960s, people turned to the wind, water, biogas, tides and solar energy for electricity and power, making use of natural resources in an integrated way, embodying the idea that "man can overcome nature". Today these natural resources are still widely studied and used as renewable energy sources. This paper will analyze the rural electricity supply model in the 1950s and 1960s, especially focusing on the integrated use of natural resources for electricity supply and the expansion of rural electrification at that time. In addition to this, it is also intended to describe how the mass “electricity revolution”, as part of the national electricity movement, was achieved and how their “technological revolution” unfolded and developed as part of the “science of the masses”.

IP45: Applied science and technology in historical perspective

Research and Development of the First Heping type Steam Locomotive

Sudubilige
Yong Mei

The research and development of Heping type steam locomotive has epoch-making significance to the development of China's locomotive industry. The Heping type steam locomotive is an important heritage of China's railway locomotive industry, which records the imprint of science and technology and social progress in the era of steam locomotives. By exploring how the locomotive was designed and manufactured in China, we will get a glimpse of China's industrialization in the fifties of the twentieth century. In the process of research and development of steam locomotives, not only theoretical knowledge was required, but also manufacturing technology should be mastered, as well as specific equipment was needed. The term "research and development" is a concept used to describe technological advance. In China, "research and development" has two levels of meaning. On the one hand, it is a compound word of "research" and "invention" to describe the actions to create something new through research and invention; On the other hand, "research and development" can be understood as a compound word of "research" and "development", which refers to the result of research and development of existing technology to meet a certain need or benefit, and the goal of research is to contribute to better performance or higher efficiency design. The fabrication of the Heping type locomotive was the result of the transmission and transformation of Soviet knowledge. In this paper, the designing and manufacturing process of Heping type steam locomotive is brought to light fundamentally, and the sources of knowledge and technique is discussed, mainly based on the articles of the engineers and technicians who participated in that engineering, the translations of the Soviet books related to steam locomotive, and the internal document of the ministry of railways. It shows that the Heping type steam locomotive was not only a successful case of Soviet technology transfer, but also

a combination of the existing practical experience and research results. At the same time, the research on Heping type steam locomotive is an important event for the realization of technology independence from technology transfer.

History as the Driver of Scientific Research: A Marginalised Tradition in the Chinese Historiography of Science

Jianan HUANG
Dian ZENG

Conventionally, utilising the history of science to advance scientific knowledge is "not at the forefront of historians' thinking". However, with the prosperity of internalism and the unestablished disciplinary boundaries, historians of science in twentieth-century China performed a highly 'technical' approach, which accelerated scientific advancement in China. In this process, the history of science served as material, enlightenment, experience, and literature review for studies in hard sciences. For instance, in the field of astronomy, Zezong Xi (席泽宗) established 7 criteria to identify novae and 2 criteria to distinguish the novae and supernovae, by studying Chinese historical materials; in medical field, inspired by ancient medical classics, Youyou Tu (屠呦呦)discovered Artemisinin (C15H22O5), a chemical drug for malaria treatment, and successfully extracted Artemisinin from Artemisia apiacea with her team.

Yet, in recent decades, this kind of 'technical' tradition in the historiography of science has been marginalised in China. This was induced by multiple dynamics including academic systems, social-cultural thoughts, and research financing. Although the emergence and dominance of this 'techinical' tradition were based on strict pre-conditions and hence may not be reproducible, this research highlights the irreplaceable role of internalism and interdisciplinary interactions in advancing hard sciences through historical research.

IP40: Mathematics and Physics

A study of the Haas effect in the Ming dynasty opera stage of Jiyi Temple--and a discussion of why a full-time conductor was not used to sing in the ancient opera stage

Yang YANG
Xiaoduo ZHAI
Ce GAO
Shijun REN

As an acoustical building for the performance of opera in ancient China, the design of its form and structure is closely related to the evolution of acoustical technology and acoustical function. Based on a specific examination of the acoustics of ancient theatres throughout China, this study found that the general width of the Jiyi Temple Stage, built in Xinjiang County, Yuncheng City, Shanxi Province, China, in the Ming Dynasty during the Zhengde period, exceeded 17.7m, and that the maximum size of subsequent Ming Dynasty theatres was only 82% of that size. The subjective evaluation show that when the actors playing the wenchang (orchestral instruments) and wuchang (percussion instruments) were positioned on the left and right sides of the stage, the drummers found it difficult to play the wenchang instruments and the wenchang musicians found it more difficult to listen to the drum board（The conducting instrument of an opera band）musicians; the rhythms of the wenchang and wuchang were not easily aligned when playing fast pieces and the actors found it difficult to express their lines smoothly. Acoustic measurements and analysis have shown that the distance between the drums and the orchestra at the left and right ends of the stage causes a delay of around 47s,

making it more difficult for the left and right players to work together and making the sound less clear and balanced; the parallel walls on either side, 16.353m apart, allow the actors singing loudly in the middle of the stage to feel a clear echo. Importantly, the Haas Effect was already recognized by craftsmen in the Ming dynasty when they created this stage, and found that the large width of the stage was the 'culprit' for the poor subjective perception described above. This was one of the earliest experiments with the Haas effect in China, as it solved the problem of harmonizing the performance of the wenchang and wuchang when the drum and board musician is also the conductor of the opera orchestra. Compared with Haas's experimental conclusions, the critical threshold reached by the Ming dynasty craftsmen was 3ms less than Haas Effect, but predated him by about 430 years.

On the invention of Zhu Zaiyu Equal Temperament from the perspective of Innovation

Xudong LI

Zhu Zaiyu was the first to invent the twelve equal temperament in the world, which is one of the important achievements of ancient China in acoustics and temperament. At the same time, this achievement is also regarded as an important theoretical innovation in ancient China. Zhu Zaiyu refers to it as the "xin fa mi lv". The process of Zhu Zaiyu's invention of twelve equal temperament is essentially a process of theoretical innovation. So what is the connotation of Zhu Zaiyu's theoretical innovation in the historical context of that time, especially in the theoretical logic of traditional Chinese culture which is different from the western scientific system? How does this innovation happen? How to show the self-consistency of its theory? Taking the historical fact of Zhu Zaiyu's invention of the twelveequal temperament as a case study, the author analyzes the concepts and intrinsic meanings used by Zhu Zaiyu in constructing his theoretical system of "xin fa mi lv" and compares other musical temperament theories within the framework of traditional Chinese cultural theories. The author believes that "problem raising, concept construction, mathematical accuracy assurance" are the three seeds buried deep in a great innovation. Raising questions is only the first step of all innovations, while the construction of new concept is the key to highlight the importance of the questions raised, characterize the problems, and choose the theoretical path. Ensuring the accuracy of mathematical calculation is the unshakable foundation of the theory for hundreds of years.

Complex numbers: Nature's Most Hidden Mysteries

Peng PENG
Xinhua ZHANG
Qing WEI

In 2022, Two independent groups from China completed experiments on quantum mechanics respectively, proving the irreplaceable importance of complex numbers in quantum mechanics. This experiment was rated by the American Physical Society as one of the ten major advances in the field of international physics in 2022. In the establishment and development of quantum mechanics, complex numbers are introduced into quantum mechanics in the form of first principles. Although Schrödinger clearly stated to Lorenz that the use of complex numbers is "unpleasant, even directly opposed" in his letter, but after his own repeated arguments, he still kept complex numbers in his Schrödinger equation. However, many physicists subsequently tried to describe quantum mechanics

entirely using real numbers, but in vain. For the role of complex numbers in quantum mechanics, the first thing to talk about is the phase factor. Chen Ning Yang once mentioned that "the three main themes of theoretical physics in the 20th century are: quantization, symmetry and phase factor". The phase factor is a complex factor with an absolute value of 1, which contain the most secretive mysteries of nature, have led to many important discoveries in the 21st century, such as quantum Hall effect, matter wave interference, quantum entanglement, topology and so on. The importance of complex phases in quantum mechanics has been repeatedly emphasized in the development history of quantum mechanics. According to Dirac, the phase factor is something more fundamental than the commutation relation of quantum mechanical operators. Therefore, this article will restore the history of the introduction of complex numbers into quantum mechanics through the study of the papers and correspondence of the pioneers of quantum mechanics, and explore the mysteries of complex numbers.

IP35: Facettes of historiography of Science and Technology

Jiangzuo zeli (Handicraft regulations) and the Allocation of Scarce Resources in the Qing Dynasty

Christine MOLL-MURATA

The study of Qing dynasty handicraft regulations since the late 1990s initially focused on technical issues of building and the production of ritual and representative objects. Wang Shixiang, the main promoter of the field, divided the genre into regulations on public construction, general administrative regulations, regulations specifying measurements of particular buildings, regulations on prices and on weapons. Since these categorizations were first made, the field has diversified and the number and scope of works considered to belong to the genre has been broadened. With the publication of large reprint series and consequently thus greatly enhanced accessibility, handicraft regulations have also been applied for research on the economic and social history of the Qing period, and publications in and beyond China have widely proliferated. For economic history, especially the regulations on prices and wages of 1769, Wuliao jiazhi zeli, have been analysed and used as a basis for global comparisons of wages and living standards. Over the course of time, other sources, often manuscripts, on the organization of crafts and construction work as well as the allocation and transport of objects have become known and are being studied from various perspectives. One case in point is the recent interest in a manuscript on the procurement of timber in the Qingshui River region between Guizhou and Hunan, Caiyun huangmu andu, for interregional markets and especially for buildings in the capital. Scholars such as Aihara Yoshiyuki, Zhang Meng and Qu Jian have dedicated important studies to this source showing the dynamics of negotiation between the central government, local administrators, brokers, and providers of the timber resources that became more and more precious. In this respect, the present paper responds to the topic of "crisis". The contributions discusses timber procurement from the perspective of the central government and the Wuliao jiazhi zeli in order to calibrate the value of high quality wood in the mid-Qing and to contextualise what the respective regulations tell and what they conceal. The Hunan edition of the Wuliao jiazhi zeli exists as a fragment that includes the southwestern prefectures of Hunan province. Its content has been made available in the database „Prices, Wages

and Transport Costs in Hunan Province in the database Qianlong Reign“ (https://www.ruhr-uni-bochum.de/gpc/hunan_province.html) that will also be presented in the paper.

Making sense of Chinese astronomy in early modern Europe

Florence C HSIA

In 1716, the young scholar Theophilus Siegfried Bayer successfully defended a thesis at the university of Königsberg on the last words of Christ. With funds from the city council, Bayer promptly embarked on a study tour that quickly led him into unfamiliar terrain. At the royal library in Berlin, Bayer carefully transcribed earlier European efforts at constructing a grammar and compiling lexicons of the Chinese language, discussions of the growth of Chinese Christianity, and sheaves of correspondence on various matters Chinese, including its long tradition of astronomical observation. Most intriguing of all was a passage from the Chinese annals concerning an ancient solar eclipse: some European savants thought it pagan confirmation of the synoptic gospels' accounts of the darkness that shadowed Christ's crucifixion. Carefully copying out the 30 Chinese characters in question, Bayer followed well-established precedent in deploying philological skills—already well honed on Greek and Latin texts—to cut his way through a century's worth of conflicting European conceptions about Chinese astronomical and calendrical practice. Bayer's approach to interpreting the textual evidence for Chinese astronomy seems to pose a sharp contrast to that taken by Antoine Gaubil just a few years later. Just a few months after joining his confrères in the French Jesuit house in Beijing, Gaubil wrote to a Parisian correspondent of his confidence in consulting an encyclopedic work for its compilation of eclipse records and concisely translating such material for a technically literate readership, including the same solar eclipse observation on which Bayer had spilled so much ink. By examining Bayer's and Gaubil's respective approaches to the darkness over Golgotha, this paper explores the methodological options available to early modern European scholars faced with the challenges of making Chinese astronomy legible to European audiences.

The Glorious 82? Reflections on the Artisans Singled Out in the Qinding gujin tushu jicheng

Martin HOFMANN

Under the category 'Kaogong dian' 考工典 (Industries and Manufactures Canon), the eighteenth century encyclopedia Qinding gujin tushu jicheng 欽定古今圖書集成 (Imperially Approved Synthesis of Illustrations and Books of Past and Present) includes a rubric containing biographies of major personalities in the field of crafts and skills (gongqiao 工巧). This section on exceptional figures of different crafts from antiquity to the Ming dynasty comprises only 82 short entries, which in comparison to other selections of artisan biographies is a fairly small number. Why did the editors of the encyclopedia single out these particular persons as representatives for craftsmanship in Chinese history? Did they have exemplary skills or particular importance for the development of specific crafts; were their achievements unique or particularly noteworthy; and were their biographical accounts especially detailed, informative, or credible? To answer these questions, this paper will scrutinize how the 82 figures are portrayed and which of their skills and characteristics are highlighted. Moreover, it will compare them to larger biographical collections from the early twentieth century such as Li Fang's 李放

(1884–1926) Zhongguo yishujia zhenglüe 中國藝術家徵略 (Brief Account on Chinese Artisans) or Zhu Qiqian's 朱啟鈐 (1872–1964) Zhejianglu 哲匠錄 (Collected Biographies of Master Craftsmen) in order to show how and why the biographical information of individuals was augmented, modified, or omitted. In this way, this paper aims to reveal to what extent the perception and historiographic representation of artisanal skills changed between the early eighteenth and early twentieth centuries.

IP12: Scientific exchanges in Modern East Asia

Chinese graduates of Tokyo Higher Technical School in the modernization of Chinese industry, 1904-1924

Lei WANG
Jian YANG

The Qing administration started actively sending students to Japan to study advanced technology in 1900. Due to this, the Tokyo Higher Technical School (THTS) became an important foreign hub for Chinese students. Although THTS was not as well-known as the seven imperial universities, graduates from THTS contributed more to China's industrial modernization than alumni of the latter institutions. Through archival research and documentary study, this research demonstrates that the function of technology importers is highly influenced by a variety of factors, including policy, opportunity and social demand, which can lead to a complex and variable pattern in various contexts. In developing countries, the suitability or appropriateness of the imported technology is more significant than its level of progressiveness.

Japanese scholar Tsuruichi Hayashi's academic exchanges with China

Xiaoxue ZHANG
Qin DAI

T. Hayashi is a Japanese mathematician, educator of mathematics and historian of mathematics. He had never been to China, but he had deep academic exchanges with China. The discussion of T. Hayashi's academic exchanges with China can not only enrich T. character research, enrich the content of the history of mathematics exchanges between China and Japan, but also promote the friendly exchanges and development of mathematics between China and Japan. Therefore, based on original materials, this article focuses on T. Hayashi and Chinese mathematicians, Chinese mathematics education and Chinese mathematics history. The study found that Chinese mathematician and educator of mathematics Huang Jiyu was T. Hayashi's first Chinese student. Chen Kien-Kwong, who was a doctoral student of T. Hayashi, actively practiced T. Hayashi's teaching thoughts. Buchin SU, who regarded T. Hayashi as both a teacher and a friend, had received timely help from T. Hayashi in his study and life. T. Hayashi's exchanges of correspondence with Loo-keng Hua provided a platform for Chinese mathematics. In the era of Japanese mathematics works were widely introduced by China, most translations were T. Hayashi's works, almost 27. T. Hayashi also had ten years of correspondence with Li Yan, a Chinese historian of mathematics. T. Hayashi was also a representative figure in the study of the history of Chinese mathematics in Japan in the early 20th century.

P25: Praxis of Historiographic Intervention in Crises: Mis/fitting the Expectant Narratives of Modern Medicine in Trans–Asia

Sex(ually-Transmitted Diseases) and the City: Public Health Policy and Syphilis in Tokyo

Susan L. BURNS

In 1953, Ibuki Chikashi, physician and director of Yoshiwara Hospital, published a book entitled The Sex Lives of Prostitutes. Its provocative title notwithstanding, a significant portion of the book was devoted to a discussion of sexually-transmitted diseases (STDs), particularly syphilis. Ibuki was uniquely positioned to discuss the public health threat posed by syphilis. Founded in 1911 by the Tokyo Metropolitan Police, it was tasked with carrying out syphilis exams of the prostitutes who worked in the brothels of Yoshiwara, a "pleasure quarters" where brothel-based prostitution had been permitted since the early seventeenth century. In fact, the examination of prostitutes for syphilis in Tokyo had begun more than three decades earlier. In 1873, the governor of Tokyo had issued the "regulations for prostitutes and geisha," which created a system of licensed prostitution that required women to submit to weekly examinations and to submit to treatment if found to be infected in order to be licensed. Despite the long-standing policy of requiring prostitutes to be examined regularly for syphilis and the availability of effective treatments in the form of salvarsan in the 1910s and penicillin in the 1940s, Ibuki found astonishingly high rates of syphilis among Tokyo's prostitutes. He found that about 35% of prostitutes in Tokyo's brothels were infected and 60% of those who worked outside the brothels (and thus were not subject to examinations) were infected. In this presentation, I explore the long and ultimately unsuccessful campaign to control syphilis in Tokyo. I argue that the myopic focus on examining prostitutes, the high cost of treatment by private physicians, and the popularity of ineffective patent drugs allowed syphilis and other STDs to spread around the city, leaving ruined lives in its wake.

Making of the Mentally Ill Patients in Tokyo: Psychiatric Hospitals, the Families and the Police in the Metropolis c.1920-c.1945

Akihito SUZUKI

Why have Japanese psychiatric hospitals shown rapid and enormous growth in the twentieth century? The mentally ill in Japan had just a few hundred psychiatric beds in 1900, but in 2020 more than three hundred thousand beds are still available, which provides the largest incarcerated population in the world. This paper will present the analyses of the rich and detailed references in case histories of the eminent Ohji Brain Hospital (1901-1945) to the situations outside the hospital and will argue three essential issues in the making of the mentally ill patients: the domestic strategy, the enforcement of the order, and the situations of the new Japanese nation and empire.

This paper will first show the influence of the new domestic power structure inside the single-family and two families negotiations on short and long incarcerations for a domestic benefit at the cost of the patients. The relationship within a single family and the gender issues between the two households were crucial. Secondly, several cases show the relatively large force of the police was able to start, and perhaps end, some cases of various lengths of custody in a psychiatric hospital. The police could intervene in interpreting the behaviour of disorderly persons into the symptoms of "the patient." Finally, the rise of the new metropolitan centre of the Japanese nation and the rapid expansion of the Japanese Empire created a further structure for the use of psychiatric hospitals for domestic and international migrants. Closely integrating into the family and the

police agencies, the new metropolitan psychiatric institutions contributed to the making of mentally ill patients in Tokyo. The paper will conclude with some comparisons with the historical findings of European, North American and East Asian social-historical works of psychiatric institutions and will discuss the role of the family and the police in creating the patients as individuals in the asylums.

Oedipal Reversal: Race, Politics, and the Psychology of the Unconscious in the Sinophone Pacific, 1944-–1971

Howard CHIANG

This paper examines how a popular tool for measuring the unconscious—the Thematic Apperception Test (TAT)—forged two diverging paths in psychological research in the mid-twentieth century. The story begins with a project led by the U.S. Office of Strategic Services (OSS, forerunner of the Central Intelligence Agency). The Chinese psychoanalyst Bingham Dai (1899–1996) worked with Harvard psychologist Henry Murray (1893–1988), the inventor of TAT, to administer a cross-cultural version of the test on Nationalist soldiers in Kunming in 1944. The Kunming collaboration fostered a community of Asian psychologists who advocated anti-racism upon returning to the U.S. Both Dai and his OSS project colleague, Robert Chin (1918–1990), turned their attention to the personality development and social adjustment of African Americans. In an era before the rise of Asian American psychology, Dai's work on race relations led him to become the first scholar in the South to openly endorse the psychological damage argument used in the landmark Brown v Board of Education (1954) decision (to which Chin also contributed). Insofar as émigré Han scientists like Dai assumed a minoritized status in Western society, Dai's critique of whiteness emerged from a self-repositioning with respect to dominant social groups.

A separate thread of research followed the Kunming episode. Social scientists employed similar projective tests to study China's "national character" by interviewing subjects who fled to Taiwan and Hong Kong. Drawing on the voluminous case files collected by political scientist Richard Solomon (1937–2017), I demonstrate how this transcultural testing of the mind in the 1960s helped to buttress a longstanding thesis about Chinese obedience. In addition to the TAT, Solomon also administered the Rorschach Test to his informants. A reversal of the Oedipal drama, Western experts like Solomon claimed that a key ingredient of Chinese political culture concerns the way the Chinese son obeys his father and superiors instead of subverting them (or "killing" them to resolve castration anxiety). In the midst of the Cultural Revolution, the use of psychological test became tethered to a new peak of Sinological interest in Maoism. Taken together, the research on race relations and national character studies shared a focus on understanding people's reaction to authority, an aspect of family dynamics central to the evolution of psychoanalytic theory.

The Goal of Public Health Nurses and their Trajectory in Liberated South Korea

Yun Jae PARK

Public health was a symbolic concept of liberation in South Korea. Before the liberation, sanitation or hygiene was at the center of medical and quarantine activities. Medical experts, in particular from western countries such as the U.S. emphasized that medical activities in colonial Korea put too much effort into treatment rather than preventive or social medicine and that it was time to move in a new direction.

Like public health, the concept of public health nursing was new to South Korea, western missionary nurses in the colonial period had introduced some public health care services such as home care nursing, district nursing, social relief work, and so on though. Public health nurse, however, was one of the significant targets of training schemes that were designed by foreign experts who envisioned the future of health system in South Korean. For them, training public health nurses was urgently required and was more important than training other medical professionals such as nurse-midwives in health unit work.

Public health is included in the curriculum of nursing schools in South Korea today and the profession of public health nurse exists. However, public health nurse is different from the goal that was issued after World War 2 in that public health nurse is closely affiliated with the activity of public health center. This paper will follow the trajectory of public health nursing and show that why the vision of foreign experts on public health nurse was not achieved in South Korea.

Free Ports as Hotbeds for the White Plague: Reluctant international aid in managing tuberculosis in Hong Kong and Singapore in the 1950s

Harry Y.J. WU

The Early Post-World War II saw a surge of tuberculosis epidemics worldwide. In Hong Kong and Singapore, the most important entrepôts in East Asia and Southeast Asia, the disease condition exacerbated due to flows of migrants. During this period, the World Health Organization resorted to technical approaches to infectious diseases, mostly exemplified by mass tuberculin tests and BCG inoculation in underdeveloped countries. Whether or not such approach was effective remained speculative. In Hong Kong and Singapore, tuberculosis was a widespread disease associated with poverty, chaotic housing and poor sanitary habits from the mid-19th century onwards. Before the availability of BCG, the white plague remained uncontrollable because of the inaccessibility of streptomycin, the only antibiotic proved effective against tuberculosis in the early 1950s. Such scarcity was due partially to the complex population flow, and partially to the embargo of important drugs as a result of the Korean War. From the mid-1950s, with the returning of British colonial governments, the WHO initiated mass vaccination programs in Hong Kong and Singapore, targeting on school children. However, tuberculosis in the two free ports were not eased by internationalists' magic bullet approach. It was instead curbed by the establishment of governmental and non-governmental medical institutions, improved housing system and non-pharmaceutical public health measures. This paper therefore nuances the language of epidemics and disease control in the two "international hubs" by examining the "internationalists"' wishful thinking in the WHO's first decade of existence. It emphasizes the nature of global health as a collaborative decolonisation effort by looking at the examples of two postwar colonies in East Asia.

Chasing the Elusive Dream – Health Unit and Rural Healthcare in Korea

Jane S. KIM

This paper examines how Health Unit, a primary healthcare system first pioneered in Sri Lanka came to be applied to the Korean context. In 1952, two years into the Korean War (1950–1953), the United Nations Korea Reconstruction Agency (UNKRA) made a request to the World Health Organization (WHO) to send experts to assist the Korean nation to rebuild its badly damaged public health system. In

rebuilding a new public health system befitting Korea, a newly independent postcolonial nation–state, the WHO experts recognized the critical problem of lack of health and medical services available to rural and agricultural sectors of the country where most of the country's population resided. To address the problem and to create a new system of health service that would be accessible to most of Korean populace as possible, the WHO experts drew on the success of the Health Unit, a primary health service program that was initiated in Kalutara, Sri Lanka in 1926. The purpose of creating Health Units in colonial Sri Lanka was to provide health services to regions that were chronically suffering from lack of access to basic healthcare services. Some of the trademark characteristics of the Health Unit included dividing the nation into 'units' of health administrations and each unit included dispensaries and health workers who were selected from each local 'units' and trained in the rudimentary basics of healthcare. This paper will explore how the WHO experts who were entrusted with the task of rebuilding the Korean public health system drew on the Sri Lankan example of Health Unit and other rural health and primary healthcare experiments carried out around the world. By reading the WHO's effort in planning in postwar Korean public health system as part of global movement in pursuing rural health and eventually health for all, this paper hopes to show the Korean public health system to be just more than a system that was born out of the ashes of the Korean War.

IP1: Issues of East Asian Astronomy

Integration and Improvement -- The Study of "Xiaozhang-method" by Chinese and Japanese scholars from the 17th to the 19th Century

Wen ZHANG
Zelin XU

The "Xiaozhang-method" is an algorithm created by ancient Chinese astronomical and calendar scientists to solve the phenomenon of "tropic year growth and decline". This algorithm started from Yang Zhongfu's Tongtian Calendar and has been inherited by other scholars since then. Since the Ming and Qing Dynasties, western astronomical theories have been introduced into China and Japan along with calendar works compiled by missionaries. After learning western astronomical knowledge, Chinese and Japanese scholars have studied the "Xiaozhang-method" by virtue of the western astronomical theories they have learned. In the Ming and Qing Dynasties, Chinese scholars, because of their own identity and the influence of the thought of "Chinese origin of Western learning ", showed two different stages in the study of "Xiaozhang-method". In the first stage, scholars chose to use the western astronomy knowledge to explain the phenomenon of "tropic year growth and decline", which was the basis of the algorithm of "Xiaozhang-method", and combined the western astronomy with the traditional Chinese astronomical and calendar knowledge. The scholars in the second stage have a futher understanding, and it is a futher understanding to integrate western astronomy into traditional Chinese astronomy. On the other hand, after absorbing the knowledge of western astronomy, the Japanese astronomy and calendar calculation scholars in Edo period showed two different stages in the study of "Xiaozhang-method". In the first stage, scholars studied and improved the "Xiaozhang-method" in the Shoushi Calendar from the perspective of the traditional astronomical calendar. In the second stage, with the introduction of western astronomy, they improved the

"Xiaozhang-method" after mastering the theories of Western astronomy to make it more accurate and reasonable, which is a practical study. The reason why China and Japan are different in the field of traditional science is due to their different national characteristics and realistic background, which also has a profound impact on their attitudes towards Western learning in the future.

The 15th-century relic Ilseongjeongsiui (Sun-and-Stars Time-Determining Instrument) and the Significance of its Production

Sang Hyuk KIM
Byeong-hee MIHN
Yong Sam LEE

The science of Joseon during the reign of King Sejong (1418-1450) has accomplished many significant achievements recognized in contemporary East Asia. However, many astronomical facilities around the observatory, which made scientific breakthroughs at the time, have almost disappeared and are recorded only in the literature. Amid this, the excavation of Ilseongjeongsiui (Sun-and-Stars Time-Determining Instrument, hereafter 'STI'), estimated to have been constructed at the time of King Sejong, in 2021, has a profound significance. Sudo Institute of Cultural Heritage has unearthed the parts of three bronze rings of STI in Insa-dong, Jongno-gu, Seoul. All of these were broken to pieces. When all the fragments are combined, the two constitute a perfect ring. According to the literature records, STI is a clock created by King Sejong himself to be used day and night. It has three rings: sundial hundred-interval ring, star-dial hundred-interval ring, and celestial-circumference ring. The sundial hundred-interval ring is a sundial used during the day, and the star-dial hundred-interval ring is a star-dial used at night. The celestial-circumference ring is a device made in consideration of intercalary day and precessional motion. The whole star-dial hundred-interval ring and celestial-circumference ring and a portion of the sundial hundred-interval ring comprise the entirety of the relics of the three rings unearthed this time. The purpose of this study is to analyze newly excavated artifacts and introduce the structure of STI with its astronomical principles and functions by referring to the contents of existing literature.

Joseon's Armillary Clock in the 18th century

Byeong-Hee MIHN
Yong-Hyun YUN
Sang Hyuk KIM
Ho Chul KI
Young-Sook AHN

This study aims to develop a restoration model of an armillary clock, Tongcheon-ui (Pan-celestial Astronomical Clock), by referring to the record of Damheonseo, an anthology of Hong Dae-Yong (1731-1783), and to the artifact of an armillary sphere in the Korean Christian Museum of Soongsil University. When living in Naju city of Jeolla Province in 1760~1762, Hong, Dae-Yong manufactured the Tongcheon-ui with cooperating clock researcher Na, Kyeong-Jeok (1690-1762), a clock expert/designer, and An, Cheo-In (1710-1787), a master craftsman. According to our study, the Tongcheon-ui was a kind of astronomical clock with an armillary sphere that is rotated by the gravitational force generated by a lantern clock's weight. As the model of Tongcheon-ui , we suggest that the lantern clock has the structure of a striking train connected to a going train, which is regulated by a foliot escapement for timekeeping, similar to the artifact of the Korea University Museum. While the armillary sphere was constructed in the

fashion of a two-layer sphere: the outer sphere, Yukhab-ui, was fixed and the inner one, Samsin-ui, could rotate around the polar axis. Particularly, Samsin-ui comprises three rings: equatorial, ecliptic, and lunar-path. Two latter rings are successively layered and tilted by 23.5° and 28.5°, respectively, over the equatorial ring. A solar miniature attached to a 365-toothed inner gear on the ecliptic ring represents the annual motion of the Sun. A lunar miniature was also installed on a 114-toothed inner gear of the lunar-path ring to imitate the daily movement in the lunar path and phase change.

III. 14:10 – 15:450

P46: Science and the Late Qing Polycrisis: Perspectives from the Interior and Non-elite 1866-1930

Astronomy, Mathematics, and Exploration in China's Great Game 1866-1879

John ALEKNA

In 1878, an amateur astronomer and mathematician residing in Nanchang, Jiangxi Province, named Huang Maocai (1843-1890) was selected to lead an expedition through Tibet to British India. Having defeated the Taiping Rebellion, the Qing government faced a new crisis: the arrival of foreign explorers on its Western and South-western borders. Despite protestations from Europeans, these expeditions could eventually represent a military threat to China's territorial integrity. Only a mirror-image Chinese expedition, led by someone with the necessary skills, could reconnoiter the situation. For this, they turned to Huang. Having come to the notice of provincial officials as early as 1871, this largely-unaccredited scholar (he held only a county-level degree) was prized for his knowledge of Western and Chinese calculation techniques, practical astronomy, and geography. He had advised local officials on the significance of the transit of Venus in 1874, and had edited commentaries on Western scientific learning that circulated in manuscript form within the province. These skills and forms of knowledge would be invaluable for the expedition, which mapped both the borderlands and India itself. Received with plaudits in Beijing, Huang's geographical discoveries were even reviewed in Western publications like Nature and The New York Times. Using surviving journals, brief records of calculations, cartographical texts, mathematical guidebooks, and archival documents, this paper traces how Huang used knowledge of the skies and numbers to help strengthen the geopolitical position of the Qing Empire in the heart of Asia. Further, it notes how Huang's results compare with the scientific-military-political exploration conducted by the British and Russian empires at the same moment, and reveals how a provincial figure advanced from obscurity to a level of national fame through his familiarity with scientific methods. I thus suggest that new forms of knowledge (and a shift in who had access to them) preceded the state's need. The expansion of science was a general phenomenon, coming (in this case) from below, not from an elite response to the crisis.

Traditional Geography, Borderland Cartography, and the Modern Chinese State

Xue ZHANG

Twentieth-century China witnessed the "modernization" of scholarship under the guidance of "Mr. Science." Studies that defied this transformation either declined or were marginalized at best. Geography, to a

great extent, was an exception. Although geography as a discipline could hardly resist the wave of modernization, traditional canon and approaches survived and even thrived in the new era. This paper seeks to explain the unique trajectory of geography by assessing the continuing influence of imperial geographical traditions in the 1920s and 30s. The 1911 revolution overthrew the Qing empire, but the Qing's ghost still haunted China. One of the daunting problems confronting the republican government and Chinese elites was how to deal with the relationship with the Qing empire's non-Han territories. China proper and non-Han borderlands used to be bonded by the Manchu-forged imperial ideology, but the abdication of the last Qing emperor severed the tie. The nascent Chinese government hoped to inherit the intact Qing territory, and thus needed to reforge the bond. I argue that the intellectual legacy left by the Qing empire, including a rich corpus of geographical texts, helped Chinese elites to reconceptualize non-Han frontiers. Specifically, I will examine the afterlives of Qing geographical classics, such as Xu Song's (1781-1848) Waterways in the Western Regions (Xiyue shuidao ji), in the early twentieth century. Republican officials' citation and adaption of traditional geography will be the analytical focus of this paper.

Crops in Crisis: Agriculture Science and Botany in Qing China, 1870-1910

Peter LAVELLE

This paper examines the conjoined histories of agricultural science and botany in the final decades of the Qing Empire. When the North China Famine (1876-76) killed millions of people, literati began to discuss the possibility of using foreign plants to mitigate the crisis. In the famine's aftermath, Chinese agronomists sought to learn about economic plants in a variety of ways as they strove to improve their country's farming output and prevent similar crises. They took advantage of new opportunities, networks, and events—from relationships with foreign diplomats to attendance at international exhibitions—to acquire knowledge and seeds from around the world for use in research and teaching. Meanwhile, as foreign botanists scoured the Qing hinterlands and frontiers for unusual and valuable specimens, Chinese leaders increasingly turned their attention to their empire's own considerable crop diversity. After 1895, as Beijing mandated new surveys of imperial geography and natural resources, provincial officials established agricultural experiment stations and other new institutions to take the lead in science and extension work. In addition, officials used a wide range of mechanisms for the acquisition and sharing of plant material, such as inter-provincial transfers, botanical collecting trips, and plant donations from farmers. Together, these trends facilitated the introduction of an unprecedented volume and variety of plant material into Chinese agricultural science. They also created the conditions for the production of knowledge about plants that was new in both form (e.g., data organized in charts) and scope (e.g., information about regional varieties of the same type of crop). By exploring how economic plants of foreign and domestic origin became the subject of scientific interest in this period, this paper takes the story of late Qing science beyond the treaty-port cities and their elite institutions to illuminate the rural and non-human dimensions of scientific change. Moreover, by exploring how agronomists used activities like surveying trips, botanical exchanges, and field experiments to study plants, the paper shows that late Qing botany transcended early modern patterns of philological and observational

plant knowledge and moved toward a more systematic understanding of crop productivity.

IP17: Science in the public

The Construction and Transformation of the Image of Scientists in Movies

Ying WANG

The research on the image of scientists in the field of science communication is a hot topic. The construction and dissemination of the image of scientists in movies are of great significance to science communication. On the basis of studying the transformation of the images of the scientists in movies in the particular historical context of the movies, this paper analyzes and reveals the strategies and rules of image construction, hoping to provide illumination for science communication and the culture of science. Therefore, when the movie reflects the group of scientists, it must integrate it into the social background and break through its stereotyped impression. Whether it presents positive or negative, real life or fictional scientists in the artistic level, it must ultimately obey the purpose of guiding the public to understand science well.

Unfulfilled Scientists' Dream: Ideals and Reality for the National Museum of Natural History in South Korea

Hyangsuk SHIN

As of 2023, South Korea is the only OECD country without a natural history museum. It has been half a century since the need for a natural history museum was discussed in South Korea, and 30 years since the government officially announced its intention to build a "National Museum of Natural History". Although the term "natural history museum" was not used, the National Science Museum, which operated immediately after Korea's liberation, and the science museum envisioned by the Korea-U.S. Association of Science Museums in the 1960s in response to the DMZ ecological survey, had many of the characteristics of a natural history museum. In the 1980s, scientists began to raise the idea of establishing a national natural history museum in earnest after the Seoul Olympics, and in the 1990s, the Ministry of Culture, Sports and Tourism announced the establishment of a national natural history museum and promoted the preparatory projects for several years. However, the 1997 Asian financial crisis that hit South Korea halted the project, and a renewed attempt to establish the museum was again derailed by a 2001 preliminary feasibility study that found it to be economically unfeasible. The project was later revived with the idea of a museum complex, but it also failed to overcome the barrier of low economic viability. In recent years, international issues such as biodiversity and climate change have prompted various actors to attempt to build the National Science Museum of Natural History. In the meantime, Korea's economy has grown significantly and there have been several regime changes. However, the journey to build the National Museum of Natural History is far from over, and new paths are being explored. Why has such a singular policy agenda been able to survive as a persistent issue for so long, and why has it failed to materialize despite being raised so consistently? This presentation will analyze the historical process and context of this issue, exploring why it has been raised so consistently and why it has failed to achieve tangible results. I will show that this is not simply a result of the establishment of a specific institution, but of a variety of factors, including South Korea's S&T policy and science culture.

Turbulent Transmissions: The Public Roles of Scientists During the Early Covid-19 Crisis in China

Yishu MAO
Anna L. AHLERS

Chinese scientists and physicians have played various important roles when the COVID-19 outbreak was detected in the People's Republic of China at the end of 2019. Those working in public health documented early anomalies and sent warnings. Epidemiologists and virologists engaged in investigation and advised the government's epidemic management strategy. Private laboratories sequenced the genome of the novel virus and shared information with the global scientific community. Chinese netizens, lamenting the suppression of information and the conduct of government authorities in this crisis, turned to scientists as sources of more trustworthy information. Over time, many scientists acquired a kind of hero status, ascribed to them by their official mandates and in the public discourse. They came to act as transmitters of information and health advisors for the domestic public, as crisis managers for public authorities, and as explorers and collaborators on "ground zero" for their global peers. However, in a context like the PR China with its high degree of political control over information, these spontaneous role definitions also created frictions, for example when remarks from scientists contradicted government authority's statements, or when the expectations of transparency by the global scientific communities clashed with Chinese scientists' domestic duty to stay away from politically sensitive topics. This study examines the variety of roles played by a group of prominent Chinese scientists during the early stages of the Covid-19 outbreak and the controversies that surround(ed) them. By combining findings from several case studies informed by collections of diverse media and material, we shed light on the public creation of scientific credibility, the relationship between science, politics and other societal domains in China today, as well as on the frictions of national and global systems of scientific and public communication.

IP6: Medicine in traditional China

An Etiological Myth: the Entanglement between Corpses and Worms in Medieval China

Yuchen FENG

Central to this research is an investigation into the secret prescriptions for the three corpses and nine worms 三尸九蟲 from the Daoist texts of medieval China, and this present paper argues that the secret knowledge was successfully kept in a small range of practitioners, and the term of "corpse" was failed to be identified as the etiological of the internal worms of the human body in the medical texts in later centuries. This present paper will reconsider the concept that the knowledge of "corpse" is considered as the myth of Daoism automatically, and reveal the etiological signified of this term.

Worms achieved near-omnipresence on earth and even shaped human civilization to a large extent. In medieval China, it was used in various fields as the noumenon and metaphor, especially by practitioners seeking to become transcendent, as a worm-free body was a prerequisite. They coined the term "three corpses and nine worms" as signifiers to indicate the creatures that, in their understanding, live inside the human body. Prescriptions and remedies against these coinhabitants were created by them as well. However, this terminology, as well as these remedies, are kept secret by these practitioners and are permitted only to be

interpreted, used, and transmitted within their limited circle.

This present paper analyses how the related terms "corpse" and "worm" gradually evolved into a fixed term in "three corpses and nine worms," as well as the prescriptions used to suppress them. By drawing on all available primary sources, both from Daozang and the received medical texts, I will argue this mysterious term, "corpse," was not understood by the editors of medical texts in the Sui and Tang dynasties despite referring to it. Through the analysis of the formula used to suppress the three corpses, it can be revealed that the three corpses can actually be summarized as the pathogenic cause of worm infestation in contemporary understanding. Moreover, the formula they created for the three corpses, a seven-ingredient formula, is one of the earliest known for dealing with the pathogenic cause of internal worms or parasites.

This present study has broader implications for the debate on the relationship between Daoism and medicine be defined. Even more broadly, it provides a perspective about what we can gain from Daoist exploration to be valued, researched, and even applied to solving contemporary crises as the "medicine" involved.

Abnormal Environment and Universal Medical Knowledge at the Edge of Empire: Zhang 瘴 in Southern Song (1127–1279) Lingnan 嶺南

Chunhao LUO

Zhang 瘴 was a concept employed by the northern Chinese elites in premodern China to denote various southern diseases and medical conditions. Literally meaning "barrier" with a disease radical attached to it, the non-human agent zhang became an ecological barrier of the imperial expansion in the south. Northern officials were reluctant to serve in the south due to their fear of zhang. Centring on zhang, this paper seeks to investigate the interaction between the changing medical knowledge in the Southern Song, the geographical imagination of Song literati, and the frontier management of the Song empire.

The existing scholarship on zhang tends to cover various geographic regions and time periods, paying less attention to the unstable category of the "south". This study aims to fill in this gap by situating the discussion of zhang in a specific time and place: Southern Song Lingnan (mainly present-day Guangdong and Guangxi). Analysing miscellaneous notes and medical treatises related to zhang, this study will discuss how Southern Song local writers conceived of the relationship between the environment and zhang. Following Chen Yun-ju's study emphasising bodily experiences informing medical knowledge about zhang, this research will argue that the abnormal environment of Lingnan was a perception constructed by human experiences, and human activities including urbanisation impacted the surroundings that caused diseases.

Possessing specific environmental knowledge about Lingnan allowed these sojourner literati to navigate localised medical knowledge, rejecting elements from the northern traditions while dismissing some indigenous practices as "barbarous". Compliant still to the principles of northern medicine, this localised medical knowledge was at the same time universal, consequently strengthening the cultural hegemony of the north. As the northern elites started to have effective treatments for the southern diseases, Lingnan became less of a fearful frontier for the northern elites, paving the way for further imperial expansion.

This study will contribute to the discussion of the relationship between

human (the literati) and non-human agents (the zhang in an abnormal environment), showing that these two categories are by no means dichotomous. Environmental features stimulated human experiences, while humans, influenced by their cultural presuppositions, defined which environmental features mattered—and which could cause medical disorders. Furthermore, this paper proposes that the emerging local medical discourses, a localist turn, paradoxically facilitated the imperial hegemony. In this imperial expansion, the settler colonialism at the southern frontiers was not a one-way transformation, but mutual integration between imperial ideology and the indigenous knowledge.

Development and Transformation of Kampo Medicine from the Meiji to Taisho Period——Concurrent about the modernization of Herbal Medicine under the dispute between China and the West

Yuqi JIN

After the Meiji Restoration, Japan pursued a policy of wholesale westernization, Western Medicine occupied a leading position, while the scientificity of Traditional Chinese Medicine (TCM) was questioned.

Kampo medical theory was relatively simplified, fragmented. Coupling with political and other factors, it faced the crisis of survival after the culture shock. However, the Herbal Medicine had a higher acceptance.

The development of Kampo Herbal Medicine reflected early germination of evidence-based practice and the transformation of Kampo.

Many books about Kampo medicines from the Meiji to Taisho period could clearly reflect Japan's reformism for TCM. Taking "Research on Kampo herbs", "Collection of Kampo panacea", "Preparations of Kampo medicines" as an example, which used Westernized medicine classification and sorting methods, retained the alias, function, usage and dosage in TCM, rarely mentioned or adopted TCM theory, such as drug property, while supplementing a lot about drug varieties, ingredients, efficacy and concoction from modern subjects such as botany, pharmacology, chemistry, etc. mostly influenced by German Pharmacology. It usually took diseases instead of syndromes in treatment.

The preparations were usually classical prescriptions. Their ingredients were fixed, applying crude herbs without processing. The early reform of dosage forms also combined TCM and Western Medicine. Kampo doctors led the early pharmacology research on TCM and promoted the development of pharmacognosy. Standardized, large-scale and industrialized Kampo preparations were simple, easy for use, having high universality. Based on Western medical paradigm, modern Kampo Medicine gained high international recognition. However, in terms of professional education, Western doctors who can legally use Kampo medicines lacked systematic training of TCM theory. Moreover, departing from the core idea of Syndrome differentiation and treatment, without personal conditions, it ultimately led to misuse incident of Minor Bupleurum Decoction.

At the turn of 20th century, China also faced a crisis in TCM. By learning from the Japanese experience, promoting the "scientificization of Herbal Medicine", China accomplished the modernization transformation of TCM. Unlike Japan, China inherited the complete and independent theoretical system of TCM, and explored the applicable parts of TCM techniques to modern times, replacing take-ism with a dialectical unity of Chinese and

Western Medicine. Furthermore, China established a modern vocational education system of TCM. The crisis of Kampo is a warning of how should Herbal Medicine develop in the international environment, Japan's model of finding a balance between TCM and international standardization is also a worthy example.

IP41: Medicine in Modern East Asia

One genre, many forms: Medical recipes and recipe books in 19th and early 20th century China

Thies STAACK

Previous research has drawn attention to the importance of the recipe as an epistemic genre in cultures around the globe from ancient to present times. The succinct and modular textual form of the recipe appears to have facilitated exchange of knowledge across cultural, linguistic and geographic boundaries. Furthermore, in the medical field its twofold connectedness to individual health problems on the one hand (as prescriptions), and common pathoconditions on the other (as formulas), demonstrate the versatility and adaptability of recipes.

In 19th and early 20th century China, various actors including medical specialists and laypersons collected and exchanged medical recipes. The fact that the lion's share of the extant medical literature of the time, both handwritten and printed, are recipe books (fangshu) also speaks to their immense popularity, even or maybe especially during a period of social and political crisis.

Focusing on handwritten recipe books from the State Library of Berlin collection, this paper aims to further unveil the role(s) recipes played in the lives of their late imperial collectors. On the basis of textual differences such as the recipes' component parts and paratexts as well as material differences in layout, book format, and temporal strata, the paper attempts to distinguish typical patterns in the production and use of recipe books. Probing the multifaceted material appearances of a textual genre with a typology of recipe books, it contributes to a better understanding of how these books served their users and why the recipe genre may have remained so popular throughout and even beyond the challenging times of the late Chinese empire.

The assistance of China Medical Board and the formation of medical research resources in Korea in the 1950-70s

Miyoung SHIN

After the war, Korea had a lot of difficulties in overcoming the materially impoverished environment. In this process, assistance projects from the international community played an important role in laying the foundation for Korea's growth. This was also seen in the medical field. The United States led the assitance projects to improve medical research and practical conditions in postwar Korea, and the Minnesota project is a representative project. In addition to the Minnesota project, there has been an international assistance project to support the development of the Korean medical field since the 1950s, which was the China Medical Board (CMB) of the Rockefeller Foundation. In the meantime, almost no research has been done on CMB's assistance for Korea because there was little data left in Korea. CMB is an assistance project that played an important role in providing resources for medical research and activities in Korea in the 1960-70s. In this study, I will focus on the annual report to examine how the CMB affected the training of human resources in medical schools in each region, including Seoul National University and Yonsei University, as well as

Kyungpook National University, Chonnam National University, Pusan National University, and Soo-do Medical College. Specifically, I will look at how the contents of the Cmb aid appeared in each region or university, and examine how it connects to Korea's medical development trajectory. Also I will examine the historical implications of CMB's assistance in building resources for medical research and activities in Korea.

Decentralization, Empowerment, and the Cold War: Educational Fund of China Medical Board and a Case of Kyungpook National University in South Korea, 1953-1974

Narae SEO

This study offers a microhistorical perspective on the China Medical Board (CMB) funding case involving Kyungpook National University (KNU) School of Medicine. Since 1945, higher education and medical education have been concentrated in Seoul, South Korea, as a result of centralization. KNU is located in Daegu, in the southeast region of Korea. The KNU School of Medicine received the CMB from the Rockefeller Foundation as the first medical education institution outside of Seoul to do so. The case of the CMB-funded KNU School of Medicine from 1953 to 1974 illustrates how decentralization and empowerment can occur simultaneously in medical education. Previous research on CMB has typically focused on describing the specifics of technical assistance, fellowship programs, and the financial standing of medical education. The majority of CMB literature resources consist of letters that illustrate the impact of studying abroad and the emotional bonds between recipients and donors during the Cold War. This study investigates how decentralization, empowerment, and the Cold War were intertwined with the CMB's funding of the KNU. Also investigated is the correspondence between CMB headquarters and KNU professors.

IP11: : Military and the application of science in modern East Asia

The Army and Spanish Influenza: The Japanese Experience in East Asia

Chaisung LIM

Since the Meiji Restoration, modern Japan has acquired many institutions and technologies from the West in order to establish a modern nation. In particular, modern military organizations played an important role as a military force in Japan's emergence as an empire through the Sino-Japanese and Russo-Japanese wars, and in the colonization or semi-colonization of Taiwan, Korea, Manchuria, Sakhalin, and other regions. They suppressed rebellions and independence movements in various regions and maintained imperial rule. Among other things, the army adopted the Prussian model of universal conscription, which required all healthy young men to serve two years of national defense duty. Since their physical abilities were directly linked to their ability to fight, it was very important for them to maintain the highest level of health.

Nevertheless, when combat broke out, they suffered gunshot wounds and other battle injuries, which required prompt treatment in the field units, not to mention a long period of hospitalization and treatment after being sent back home. Even in peacetime, they were forced to live in groups away from their families, undergoing military training during the day and living with the Internal Affairs Unit at night. Therefore, they were placed in a vulnerable position against infectious diseases. When acute infectious diseases such as cholera, typhoid fever, and

diphtheria broke out, soldiers who lived together at all times were more susceptible than those in general society.

In response, Ministry of the Army established a Medical Bureau, and medical departments were formed in each unit, with military physicians assigned to take overall medical and sanitary measures within the organization. In order to effectively treat large numbers of patients, garrison hospitals (later, army hospitals) were set up in key locations to treat wounded soldiers and other patients. Nevertheless, when the Spanish influenza broke out in 1918, more than 100,000 soldiers were infected for two to three years, and more than 2,000 died. As long as it was not a war wound, no disease was the leading cause of death within a short period of time like Spanish influenza.

Therefore, this presentation will use medical health statistics and historical documents of Ministry of the Army to clarify the outbreak and pandemic of Spanish influenza, examine the response measures led by Medical Bureau of Ministry of the Army, and present the impact that Spanish influenza had on the military medical system it left behind.

Engaging with an "obsolete" concept: The professional reception of trench warfare tactics in China after World War I

Clemens BÜTTNER

For military scientists everywhere, World War I changed everything. In the years between 1914 and 1918, a monumental revolution of military tactics and technologies took place that made most previous knowledge of and assumptions about warfare and battlefield operations obsolete. The unexpected emergence and constant transformation of trench warfare tactics and technologies on the Western Front turned out to be an especially puzzling challenge for military professionals of the time, since the fundamentally defensive orientation of trench warfare contradicted the then-prevalent assumption that maneuver mobility and swift offensive operations were the only viable paths to military triumph. Yet, time and again trench warfare tactics proved to be most efficient and effective when engaging in heavy combat. Accordingly, military scientists had to deal with the following questions: How to turn one's own trench fortification systems into insurmountable and impenetrable lines of defense, how to (in face of a common disdain of defensive and positional warfare) justify their utilization and ever-growing sophistication, and how to simultaneously develop these systems into starting points and gateways of (hopefully) unstoppable offensive operations? However, already by the end of 1918 it seemed as if trench warfare had become an obsolete concept, useless in the ascending era of motorized and combined arms warfare.

Still, the subject of trench warfare featured heavily in the Chinese professional military literature of the 1920s and 1930s. In many journal articles, manuals, handbooks and monographic treatises, the principles and developments of World War I trench warfare were analyzed. This paper examines how Chinese military professionals – who also were staunch proponents of mobility and offensive action – traced the evolution of WWI trench warfare, how they discussed the advantages and disadvantages of trench warfare, and how they aimed to utilize these insights for their own operational and strategic thinking. Chinese interest in trench warfare derived from two factors: Pronounced professional scientific curiosity about all (old and new) military developments, and failure to acknowledge that the successful application of trench warfare tactics required two conditions the Chinese military could not

meet: Massive amounts of artillery (and a little-motorized enemy), and geographical conditions that made it impossible for the enemy to circumvent trench fortifications.

Research, Development and Application of Bupleurum Injection in Taihang Resistance Base in 1941

Suting BAI

In 1941, the military "mopping up" operation of Japanese army in the area of Taihang resistance base caused the spread of infectious diseases such as malaria, whereas Japanese drug blockade against the base led to the shortage of antimalarial drug—quinine. China at that time was still at the early stage of chemical medicine development, incapable of synthesizing quinine chemically. In the face of this technical dilemma, the Taihang resistance base integrated human and material resources to develop traditional Chinese medicine—bupleurum injection to replace quinine.

The selection of bupleurum was based on the theory of traditional Chinese medicine, clinical experience of the Chinese Red Army period as well as the advantages of local materials.Its dosage abandoned the traditional Chinese medical form of decoction and paste, but adopted the modern form of injection. Its research and development process followed standard research procedure of modern Chinese medicine: firstly, to find out the effective component of bupleurum for antipyretic—volatile oil through chemical analysis; next, the effective components were extracted by secondary distillation; finally, the safety and efficacy of bupleurum injection were checked by repeated antifebrile tests.

The stable and effective therapeutic effect of bupleurum injection in the process had boosted the confidence in the application of traditional Chinese medicine. Meanwhile, western medicine was no longer blindly worshipped. As the first injection in the history of traditional Chinese medicine, bupleurum injection is an important turning point in the development of modern Chinese medicine, which also reflects the efforts and adjustments made by traditional Chinese medicine in the face of the impacts and challenges of western medicine in modern times.

IP22: Multilingualism, dictionaries and the sciences

What is a Word? Units of Meaning in Early and Mid-Twentieth Century Dictionaries

Mariana MUENNING

I describe how the phonologist, language reformer and accidental lexicographer Wei Jiangong 魏建功 (1901—1980) formulated a concept of "word" to be applied in lexicography that was so concise that it actually denoted "free morpheme" and enabled him to compile the most successful modern dictionary: The Xinhua Zidian 新華字典, 1953.

Wei Jiangong was a linguist who was not only a specialist in the reconstruction of the historical pronunciation of Chinese, but was also involved in the standardization and promotion of the modern standard language (guoyu 國語) in both the Mainland and Taiwan in Republican times and in the introduction of the simplified characters in the PRC.

Searching for the ideal tool to promote guoyu, he reviewed the eight volume dictionary Guoyu Cidian 國語辭典 published in the 1930s and 40s and came to the conclusion that if he wanted to realize a reference work whose lexical items actually

match the morphology of Modern Chinese, he must compile a dictionary himself.

Wei Jiangong developed a concept of "word" (ci 詞) as "unit of meaning". It de facto denotes the free morpheme – before the now widely used term yusu 語素 (defined 1964 by Lu Zhiwei 陸志韋, 1894 – 1970), as "meaningful syllable") was coined. Wei applied this concept in the compilation of the first edition of the monolingual pocket dictionary Xinhua Zidian which became the "world's most popular reference work" (Guinness World Records 2015).

My research is based on a thorough analysis of the two dictionaries and of Wei Jiangong's and his contemporaries' articles on wordhood and lexicography. It is contextualized with the history of the discussion of the "word" (ci) in contrast to the "character" (zi 字). It is additionally put into perspective with an evaluation of the influence of phonographic spelling.

Technologies of the Humanities: an exploration into Christian Mentzel's engagement with things Chinese

Martina SIEBERT

Long-time personal physician to the Great Elector Friedrich Wilhelm and later first curator of the Berlin Sinica collection Christian Mentzel (1622-1701) started his journey into learning Chinese only in his early sixties. But he nevertheless had two big plans: aggregating the medicinal knowledge available to him in an "Herbarium Chinense" and compiling a Chinese-Latin dictionary by a material and intellectual appropriation of the Zihui 字彙.Resources stored today in Krakow and Berlin bear witness to both these projects. They allow glimpses into Mentzel's meticulous work to understand the structure of the Zihui, to compare it to the other complete Chinese dictionary at his disposal – the Yinyun Zihai 音韻字海 –, to count the number of the characters and grasp their order and finally to search for their transliterations and translations. His "Herbarium Chinense" came down to us only in a very preliminary stage. But when combined with traces in the Chinese originals and Mentzel's other drafts and scribbles, we similarly get an idea what he had planned and how he hoped to accomplish this plan.

The focus of the presentation will lie on Mentzel's tools of the trade, the successive economization of his work processes, and his overall perseverance to engage in this type of seemingly exotic, large-scale projects. Mentzel had to rely on the humanist's technologies of his time, on the compiling of lists and tables, of copying and assembling and last but not least on his international networking to pave his way into the vast and unknown territory of things Chinese.

Continuity and Change: The Evolution of China's English-language Scientific Journals across Different Historical Periods

Mingyue HAN

With the introduction and development of modern science in China, various academic journals were established, including a special type of foreign language scientific journals founded in China. This article aims to trace the evolution of China's foreign language scientific journals during different historical periods, with a focus on English-language scientific journals. Specifically, the article seeks to explore why English-language scientific journals were established in China, who the founders were, what the form of publication was, and the impacts of these journals.

During the late Qing Dynasty and the Republic of China period, the earliest

English-language scientific journals in China were founded by foreigners who resided in China, such as missionaries, and Chinese students who returned to China after studying abroad. These journals played a significant role in promoting the establishment and development of natural sciences in China, as well as facilitating communication and dissemination of scientific knowledge in scientists.

After the establishment of the People's Republic of China, in order to eradicate the influence of semi-colonial history and promote the cultivation of domestic scientists, various English-language journals were transformed into Chinese publications with English abstracts. However, there were still several scientific journals published in English, which primarily displayed the most important research and discoveries of China's top scientists. Under the backdrop of the Cold War, the development of English-language journals inevitably suffered from serious political influences and experienced many twists and turns.

With the beginning of Reform and Opening up, the National Science Conference brought about the "spring of science" in China, and the open economic environment also promoted more frequent communication with foreign countries. English-language scientific journals in China entered a period of growth and prosperity, but also faced challenges of high-qualitied articles being appealed to internationally renowned journals. In past two decades, several English-language scientific journals in China sought to enhance the overall quality and influence in their fields, to increase the discourse power of China's science.

The process of glocalization of English-language academic journals in China went through stages from passive acceptance to self-reliance, and to active participation. The history of China's establishment of English-language scientific journals is synchronized with the development of science in China and the history of China's integration into the world of science.

P35: Astral Sciences in Contexts of Cultural Encounters

When George Sarton Met Oriental Science: Shinjo Shinzo's Article on Scientific Japan and Its Transnational Reflections

Xudong GAO

Traditionally, the modern rediscovery of oriental science was mainly attributed to Joseph Needham. This report will present a different origin of it. After World War I, the Western civilization was widely questioned by the “frontier regions” . Shinjo Shinzo, an important founder of modern Japanese astronomy, launched a systematic study of the History of Chinese Astronomy during the 1920s. At the Third Pan-Pacific Scientific Congress held by Japan in 1926, Shinjo, as the minister of Science Department at Kyoto Imperial University, specially published a historical paper on Scientific Japan: Past and Present. This was an English book for introduction of this congress to the western world, with historical and frontier achievements of Japanese science showing somewhat uniqueness. Scientific Japan included 6 papers of history of science, and Shinjo was the general editor of the whole book. Sooner, George Sarton, the later founder of the Department of the History of Science at Harvard University, encountered and reviewed Shinjo’s paper in long length on Isis of 1928. On the one hand, Sarton showed much interest on Shinjo’s “special study” and believed that more information should be “urgently needed”. On the other

hand, Sarton wondered why Shinjo, as a modern Japanese scientist, reported a paper on the history of ancient China? By comparing the contexts from their views of science, culture to the imaginations of civilizations, we could see Sarton's interest on Shinjo based on their common need for a new world order with the coming “Pacific Period”, thus establishing a new “cultural axis” beyond the old European center. Further, their different expectations actually mirrored their own national needs within imperial powers, including emphasizing more on the discontinuity or continuity in the history of science, more on the European colonies or East Asian shared culture, and more on a union or competition with European successors. Coincidentally, Zhu Kezhen, a main founder of Chinese meteorology and one of the first students of Sarton at Harvard, also attended this congress, and left some different impressions. But he still continued to read Shinjo's works even meeting Joseph Needam during World War II. This transnational discussion between the two world wars could not only help us to reevaluate the significance of the Chinese history of science as a cross-cultural mediator in the global origin of the history of science, but inspired us the necessity of post-war period for a coexistence of multiple civilizations.

Jesuit Cosmology in Japanaese Translation: A Newly Discovered Manuscript of Sufera no nukigaki (Selection on the sphere) and its significance

Ryuji HIRAOKA

This paper presents the results of an investigation of Sufera no nukigaki スヘラの抜書 (Selection on the sphere. Hereafter Nukigaki), a Japanese translation of a Jesuit cosmology textbook, composed during Japan’s “Christian Century (1549–c. 1650).” Although this translation’s existence had long been suspected, no extant copy was known until a manuscript was discovered in 2019 at the Herzog August Bibliothek, Germany.

For historians of East Asian science, Nukigaki is particularly noteworthy for two reasons. The first is that it is the earliest book dedicated to European science ever written in the Japanese language. Scientific knowledge in Japan had been overwhelmingly influenced by traditional East Asian science from ancient times. With the arrival of Europeans in the mid-sixteenth century, however, Western scientific thought began to reach the archipelago through a variety of channels and in various forms, gradually gaining traction in intellectual circles. Nukigaki is situated precisely at that turning point and occupies a unique place not only in the history of science in Japan, but also in our understanding of the global circulation of scientific knowledge.

Secondly, as Sven Osterkamp has pointed out, Nukigaki is the missing link in the initial transmission of Western cosmology to Japan. Before this discovery, we had the Latin original, De sphaera (On the sphere), and the revised Japanese translation, Nigi ryakusetsu 二儀略説 (An outline of heaven and earth), from which the Christian elements in the original were entirely removed. However, the initial Japanese translation made by Jesuits themselves, hypothesized to exist between the two, had yet to be found. The Nukigaki fills this gap, making it possible for the first time to trace how European cosmology was first translated into Japanese and subsequently edited and transformed before being passed on to future generations.

The main purpose of this paper is to examine the textbook from the following aspects: 1) the general outline of the work, (2) the translation, (3) differences between

De sphaera and Nukigaki, (4) revision from Nukigaki to Nigi ryakusetsu, (5) traces of later use.

Islamicate Reading of the Chinese Calendar: Quṭb al-Dīn al-Shīrāzī (1236–1311)'s Note on a Topkapı Fragment (Ahmet III 3455)

Yoichi ISAHAYA

The westward invasion of the Mongols wielded a grave impact on the Islamicate world in the thirteenth century. The influence was, as well known, not confined to the political and military spheres. In the Mongol period (1206–1368), the Chinese calendar was first expounded in the zīj, Islamicate astronomical handbook with tables against the backdrop of the fact that the Chinse calendar held practical significance in several fields such as administration and historiography in Mongol-ruled Iran. Naṣīr al-Dīn al-Ṭūsī (1201–74), a Muslim polymath, initiated the cross-cultural exchange by incorporating the Chinese calendar into his Persian astronomical handbook Zīj-i īlkhānī (ca. 1272) as a result of his "astronomical dialogue" with the "sage of Cathay," Fu Mengzhi 傅孟質. The so-called "Cathay calendar" is remarkable as a unique production of direct collaboration by scholars on different intellectual foundations. Among the contents of the "Cathay calendar," a section on the lunar anomaly is worthy of attention as the sole part, in which al-Ṭūsī very likely engaged in calculation independent from a couple of the Chinese original sources. Furthermore, Niẓām al-Dīn al-Nīsābūrī (d. ca. 1330), in his commentary upon the Zīj-i īlkhānī, made use of a geometrical diagram for explanation in this section. The West-Eurasian "geometrical cosmology" enabled the geometrical explanation of—a part of—the Chinese astronomy which was based on the "numerical cosmology" with no diagram. As a supplement of a series of investigation into the "Cathay calendar," I will focus on an Istanbul manuscript (Topkapı Sarayı Müzesi, Ahmet III 3455) including folios, to which some tables of the "Cathay calendar" were attached with explanation. Most parts—probably the part of the "Cathay calendar, too—of the manuscript were copied by Quṭb al-Dīn al-Shīrāzī (1236–1311), a leading disciple of al-Ṭūsī, from December 1265/January 1266 up to 1268. Interestingly enough, the part on which al-Shīrāzī noted is also the section on the lunar anomaly. Therefore, the Topkapı fragment could be represented as the earliest—even before al-Ṭūsī's Zīj-i īlkhānī (ca. 1272)—Islamicate reading of the Chinese calendar.

Traditional Time with Changing Rulers: Lunisolar Calendar in Modern Okinawa

Takuya MIYAGAWA

This article traces the survival of lunisolar calendar in modern Ryukyu (Okinawa) from the late nineteenth century to the late twentieth century, the period of two changes of rulers, Japan and the United States. Under the tributary relationship with Qing China since the seventeenth century, the Ryukyu Kingdom (RK) had used lunisolar calendar, Senjitsu tsusho (選日通書). The situation began to change drastically in the late 19th century when the Gregorian calendar system was adopted as the official time frame by East Asian governments, and also when the Japanese Empire began colonial rule over neighboring countries such as Ryukyu (Okinawa), Taiwan, and Korea. Through 1870s, RK became the second colony of the Japanese Empire after Hokkaido. The Meiji government forced the Ryukyuan people to adopt the new calendrical system, despite strong opposition to the calendar reform even on the mainland Japan. The Meiji government,

eager for rapid industrialization, suddenly announced at the end of 1872 that it would adopt the Gregorian calendar from the beginning of 1873 and abandon the old (lunisolar) calendar. This policy was strongly opposed by the public, and therefore, the government had to grant a grace period for transition from lunisolar to the Gregorian until 1910. Despite the government's encouragement to the Okinawans to switch from the old to the new calendar, and despite the efforts of the Okinawan intellectuals to enlighten the public, most Okinawans kept their practice based on the old calendar, which continued under the US rule after the WWII. When Japan annexed the neighboring countries, they used lunisolar calendars as their main dating system both at the official and public spheres. Colonization meant that the colonized had to follow the colonizer's policy – replacement of time system – but the transition process was not achieved as smooth as the colonizers intended. This article tries to describe the survival of lunisolar calendar in Okinawa, not focusing on the process of 'modernization of time' by introduction of the Gregorian dating. Looking at time system in modern times can provide us with another perspective on what 'modern(ity)' means. When we say 'modern society/science', it sounds as if the traditional has been replaced to something new and (Western) modern. This case study aims at show that the East Asian 'modern' era was not constituted only by 'something modern'.

IP27: Animals and Veterinary Science

Entangled between oral nomadic versus written Chinese traditions: Mehmed Siyah Kalem's horses

Kiraz Perinçek KARAVIT

References to specialized veterinary texts began to appear in Chinese sources during the early sixth century. These manuscripts about practice methods show that Chinese horse medicine borrowed especially from cultures along the Silk Roads. This borrowing happened mainly during two eras when interactions with nomadic cultures intensified: Northern Dynasties and Mongol period.

Following the rich manuscript tradition, nearly all the texts of Chinese veterinary medicine are illustrated. Some circulated separately as independent publications. As a result of the exchange of veterinary ideas, the traditions become almost identical at both ends of the Silk Roads. However, the essential concepts went from West to East.

In these terms, these manuscripts can also be a valuable source that can shed light on the research of Mehmed Siyah Kalem's paintings, kept in two albums at the Topkapi Palace Museum Library in Istanbul. Produced in Chinese Turkestan during the 14-15th centuries with ink and brush on paper, these paintings attract attention because of their unusual themes: nomadic life in the steppes. Cut and pasted on separate folios; the pictures are found devoid of text. A number of them depict horses, mules, and donkeys, but none are being ridden. Besides, the animals are usually shown in problematic situations; skinny, suffering, or unwilling to move. In the search for the unrevealed stories behind them, the surprisingly similar illustrations in Chinese veterinary manuscripts strengthen the idea that some of them can be depictions of veterinary practices or stories about animal diseases and treatment.

This case exposes the entangled nature of scientific knowledge's production, circulation, and preservation through mobility networks. In the first layer, veterinary practices from Central Asia enter

the Chinese milieu orally. This knowledge is written down in the second layer and materializes in richly illustrated texts. The third layer consists of the travel of these texts as portable objects back to nomadic lands. In a way, what is orally transmitted from nomadic lands to sedentary China goes back to its sources in a written and illustrated format. The fourth layer of mobility can be considered the work of the historian today, trying to understand the meaning of Mehmed Siyah Kalem's paintings, referring to Chinese written sources. Along the mobility, various ruptures, loss, and gaining of new meaning processes occur. This presentation aims a kind of archaeology to reveal and reflect on these mobility layers.

***Tongbenma* (The bronze galloping horse): a "photograph" 1400 more years before photography**

Zhihua LEI

Ce GAO

Paces of horses engaged human attention and caused interminable discussion because of their extreme complexity. Muybridge's serial instantaneous photographs of horses in motion proved that all four legs of the horse are off the ground simultaneously during a particular moment when it is trotting. Those photographs, which contradicted all traditional representations in art, shocked artists and effected a radical change in the art of depicting horses in motion. It is generally accepted that the traditional artists failed to depict the real attitudes of a running horse. Here we report exceptional accurate position of a Chinese ancient bronze galloping horse from about 2nd–4th centuries, *Tongbenma*, exhibiting the instant at which all hooves leave the ground. The horse's right hind leg was placed on a flying bird that not only keeps the horse's balance on the ground, but also shows the horse is entirely in the air. We find that *Tongbenma* is running in trot (快步) rather than flying pace (對側步). The bronze galloping horse was unearthed in Wuwei in 1969. Wuwei is an important city on the Silk Road. Similar postures of horses appeared in artworks, which were unearthed in tombs of the Han Dynasty (206 BCE – 220 CE) in various provinces of China, indicate that this kind of postures may have a common origin. We suggest that the most probable origin is ancient technology of equine exterior assessment (*Xiangma Shu* 相馬術). However, it is a complete mystery to us how the ancients detected this real position from running horses by the unaided eyes 1400 more years ago. These findings deepen our knowledge of the art of portraying horses in galloping.

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The evolution of knowledge of Przewalski's horses in the Anthropocene perspective

Jiahe PENG
Wei CHEN

The progression of human understanding of Przewalski's horses is originally divided into three stages in this report. The initial stage spans the years between 1879, when Przewalski first acquired samples of his horses, and the middle of the twentieth century. The knowledge of wild horses increased in the West due to the utilitarianism of the "empire of knowledge," which was propelled by the horses' status as a natural resource on the edge of civilization and their unrestrained exploitation.

The second phase, which began approximately in the 1960s, saw the emergence of ecological thinking, which altered the methodology and goal of wild horse knowledge creation. The original nations and areas took an active role in wild horse conservation (this report primarily utilizes data from China), and patriotic enthusiasm hastened the transnational dissemination of knowledge. The public not only becomes the recipient of pertinent knowledge, but also plays an obvious dynamic role in knowledge creation, which is reflected in the third stage of the evolution of knowledge about wild horses. This stage reflects the shift of media and public influence to mass wild horse knowledge production in the new century. The relevant institutions have stepped up their efforts to promote endangered species,, knowledge of Przewalski's horses has spread from professionals to a wider range of people, and their related knowledge creation activities are the result of network of activities, and human knowledge of wild horses has thus become stronger and more diverse and complex.

According to the Anthropocene perspective, we contend that knowledge of wild horses originates from a cognitive structure created by fusing human knowledge of other animals with knowledge of encountering wild horses, and that the amount of experience needed to develop this knowledge is also constrained by social circumstances. By placing restrictions on information producers, civilization shapes the economy of knowledge about wild horses. As attitudes toward natural resources shift in human culture, the unfortunate Przewalski's horses eventually return to the wild. This method has also benefited greatly from the spread of information about wild horses. The development of today's wild horse knowledge has been aided by the flow of information among professionals, and its wider diffusion has strengthened its form and reduced its susceptibility to loss. The accumulation of the knowledge is not only a reflection of the process of human knowledge about Przewalski's horses, but also a microcosm of the fate of wild horses in the Anthropocene.

P19: Translating East Asian Sources: Historical Studies and Research

Rashīd al-Dīn and the intricacies of articulating Chinese medicine in medieval Iran

Dror WEIL

This talk will focus on the translation of medieval Chinese medical texts into Persian by the Ilkhanid vizier and physician, Rashīd al-Dīn Faḍlallāh (1247-1318). In particular, it will discuss the appeal of Chinese scientific knowledge, the difficulties in dealing with the Chinese language, and the various methods applied to convey meanings and describe practices, as these appear in the extant potions of Rashīd al-Dīn's Tanksūqnāme.

Mountains, rivers, plants and other stuff: how (not) to translate an emperor’s jottings

Catherine JAMI

More than ten years ago, I undertook a French translation of the Kangxi jixia gewu bian 康熙幾暇格物編, a collection of 93 jottings by the Kangxi Emperor (r. 1662-1722). Like other texts in the biji 筆記 format, it covers a great variety of topics. While this task is only now nearing completion, it has turned out to be challenging in several respects.

What struck me from the onset was the great variety of place-names mentioned in the jottings, many of which refer to locations beyond the Great Wall, where

classical Chinese was not the main vehicle of written communication. Many of these locations became part of the Qing empire under Kangxi and his two successors, and their names were written in Manchu before they were standardized in Chinese. This added to the difficulty of finding where they actually were.

Studying the Manchu language has enabled me to solve many if not all these difficulties, and also some of the obscurities that earlier scholars who studied the Kangxi jixia gewu bian (first and foremost the late Li Di 李迪, 1927-2006) before me had left unanswered. They concern mountains, rivers, plants, animals, substances… Very often, the use of a loan word from Manchu in the Chinese text turned out to be a means to integrate new knowledge into scholarship.

But solving puzzles by identifying loan words brings to the fore another difficulty, experienced by most translators of technical texts: should translation provide a text that is as clear and easy to read as possible, or should it follow a slightly more literary path by seeking reproduce the 18th century Chinese reader's occasional experience of encountering an unknown word, which in principle signaled the Manchu sovereign's contribution of new elements to scholarly learning?

In this presentation I will discuss this question using some examples from the text, with the aim of making fully explicit the choices available to the translator working on this particular text, and the challenges posed by the demand for consistency in translating a text that, while relevant to the history of science and technology, does not present the kind of standardised language encountered, among others, in mathematical and astronomical texts.

Sino-Indian astronomical texts in translation – authorial intention vs. readers' interpretation?

Bill M. MAK

Sino-Indian astral treatises dated largely from the first millennium CE represent a substantial body of translingual technical texts composed in China. These texts are notoriously difficult to understand for a number of reasons: Firstly, many of them are translations of Indic texts which are lost or unknown in the later Indian tradition; secondly, the Chinese translation reflects the translator's understanding, with interpretation and interpolation, some more liberal than others, and are not necessarily faithful to the original; last but not least, the subject matter itself is technically challenging in the way the ancients conceived them. Modern scholars who attempted to interpret them fall largely into two camps, predestined by their disciplines as Indologists and Sinologists. Whereas the Indologists would argue for an interpretation that should be as close as possible to what is considered as the author's intention, the Sinologists would be more interested in the translation as a historical document in its own right and in the ways it was understood by its Chinese readers. The topic of modern translation of historical Sino-Indian texts is an important one in translation studies since Chinese translation of Indian texts, mostly but not exclusively Buddhist, is one of the most ambitious and long-lasting translation projects ever undertaken in human history. Over 2,000 such texts dated from the first century CE are extant and the astral treatises represent a curious subset that accentuated this problem of translation and interpretation.

Translating a 19th century Chinese mathematical text: into algebraic

formulas or beautiful French? A difficult choice

Andrea BRÉAD

Early 20th century readers of Chinese mathematical texts rendered certain results directly into mathematical formulas. However, contemporary historians of science prefer to translate such texts into natural language to better reflect modalities of mathematical expression in the originals. While each option has its advantages and disadvantages and its own potential readers, I will argue that it can be fruitful to follow both paths in order to understand the choice of style by the author himself. My argument is based on my translation of Li Shanlan's Comparable Categories of Discrete Accumulations 垛積比類 (1867) into French. I will describe the kind of language used in the original, where a large number of summation procedures are expressed in Chinese literary prose. The formulaic nature of the identified procedural and algorithmic code of the book not only incites the translator to equate the original text with algebraic formulas but it also reveals that Li Shanlan himself might have used algebra to derive his procedures.

P60: Ontological Approaches to East Asian Medicines

An Ontological Anthropology of Covid-19: Responses to the Pandemic in Korean medicine

Taewoo KIM
Kyung HEE

Medical intervention in disease is deeply social. From collective understanding of a disease to social responses to the disease, medical practice is unimaginable without social factors. Recent discussion of ontology in anthropology points to a deeper and significant layer of the social that premises the medical practice of disease: the ontological underpinnings of the reality of a disease. Even though genetic explanation of Covid-19 is dominant with widely practiced preventive (e.g. m-RNA vaccine) and interventionist (e.g. Remdesivir) measures relying on this model, it does not preclude all potential understandings of the disease. Inserting plural ontologies through an anthropological lens goes beyond this seemingly only one conceptual model. Incorporating the concept of analogism, referred to as East Asian medical ontology among Descola's (2013) four ontological modes, into anthropological fieldwork of Korean medicine in South Korea, this study examines alternative ontological grounds of disease reality and its elaborations in the diagnostic and therapeutic practice of treating Covid-19. The East Asian medical concept of Six-Qi (□氣) is often approximated with the biomedical concept of the virus. However, when ontological ground is considered, the two things are visibly divergent, as the virus relies on a genetic understanding of the pathogen while Six-Qi is part of the "dense network of analogies" (Descola 2013: 201). Six-Qi does not premise a separate entity that causes the infectious disease. Rather, when the body is in contact with Six-Qi, the disease is understood as the state of entanglement in-between without separably identifiable entities of an external Qi and an internal body. Exploring layers of entanglements—in-betweens of ontology and medicine, Six-Qi and the body, and knowledge and practice—this study highlights the foundational significance of ontology in discussion of socio-medical practices.

The ontological transition of Sasang medicine by discipline-making practice: things, thought and action

Hyunkoo KIM

Kyung HEE

This paper starts by introducing Sasang medicine, a current of Korean medicine, which emerged in the late 19th century and is now recognised as a legitimate discipline in the university-level education of Korean medicine. It problematizes this phenomenon by suggesting that through being institutionalised, Sasang medicine has experienced an ontological transition. This ontological transition includes re-locating Sasang medical practitioners from local clinics to the university and hospital settings and reassembling the concepts and phrases from the classical texts in the standardised textbook. For example, based on archival research and an in-depth interview with Professor Song, the founding member of the department of Sasang medicine at the oldest school of Korean medicine, this paper indicates that the whole of Sasang medical classics were broadly divided into 'theory' and 'clinical' parts, and specific ways of interpreting classical texts were recognised as authoritative so that a different kind of ethics was required. Furthermore, this paper not only demonstrates various actors in the transition but also attempts, following Farquhar's (2020) framing, to reveal how they are entangled in making Sasang medicine a disciplinary practice.

Strange and familiar food in the making of bodies and relations in rural north China

Mikkel BUNKENBORG

Based on fieldwork in rural Hebei, this paper explores the implications of the perennial distinction betweenfan, staple foods, and cai, dishes with meat and vegetables. Described by the archaeologist K.C. Chang as a basic principle of Chinese food, the dualism is evident in contemporary north China, where family meals often centre on fan made from wheat, maize, and millet, whereas meal involving outsiders allows the cai to take centre stage as the homely staple foods are either omitted or reduced to a final bowl of noodles. Different foodstuffs appear to be invested with particular meanings and functions and thus there is a contrast between, on the one hand, an endo-cuisine of wheat, maize, and millet, which is cooked by women for family members and associated with homogeneity and consubstantiality, and on the other hand, an exo-cuisine of meat, vegetables, and condiments, which is often cooked by men for outsiders and associated with hierarchy and differentiation. Complicating the simple analysis of a cultural distinction between strange and familiar food deemed appropriate for two different social situations, this paper explores how an ontological approach might raise questions about the properties of these foods, about the way the foodstuffs are entangled with other socio-material components of a given situation, and about the way people deploy foodstuffs as substances that produce bodies and social relations.

Words and things in Chinese medicine: what do the sounds of the five seasonal colours do in medical practice?

Elisabeth HSU

In her pathbreaking Meeting the universe halfway Karen Barad (2007) insists that meaning and matter, or words and things, are ontologically "entangled"; while Latour has long problematised the "thing", she points out that the "word" remains undertheoretised in this respect. Structural linguists are not unfamiliar with such claims. Ferdinand de Saussure's axiom that the sign's appearance/ sound and meaning is arbitrary in natural languages has variously been questioned, before and after his posthumous publication of 1916. One of the better known critics is Roman Jakobson

(see his posthumous Six lectures on sound and meaning, 1942), who inspired among others contemporary cognitivists. Another is Brent Berlin (1986), whose ethnobiological evidence should not be reduced to a curious and exceptional matter of onomatopoetics, as structural linguists are forced to do. Rather, as argued here, the sound of ethnobiological folk taxa will be shown to have a gestalt (Köhler 1929). The Chinese lexicographic traditions have produced a treasure trove in this regard. So, starting with the sound shape of qing, which inter alia (Chinese article on Chinese characters for living kinds which have qing as sound giver), refers to the uplifting greenness of wood sprouting in spring, I discuss in this presentation the entangled sound and meaning of the lexical items of the four seasonal colours that in translation are known as green, red, white and black, and as fifth colour, yellow in the centre. To what extent these explorations on the matter and meaning of colour terms take place in the interstices of gestalt psychological, phenomenological or ontological approaches to ethnobiological and Chinese lexicographic materials is open for discussion.

P23: Science and Civilization in Korea: The Statecraft of Science and Technology in Korea

A Policy Text That Has Become History: Choi Hyung Sup's Theory of Scientific and Technological Development for Developing Countries

Manyong MOON

Choi Hyung Sup (1920-2004)'s trilogy of Development Strategies for Science and Technology in Developing Countries (1981-82) is actually the first work of science and technology policy studies in Korea, but the Korean science and technology policy academia does not evaluate the book as a policy book. This may be because the discussion of this book modeled on the basis of Korean experience was considered a historical description for Koreans, and was not very useful in the domestic environment since the 1980s. However, the three volumes of Choi's Development Strategies all were translated into English and published and so far, his theory of science and technology development for developing countries has been used as a useful approach in science and technology ODA (Official Development Assistance). This means that in Korea, the book that has already become history was been built on the basis of actual history, so it is considered a valuable model for developing countries to date. This presentation will argue that the Development Strategies was written from the beginning with overseas readers in mind. The third and final part of this text was translated and published in 1989, but its contents generally remain in the 1970s. This means that changes after the completion of the original Korean manuscript were not faithfully updated. That's because he penned this work with publication abroad in mind from the beginning. Though accounts of Korea's experiences could make the text seem like a "memoir" to most Koreans, this work could serve as a useful theoretical text for developing countries that had to devise policies to promote science and technology right away. And, I will show this book is the result of expanding KIST's experience. After publishing the study on KIST, the first Government-funded research institute in Korea, in 1976, Choi hoped to publish it English, and was advised that narratives needed to be enlarged for the English volume. Accepting this, he published chapters of the book in domestic journals, printed Korean books, and translated into English. Therefore, at the heart of this book

lies KIST, where he worked as the first president. Lastly, I would like to examine how Choi's ideas are distinguished from overseas scholars who argued for science and technology policy theory for developing countries at the time.

A Korean style application of Chinese calendrical astronomy

Yong Hoon JUN

A research on calendrical astronomy determining days and local time during the King Sejong 世宗 period (1419-1450) can reveals a character of Korean style application. Being helped by the research on calendrical calculation systems including Shoushili 授時曆 and Datongli 大統曆 during the first fourteen years of king Sejong period, Korean astronomers in around 1434 could perfectly calculate four time-units, namely year □, month 月, day 日, and hour 時, which are totally accord with Chinese ones on the location of Nanjing 南京, the standard point of astronomical calculation in Ming 明 China. Due to the obligation of 'upholding the first month and first day' (奉正朔) enforced by the Tribute-investiture (朝貢冊封) relationship between Joseon and Ming 明 China, they in Joseon, the vassal kingdom, must use Ming's calendrical days □日. The local time measured in real time on the meridian of Seoul, however, is different from that of Ming China, and the use of local time of Seoul was not confined by the Tribute-investiture relationship. The time of sunrise and sunset (日出入時刻) and the length of day and night (晝夜刻) based on Seoul's latitude in particular were distinct from that of Ming China. In Joseon they used these local time in daily life without limitation and Korean annual calendar was filled in with these local time. In Joseon, from the 1st day of 7th Month in 1434, they started to use the standard water clock, Jagyeoknu (自擊漏, automatically striking water clock) in daily life, and it was Korean local time that Jagyeoknu automatically measured and struck to tell. It can be said that a combination of Chinese calendrical days and Korean local time is a Korean style application of Chinese calendrical astronomy.

The Position of Science and Technology in the Premodern Korean Government Organization

Dongwon SHIN

How can we organically understand the relationship between science, the term we will now use in place of pre-modern "science," and technology? Although premodern concepts did not exist that exactly corresponded to those of modern science and technology, the fields of science and technology did not exist in isolation. Above all, the system of Confucian bureaucracy that had existed throughout the entire history of premodern Korea was the biggest incubator for science and technology. In Confucianism, the ancient Zhou dynasty is considered the example for monarchy, based on Zhouli (Rites of Zhou), presumably published during the Han dynasty. In this book, the bureaucratic system was divided into six departments, later formulated as an organically structured bureaucratic system, according to six canons: lidian (Canon for internal affairs) hudian (Canon for financial affair), lidian (Canon for rites), bingdian (Canon for military affairs), xingdian (Canon for legal affairs), and gongdian (Canon for industrial affairs). In Korea, this bureaucratic system, based on the same six canons, was introduced in the 7th century, during the Three Kingdoms period at the latest, and lasted for 1,500 years, until 1894, when a Western one replaced it. Thus, all major

activities of science and technology were defined by this system throughout the entire premodern period in Korea. This six-canon bureaucratic system played the role of the most powerful source for social order, rather than as a simple administrative organizational structure. For example, the officials in charge of educating professionals in science, such as yin-yang theory, pungsu, medicine, and mathematics, as well as the professionals themselves, were top leaders in their fields outside of the government as well. It was government that was in charge of large-scale construction work, and they carried it out through the offices and methods defined by the gongjeon canon. And it was the government offices in charge of handicrafts that controlled civilian handicrafts. This bureaucratic system was the biggest supporter of science and technological activities, while at the same time it sometimes played the role of a hindrance that limited their development, as there was no need for development beyond what government needed. Within this firm bureaucratic framework, various fields of science and technology, as well as politics, economy, military, penal administration, and culture, were connected, to form an integrated system. This system played a major role in all activities related to science and technology, until Korea was incorporated into the new modern world order.

August 24th

I. 9:00 – 10:40

P65: Metallurgical Technologies in Ancient China

The Peak of Metal Decoration Techniques in China from the Warring States Period to the Han Dynasty: the Art of Cuo Gold and Silver

Huang HUANG
Yufeng XI
Guojing ZENG

The ancient Chinese art of Cuo 错 Gold and Silver, which began in the Spring and Autumn period and flourished from the Warring States to the Han dynasty, was a magnificent technique for decorating metal surfaces. After the Han dynasty, the craft was lost, and later generations disputed the details of the Cuo 错 Gold and Silver process. From the previous research review on Cuo 错 gold and silver bronzes, we found that, the gold and silver samples were scattered and no special microscopic observation of the accumulation of sample photographs in previous studies. In addition, the previous research results are mostly derived from literature-based speculation, so the lack of actual observation and physical photographic evidence resulted in the current generation of the previous speculation as a conclusion, or even as a definitive reference.

Through microscopic observation and analysis of Cuo 错 gold and silver bronzes collected from several sites in Anhui Province, this paper discussed the process of 'Cuo 错 gold and silver' artefacts from this region during the Warring States

to Han dynasties, exploring its specific technology details and offering new suggestions for the conservation of such artefacts.

From 2-D to 3-D: a change of method on the study of bronze inscriptions, and its impact on the study of craftsmanship in bronze

Beichen CHEN

Three types of scripts are regarded as among China's first writing system: 1) oracle-bone scripts – characters on bone that were carved by a metal tool; 2) brush writings – characters on stone/jade/bone which required a brush; and 3) bronze inscriptions – characters on bronzes that were transferred from clay. By directly observing the characters or their rubbings, two-dimensional shapes of all the three types have been studied constantly since the Song Dynasty (AD 960-1279) or even earlier, but not until in recent years did the researchers realise that at least one of them, the bronze inscriptions, may have more complex three-dimensional structures that cannot be fully reflected in two-dimensional shapes, which, as best, is only their projection onto the plane of the inner side surface of a bronze vessel. Using newly excavated inscribed bronzes from the Zhou period (c.a. 1050-221 BC), this paper observes bronze inscriptions in both two-dimensional (rubbing/micro-photographing) and three-dimensional way (silicone moulding) to see what kind of information can be gained by changing the method. It also highlights the latter, as the three-dimensional moulds of characters are able to offer us a chance to directly observe the ways in which craftsmen used their knowledge and skills to manipulate clay in order to 'write' on bronzes.

New copper ores and the rise of great Shang bronze metallurgy

Siran LIU
Guisen ZOU

The shift from smelting oxidic to sulphidic copper ores was one of the most important metallurgical innovations in the Bronze Age. It allowed ancient human beings to explore low quality but massive primary ores deposit and create a much more stable supply of raw copper for large-scale bronze casting industries. In this light, the timing of this shift matters a lot for the investigation of the Bronze Age China, as the power of elites was largely legitimized by dominating the manufacturing and distribution of bronze ritual vessels. This research employed multiple geochemical and metallurgical characterization methods to study a 14th century BC smelting workshop, Tongling, in Yangtze River valley and firmly identified the evidence of using both chalcopyrite and malachite at this site. So far, this is the earliest evidence of smelting primary sulphidic ores in China. This result provides us a new horizon to re-consider a range of cultural phenomena in Shang archaeology such as Erligang expansion and appearance of substantial bronze vessels as burial goods in the Middle-Late Shang period.

Piece Molds or Lost Wax? Casting Diatrete Ornamentation in Early China

Peng PENG

Over the past half-century, research on early Chinese lost wax has been impelled primarily by the belief that, in a tradition with massive metalwork cast, the use of lost wax was curiously absent. To many scholars who equated this process with fine casting, it was mystifying to hear that the Chinese used “inferior” techniques (with piece molds) to cast superb bronzes. A few of them developed this puzzle into an argument that Chinese metallurgy had arisen independently, unaffected by outer Eurasia: the retention of the “false” methods

could only be explained by a lack of awareness of the casting "norm," it was argued, and behind the absent lost-wax revolution was the self-sustenance of Chinese Bronze Age. A response to Donna Strahan's prestigious lecture, "Debating the Use of Lost-wax Casting in Ancient China," this article presents my updated thinking about lost wax versus piece molds in early Chinese casting practices. Strahan's studied "diatrete" ornamentation in the Met, to me, can be securely identified as lost-wax cast thanks to some telltale traces. Through this critical investigation, I invite my fellow art historians, archaeologists, and metallurgists to emerge from the "doubting of lost wax" era to tackle new challenges in early Chinese archaeo-metallurgy.

The Joining Method of Bronze Vessels in the Pre-Qin Period of China

Yu LIU

The most prominent characteristic of ancient Chinese bronze wares consists in the utilization of piece-mold casting technology to product ritual bronzes, which is vastly different from the traditional use of the forging method and lost-wax process for weapons, tools, and decorative items in West Asia, Europe, and other regions. The piece-mold casting technology in China was initially formed in the Erlitou period (18–16th BCE) and reached the first climax in the late Shang dynasty (13th–11th BCE). A large quantity of bronze vessels with intricate design and shape were fabricated by complicate casting process, which includes mold-division process and joining method. The joining method mainly suggested that the separate casting technology, brazing and soft soldering technology.

The earliest known instance of the separate casting method could be traced back to a jiao (a wine cup) of the Erlitou period. In the late Shang dynasty, the proficient application of the separate casting method made it possible to produce a large number of exquisite and complex ritual vessels. In order to join the appendages to the main body of a vessel, the most commonly used separate casting method was "the tenon type" cast-on method, which used to cast the sculptured appendages on the body. There were also other methods, such as the riveting cast-on method, pre-cast method, and multi-cast-joints. Following phase 3 of Yinxu period, the bronzes were becoming less complex and the number of those produced using the separate casting method was also dwindling. In phase 4 of Yinxu period and the early Western Zhou dynasty, there was an increasingly stronger tendency of integral casting.

Brazing technique was used in the middle Shang period, and the soft soldering technique was used no later than the early Zhou dynasty. The use of the soft soldering technology in the late Shang period could not be ruled out either. The emergence of the brazing and soft soldering technology in the Shang dynasty could be regarded as an objective supplement to the technology of cast in a single pour, thus meeting the practical and decorative needs. On the base of summarizing the previous research, the early usage of soft soldering and brazing technique, and the evolution of the soldering flux during the pre-Qin period are also discussed.

The Tone List and Arrangement of Zeng Gong Qiu Chimes Based on Sound Measurement Work

Wenjie ZHANG
Nianyi MA

The almond-shaped musical bells are a unique technical invention in ancient China and have had a profound influence on East Asian ritual civilization. In recent years, a new batch of bronze chimes from the

vassals of the Zeng state in the Spring and Autumn period has been unearthed in Suizhou, southern China, filling a gap in the early development of the Zenghouyi chimes. We have been invited to carry out a scientific tonometric work on this batch of musical bells and to attempt to discuss the issue of the musical system of Zeng Gongqiu, an important Zeng vassal, from the perspective of the tonal array and choreography, as a means of shedding light on the unique path of musical development in southern China during the mid-Spring and Autumn period.

Ancient Bronze Implements in the Greater Bay Area of South China: A Historical and Archaeometallurgical Study

Chao Franklin HUANG

An implement is one of the fundamental elements for the structure of socio-economic productivity that plays a crucial role in the development of the agrarian society in the context of ancient civilization. Expansion of agriculture, in turn, leads to the organic evolvement of that implement. As the implement evolves and improves so will the development of agriculture and its associated industries speed up and become more efficient.

Bronze implements were one of the important development stages in the broader history of tools; the result of the gradual speed of advancement and the inherited notion of development from stone tools which laid the foundation for the natural development of implements of a variety of metallic materials.

The archeological finds of ancient bronze implements in the Greater Bay Area of South China, a more precise geographical name of spatial and cultural characteristics for the ancient historical name “Pearl River Delta”, are significant indicators for the studying levels of socio-economic status, regional productivity and metallurgy in this area. With some of the latest archaeological finds, archaeometallurgical works and classification analysis on bronze implements and casting stone moulds, new light has been shed on the early progression of civilization of South China and the particular characteristics of its bronze wares.

A Study of Bronze Sword in Early China, Alloy, Manufacture and Function----with a comparation of bronze sword in early Eurasia

Rongyu SU

Bronzes in early China, not only vessels but also weapons, were so unique that their alloys, manufacture technologies, as well as functions were independent and far from those in other civilizations. Bronze sword appeared quite late in China and their types had been formed around fifth century BCE, all of them were cast with high tin bronze, and had been decorated magnificently with many materials in different techniques, especially those for Kings known through inscriptions, which were invaluable in the classic document. However, the unearthed swords for Kings, they are almost intact without any traces for wrestle. Both use traces and their high-tin alloys indicate those swords not use for wrestle, and the bronze swords from normal tomb occupies same features. The archaeological bronze swords also proposed for burying master same as bronze rituals. Comparing with bronze swords discovered in Near East, this paper concludes the total different of material the manufacture of swords in early China caused of its unique function.

A Reconstruction of the Melting Furnace of Houma Bronze Foundry Site: From East Asian Perspective

Takafumi NIWA

To reconstruct a bronze melting furnace at Houma bronze foundry site, the author

investigated furnace walls, clay molds and blowpipes (tuyere) excavated from this site. Rough clay was found on the outside surface of furnace wall fragments. This clay is considered to have been used to fix parts of furnace walls, which was a technique commonly used in clay molds excavated from this site and different from what was found in a pottery furnace with clay attached to the inside surface of pottery from Yayoi period in Japan. The author proposes that the furnace structure and a repair method using clay for attachment are important factors when discussing production systems in East Asia.

The author classified curbed blowpipes (tuyere) from Houma bronze foundry site into two types, the "Northern style" and "Yellow River basin style." The Northern-style blowpipe originated in the Eurasian steppe and spread to Northeast Asia and from Northern China and the Korean Peninsula to the Japanese archipelago. Through the transfer process, the form and manufacturing technology of the blowpipe itself gradually changed, but all such artifacts have the fact that they were used with a crucible furnace in common. The only feature that the blowpipe from Houma bronze foundry site has in common with the Northern-style curved blowpipe is its curved shape, but its size and manufacturing technology are different. The reason for this phenomenon can be attributed to different melting techniques between Northeast Asia and the Yellow River basin.

(This work was supported by JSPS KAKENHI Grant Number JP16H05946, JP17H01646, JP20H01365.)

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Three types of scripts are regarded as among China's first writing system: 1) oracle-bone scripts – characters on bone that were carved by a metal tool; 2) brush writings – characters on stone/jade/bone which required a brush; and 3) bronze inscriptions – characters on bronzes that were transferred from clay. By directly observing the characters or their rubbings, two-dimensional shapes of all the three types have been studied constantly since the Song Dynasty (AD 960-1279) or even earlier, but not until in recent years did the researchers realise that at least one of them, the bronze inscriptions, may have more complex three-dimensional structures that cannot be fully reflected in two-dimensional shapes, which, as best, is only their projection onto the plane of the inner side surface of a bronze vessel. Using newly excavated inscribed bronzes from the Zhou period (c.a. 1000-221 BC), this paper observes bronze inscriptions in both two-dimensional (rubbing/micro-photographing) and three-dimensional way (silicone moulding) to see what kind of information can be gained by changing the method. It also highlights the latter, as the three-dimensional moulds of characters are able to offer us a chance to directly observe the ways in which craftsmen used their knowledge and skills to manipulate clay in order to 'write' on bronzes. These moulds can be compared in both technical and social levels. As we know, in both the Shang and the Zhou periods, their writing systems, along with languages, ritual practices, and many other things used by the ruling class, may have served as a strong means to connect disparate regions of the territory. This object-based study discusses how did craftsmen in different regions learn the current font and writing format, and how were social relations reflected by their knowledge and skilled craftsmanship.

North-South Exchange of Bronze Resources 金道锡行 and Investigation into theMethod of Tracing Bronze Materials during the Pre-Qin Period

Jianli CHEN

The study of the traceability of bronze materials aims to establish a stable mapping between the bronze vessels and geological sources of copper, tin and lead. Revealing the pattern of exploitation, utilization and exchange of bronze metal resources in ancient times is an important path and a key basis for studying the origin of civilization and the formation of early states. This paper takes the north-south exchange of bronze resources 金道锡行 during the Eastern Zhou period as an example, and introduces the investigation of copper and lead smelting sites, the analysis of bronze testing and related traceability research in the middle and lower reaches of the Yangtze River during the fortnight period, discussing the theoretical basis and the construction of a traceability method system for the traceability of bronze materials during the pre-Qin period.

Lost Fibre: Casting Methodologies of the Ba Culture

Pujun JIN

Excavations at the Lijiaba and Yujiaba Sites have revealed evidence of the lost-fibre casting technology appearing on the handles of bronze Mou of the Ba culture during the Chinese Warring States period (475-221 BCE). After the rope-shaped models made from the ablated material were prepared as a mold package which would form as an undetached component of the bronze body in the casting process, keeping the subtle textures without any the trace of seam lines. This ancient handicraft originated in the early period of Shang Dynasty (16-14th century BCE) and was developed throughout almost the entire Chinese Bronze Age.

P52: Crises and Inventions: Medicine and Healthcare in late imperial and modern China in global context

Smallpox, Variolation, and Vaccination in Late Imperial China: Medical Innovation in Question

Florence BRETELLE-ESTABLET

Florence Bretelle-Establet (Senior Researcher, SPHERE, UMR 7219, CNRS & Université Paris Cité) will focus on the constitution in nineteenth-century China of a body of knowledge related to Jennerian vaccination. By focusing on the first texts written in Chinese presenting Jennerian vaccination−the Extraordinary Book about Smallpox Vaccination newly Published in England 咭唎國新出種痘奇書 translated by Staunton (1805) and the Smallpox Extraction in Brief 引痘畧 by Qiu Xi (1817)−, she will first examine how this knowledge integrates earlier and local knowledge, such as specifically Chinese theories on smallpox and variolation. She will analyze how the introduction of new medical technics, variolation, and later, vaccination, was presented to the readership and what types of arguments were used to convince people of the interest of these new techniques. She will finally study how, over the course of the nineteenth century, the knowledge and the new tools created to vaccinate were in turn questioned in the various milieus that practice medicine in the southernmost regions of China.

Masters, Schools, and the Professionalisation of Chinese Medicine (1929-1949)

Jean CORBI

Jean Corbi (PhD, Sciences Po Paris) works on the professionalization of medicine and

physicians during the Nationalist period, focusing on the province of Sichuan, which occupies a special place at that time. Among the numerous archives that he was able to consult and study, for the province of Sichuan, are a very large corpus of doctors' registration forms, as well as examination papers that were intended to evaluate the knowledge of Chinese doctors applying for official registration. In this panel, Jean Corbi will study what these documents reveal about the experience and knowledge expected from these doctors whose professional identity became increasingly influenced by Western-model and the Chinese State.

Teach "Old Drugs" New Tricks: John Dudgeon (1837 – 1901) and Chinese Medicine

Sung-hung HSIEH

Hsieh Sung-hung (Master student, Institute of History, National Tsing Hua university, hereafter NTHU) will focus on the encounter between European medicine and Chinese medicine in the 19th century. John Dudgeon, a missionary of the London Missionary Society and a medical graduate of University of Glasgow, surprisingly expressed unusual interest towards Chinese herbs, in contrast to his Western colleagues who were highly critical of this local therapeutic system. Far from being simply indifferent or hostile, a dynamic and innovative attitude can be found in Dudgeon's writings. It is quite common for the traditional Chinese pharmacological books (called Bencao 本草) to offer tens of different functions in the descriptions of one herb, but Dudgeon reduced them to several specific ones through the lens of "tropical medicine." By examining historical records, this research argues that the shared healthcare knowledge among English physicians in East Asia could be linked to Dudgeon's concerns about cholera, diarrhea and vomiting. This special approach to Chinese medicine prompted him to rearrange the major and minor functions of these old, long-used Chinese herbs, and he, eventually, carried out a refreshing change in the discourses and applications of herbal medicine.

The 'Cultural Adaptation' of Smallpox Vaccination on the Korean Peninsula in the 19th Century

Océane LACHAUD

Océane Lachaud (PhD, INALCO, IFRAE) will illustrate this phenomenon of renewal, reconfiguration and reformulation of medical knowledge and practices in premodern and modern East Asia, by focusing on the history of vaccination in Korea. The Jennerian vaccination technique was introduced in Korea during the 19th century in a medical environment where Chinese medical traditions have been for several centuries a major reference. Through the transmission of this new medical technique, conceptual differences, but also practical differences, have led to major changes and even crises in the medical paradigms previously established by Korean physicians. Studying all these differences would permit to understand how this method was put into practice in the context of 19th century's Korea, and more broadly, to understand how a medical technique of foreign origin was adapted, transformed, and even remodeled, to be used in a medical culture distinct from the environment in which it was originally developed or discovered. This study is based on the analysis of medical treatises compiled by Koreans during the 19th century which most of them reformulate parts of already existing Chinese and Japanese medical treatises on vaccination.

How did Electro-Acupuncture Become Acupuncture?

Wenbo LIANG

Liang Wenbo (PhD student, Université Paris Cité & SPHERE UMR 7219) works on the philosophical, political and epistemological conditions that led to the emergence in People Republic of China of new forms of acupuncture (« acupuncture anesthesia», « electro acupuncture ») in the 1950s. Relying on archive material produced by different hospitals in Beijing, Xi'an and Shanghai, from the 1950s to the 1990s, he explores how acupuncture was reshaped and rethought at the intersection of national political ideologies, new theories coming from the West, and new devices, such as electro-acupuncture equipment and the use of electricity in acupuncture. In this panel, he will particularly focus on the epistemological changes in the discourses and theories about acupuncture, pain, acupoints, brought by this hybridization.

Silkworm Epidemics of the 19th Century: The Measures of Prevention and the Health Care

Chuan-hui MAU

Mau Chuan-hui (Professor and Director of Institute of History, NTHU) will focus on the ways in which knowledge flows between the silk moth rearing and human healthcare, especially during the modernization of sericulture that started since the 1830s in France, and then was successfully introduced into Japan, China and then in Taiwan. The sericulture was one of the essential artisanal activities in China. Silk farmers reared Bombyx mori in their living houses. Silk moths are susceptible to disease: once they get sick, there is no way to treat them. Keeping healthy conditions was one of the keys to succeed in their cultivation. Otherwise, several sericulture products including leaves and fruits of mulberry tree and silkworm excrements can be used as medical materials. The author will take the case of the epidemic illness, the pébrine, which almost ruined the world's sericulture in the mid-19th century. For saving this activity of great economic value, the French government mobilized scientists and experts to find solutions. The method for reproducing eggs, called grainage cellulare, was thus invented by Louis Pasteur (1822-1895). Afterwards, measures and processes were settled successively, and the newly introduced concepts and methods influenced health care.

From Theory to Practice: Clinical Acupuncture in the Late Edo Period

Mathias VIGOUROUX

Mathias Vigouroux (Nishogakusha University) will analyze the acupuncture casebooks of Nakashima Yūgen, a village doctor in the Bizen province, to shed light on how the body of theoretical knowledge related to the acupuncture channels theory and accessible through textbooks during the nineteenth century was applied in clinical practice. The publication of Sino-Japanese acupuncture textbooks and the production of acupuncture mannequins and charts became necessary components of the dissemination of the channels theory in Tokugawa Japan (1603-1868). However, very little is known about its implementation in clinical practice. To understand the interrelationship between textual knowledge and clinical practice during the late Edo period (1603-1868), the author will compare the content of Nakashima's casebooks with four acupuncture textbooks published during the seventeenth and eighteenth-century: the Shinkyū yōkashū (1695), the Shinkyū bassui taisei (1699), the Shinkyū chōhōki kōmoku (1749), and the Shinkyū tebikigusa (1773). Containing both theoretical and clinical aspects of acupuncture practice and written in colloquial Japanese with readings of the Chinese characters these textbooks were available to a large audience of both

practitioners and non-practitioners. Focusing on these documents, the author will discuss how the theoretical knowledge related to the channels theory that circulated in print during the late Tokugawa period translated into Nakashima's clinical practice.

"Rod of Asclepius" as a Remedy: Greek Elements in a Tibeto-Mongolian Materia Medica by 'Jam-dpal-rdo-rje (1792-1855)

Kuosheng WU

Wu Kuosheng. (Assistant Professor, Institute of History, NTHU) will explore the foreign medicines which were introduced and preserved in the Illustrated Tibeto-Mongolian Materia Medica of Ayurveda tradition. The work was written in Tibetan language in the 19th century by Jam-dpal-rdo-rje of Mongolia, with Mongolian and Chinese translations for each picture. It is surprising that the author mentioned several mythological animals, like "Phoenix" or "Rod of Asclepius" as remedies for some illness. The legends of the foreign medicines will be discussed to figure out where the new knowledge of the pharmaceutical substances included in this book came from, and how knowledge about these substances was finally compiled into an illustrated handbook with graphics and inscriptions for the readers to identify before use.

P18: Decision-making amid Crisis: Transnational Re-conceptions of Reason and Science in Mid-Century East Asia

Making the Rational Decision amid the Educational Crisis: The Transnational Network in the Rise of Behavioral Science in South Korea in the late 1960s

Youjung SHIN

In December 1966, Dan H. Jones at the American Institutes for Research (AIR) arrived in Seoul to initiate worldwide aptitude testing. With the goal of optimizing the use of human resources in developing countries, USAID contracted with the AIR, a leading behavioral research institute, to develop "the objective and scientific method" for assessing peoples' talents. Understanding and assessing Koreans' talent became a transnational concern in the 1960s. It resulted in an entangled network of ideas and practices bringing behavioristic ideas and practices in navigating Koreans' talent in the Cold War. This paper examines the contingent making of this scientific method in investigating Koreans' talent, especially in the context of contested discussions in South Korea over the role of the education system in national development in the late 1960s. Amid the controversies over the reformation of the college entrance exam, USAID's initiative of aptitude testing was regarded as a way of bringing rationality both at an individual and national level in South Korea. By revealing the way Koreans' talent became the channel for bringing behavioristic ideas and practices – which led to the establishment of the Korean Institute for Research in Behavioral Sciences in 1968 – this paper highlights the transnational engagement in making rationality in decision-making which reshaped the notion of reason, education, and development in South Korea.

Industrial Standardization for War Production and Post-war Commerce

J. Megan GREENE

In the early to mid-twentieth century, as Chinese industry integrated into the global economy, Chinese manufacturers, government organs and scientists became increasingly concerned with adopting standards to make Chinese products intelligible to the world and to govern production of both domestic and export

commodities. With the outbreak of the Second Sino-Japanese War and the consequent need for a network of industries in inland China to manufacture essential goods, standardization increased in importance. Under direction from the Nationalist state, government technicians went to the US to learn standards, Chinese engineers in the US collected information on standards that they disseminated to China through scientific publications, US standards experts traveled as consultants to China, and Chinese state research institutes worked to develop standards for essential products. Members of the American War Production Mission in China, representing US government, military, and industrial interests, also pressed Chinese industry to adopt standards of the American Standards Association that would bring Chinese industry and agriculture into the American orbit. Even while all of these efforts were underway, however, industrial conditions in inland Chinese factories were so unpredictable and inconsistent that the application of uniform standards was a challenge. This paper explores the debates over the need for and application of standards amongst Chinese industrial planners and technicians, and U.S. advisors during the war. It examines the tension between the need for immediate production, the desire to modernize and regularize production, and the expectation that standardization could position China to integrate into an American dominated economic sphere.

"Wartime Transpacific Circulations and the Great Management Debate"

Peter E HAMILTON

Amid the prolonged crisis of World War II, both the U.S. and Nationalist governments made concerted efforts to "rationalize" China's wartime production and plan for its accelerated postwar industrialization. Jointly state-sponsored academic exchanges and training programs were a critical component of that effort. Hundreds of mid-level Chinese officials, military officers, professors, and graduate students came to the United States during the war to study topics such as management, economics, engineering, and industrial and labor relations. Yet, due to the embedded influence of Taylorism in Nationalist China and government institutions such as the China Institute of Scientific Management (中國科學管理協會), Chinese discourse viewed management as a natural "science" that could maximize productivity through enumeration, mechanization, and hierarchy. In contrast, at institutions such as Harvard, these Chinese students encountered faculty such as Wallace Donham, Elton Mayo, Fritz Roethlisberger, and Franklin Folts who were pioneering more humanistic approaches to management that drew on psychological research to discourage excessive mechanization and hierarchy in order to encourage creativity and foster inter-personal cooperation. Drawing on archival sources from the Academia Sinica and Harvard Business School, the press, memoirs, and other sources, this paper examines these intellectual entanglements amid global crisis and asks three questions: which Chinese individuals were prioritized for this opportunity of state-sponsored training and why? Which U.S. institutions, programs, and professors served as their primary hosts and why? And what forms of debate, conflict, and exchange ensued as these transpacific educational circulations brought these allies' different perspectives on the 'scientific' nature of management into relief?

P48: Depicting Premodern Chinese Medicine: Body, Healing and Their Contexts in the Ancient Images

Curved spine : the shape of spine in Taoist body diagrams and its influence on medical body diagrams

Shujian ZHANG
Xinyue ZHANG

From the early taoist diagrams of human body to the end of the Qing Dynasty and the beginning of the Republic of China, the taoists has been exaggerating and deforming the human spine in a shape-shifting manner. It is likely that medical practitioners were influenced by this style of representation, and there are also a large number of diagrams of the human body with curved spine in the side viscera diagrams and Mingtang diagrams, which are always showing the human torso in an elliptical "egg shape".

The taoists may be based on the body concepts such as regarding the human body as Luding, a kind of stove oven, and constructing Zhoutian, which is a circular "circumference" of the body's essence pathway, as the ring-shaped path of Jing and Qi, and the pursuit of return to the infant body, these cognitions lead to a freehand and imaginative expression of the spine shape that deviates from reality. No later than the Ming dynasty, medical practitioners began to depict the actual physiological spinal curvature of the human body, which diagrams exist at the same time with the diagrams of the curved spine with taoist style. By the Qing dynasty, the depiction of spinal curvature in the medical human figure diagrams showed a tendency to part ways with the taoist freehand style of the previous generation. Although the representation of the curvature of the spine was very crude, later medical images of the human body at least gradually straightened the spine and no longer depicted it in the shape-shifting manner. However, the curved spine in taoist diagrams of human body continue to exist, the presentation of the curved spine never changed. This way of depicting appearance, which is not afraid of being very different from reality, is shaped by the Taoism special way of perceiving and viewing the body, and although its intention is not the same as the accuracy pursued by today's medical anatomical images, perhaps it also contains another form of reality.

The implantation and transmission of Plague Culture of the ‘Five Plague Immortals’ in the murals of shuilu

Yi BAO
Honglei SHI

The "Five Plague Immortals" in the murals of shuilu in Ming and Qing Dynasties is a kind of plague immortal image developed under the pedigree of Taoist immortals. As an important expel disaster immortal system in shuilu, the modeling of Five plague Immortals shows a combination of human beings and livestocks. This shape, to a large extent, draws on the image of ‘Nuo‘. which is also an imagination of the host of plague pathogens. In terms of the quantities of immortals, it is consistent with the traditional Chinese medicine of "five Elements". The internal connection of this culture reflects the means of plague preventions and controls in China, as well as the external reflection of plague culture. In this paper, through the multi-dimensional interpretations of the "double proof method", the beliefs in the five shuilu plague immortals is stripped from the simple image meaning, and its formation cores and cultural characteristics are deeply deconstructed.

Moxa Therapy Scene Depicted in the Ukiyo-e in 19th Century

Shan JIANG
Huan LIU

Ukiyo-e（浮世繪） is a representative form of Japanese fine art. It appeared since Edo period (1603-1867) and continued to

flourish until the Meiji period (1868-1912). The mainstream to create ukiyo-e was by printing on wood panels, which made it a convenient way to disseminate popular culture and ideas widely.

Considering the aim of "popularity", the artists of ukiyo-e would like to choose the theme of daily life and customs. Thus medical practice was also selected as a scene by the artists. Among them, moxa therapy is a frequently used scenario. At present, moxa-themed ukiyo-e have been generally introduced by the museums collecting them. And some scholars have analyzed hidden clues about using moxa in the 17th century ukiyo-e created by Hishikawa Moronobu（菱川師宣）. However, the popularity of moxa related ukiyo-e created in the 19th century was rarely discussed. In this regard, the article analyzes some typical works all on the same moxa theme by Utagawa Kunisada（歌川国貞）, Tsukioka Yoshitoshi（月岡芳年）, and Toyohara Kunichika（豊原国周）, who were active in the very century. From the viewpoint of history of image and art, the article analyzes the characteristics of the moxa scenes and their distance from real medical practice. The authors attempt to answer these questions: why moxibustion, among acu-moxa therapy, became a popular theme in ukiyo-e? What aspects of moxibustion did the artists attempt to present? Observing from ukiyo-e, the article throws light on the historical situation of popularity, social status, patients, and applicable syndromes of moxibustion in the 19th century Japan.

Rethinking the Anatomical Structure and function of Chong Channel Based on Ancient Documents and Images

Ran WEI

This paper discusses the anatomical basis of Chong channel (冲脉，Chong Mai)，and traces the source of ancient people's understandings about it by analyzing the circulation and functional characteristics of Chong channel in ancient documents and images. Chong channel is one of the eight extra-meridian channels of the human body, which is called "sea of the twelve meridians", "sea of the entrails", and "sea of blood", and is closely related to the reproductive function of body. However, the route of Chong channel is not uniform in different books, and the theoretical interpretation of its function is also complicated. This paper has reviewed the circulation route of Chong channel, and compared the depictions of Chong channel in Chinese medical literatures with the drawings of arterial blood vessel in the East Asian and Western medical books. The functions of Chong channel in Chinese medicine and circulatory system in Western medicine were also discussed. The involved literature this paper employed include ancient books from Eastern and Western medicine, like“Inner Canon of the Yellow Emperor”(黄帝内经), “Nan Jing”（难经）, “Research on Eight Extra-meridian Channels”(奇经八脉考) and “De Motu Cordis”（心血运行论）, particularly the images from the Ming and Qing anatomical works, like“Yi Lin Gai Cuo”(医林改错) and “Jie Ti Fa Meng”(解体发蒙). This paper shows that the route of Chong channel originates from the ancient people's observation on the main artery. The theory of Chong channel covers the anatomical structure and function of the body circulation in modern medicine. It is just the simple understandings on blood circulation physiology by the ancients, and is also the specific expression of the "like loop has no end" thought of TCM. This paper is dedicated to representing the anatomical basis and functions of Chong channel, making contributions to the construction

process of the meridian theory, and providing ideas for the study of the theoretical origin and clinical application of meridians.

The “Sweet” Pancreas: an Intellectual and Pictorial History in the Translation of Medical Literature

Xiaoyang GU

The pancreas is neither part of the five Zang organs (五脏) nor of the six Fu organs (六腑). Thus, it has not received much attention in Chinese medical literature.

Biomedicine and Chinese medicine met when Jesuit missionaries arrived in China and began translating anatomy and physiology texts into Chinese. In the 19th century, medical missionaries played an essential role in translating biomedical literature. As for the word pancreas, an early and influential translation was the term "sweetmeat" (甜肉), which was proposed by the British missionary Benjamin Hobson in 1851 in his Manual of human anatomy and physiology（《全体新论》）.

"Sweetmeat(甜肉）" was a literal translation of the term "sweetbread," which was usually used in recipe books and was the laypeople's word for pancreas or thymus. Thus, it is not a faithful translation of the pancreas. However, over the decades of the term's popularity, several Traditional Chinese Medicine(TCM) practitioners reinterpreted the term, and the biomedical knowledge of digestion tagged along with it. The word "sweet" was viewed as equal to sweetness in the five flavors（五味）of TCM theory. Since the five flavors correspond to the five Zang organs in the human body and the sweet flavor goes to the Pi(脾), the term "sweetmeat" was seen as proof that the pancreas was affiliated with Pi(脾). Some TCM practitioners even drew pictures in which the anatomical relationship of Pi（脾）and the pancreas were altered to show the affiliation. The digestive function of the pancreas juice was also viewed as validation of the Chinese medical literature "Pi（脾）governing transportation and transformation."

By using "sweetmeat" as an example, the author tried to understand the reception and reinterpretation of biomedical knowledge by modern TCM practitioners, and the production of knowledge in modern China.

Representing the Spleen: Genre, Metaphor, and Useful Anatomies

Lan LI

This paper analyses representations of the spleen (pi 脾) to explore themes related to graphic dynamism, translation, and aesthetics in Chinese medical sources. Though unremarkable in biomedical anatomy, the spleen often sat at the center of East Asian anatomical cosmology. Premodern texts occasionally described the spleen as the most extreme Yin of the Yin organs, ruling the body’s supply of Qi. It operated alongside the stomach and shaped one’s taste, preferences for flavors, and sensitivity to flavors. Meanwhile, the spleen rarely appeared fixed in anatomical illustrations. This paper considers the ways in which illustrators depicted the spleen, comparing two sources by anonymous illustrators in the Edo period. The first set of anatomical images is a Japanese version of the thirteenth-century text Yi Yin Tang Ye Zhong Jing Guang Wei Dafa 伊尹湯液仲景廣爲大法, attributed to Wang Haogu 王好古 (1200–64?). The second set of images focuses on illustrations associated with 十四經發揮 attributed to Hua Shou 滑寿 (1304-1386). Through closely reading illustrations of the spleen and its associated systems, I argue that East Asian medical anatomy offered practical and dynamic representations that were meant to be taken

literally, not figuratively—rather than operating as metaphorical objects, coded as "unreal" entities without a biomedical analog, representations of the spleen connected with clinical cases and conceptual cosmologies that could be taken for granted. This paper thus engages with postcolonial science studies to frame Chinese medical anatomy and contribute to visual studies by placing aesthetics in the context of use and usefulness and further reconfigure scholarship on metaphor and translation.

IP24: Medical Pratices in modern East Asia

Temple Prescription: Research on Yaoqian Based on STS Perspective

Huiwen QIU

Asking for yaoqian (prescription divinations) is a common healing ritual in southern Fujian. When people feel unwell or sick, they go to the temple to get a piece of paper with the corresponding number printed on the name of the medicine, the dosage and symptoms. Yaoqian is a complex medical method that combines traditional Chinese medicine and folk beliefs. It can divided into surgery, ophthalmology and pediatrics, etc., contains hundreds of different medicines. The following will illustrate the logic and technicality of yaoqian.

Yaoqian includes some exotic ingredients such as ferrosic oxide and oven earth (scorched earth in the firewood stove), but because these materials are hard to find nowadays, people then choose red bricks or rusty iron nails as replacement medicinal materials. These objects were originally produced due to specific needs, now they have been developed with new functions and even entered the human body, which prove the mobility of substances.

For conditions that cannot be clearly expressed, or symptoms are unstable and beyond the scope of cognition, Chinese people usually think it might entangled with "something dirty". Patients often seek clinical medicine unsuccessfully under this circumstance, but it's easy to cure in folk belief. The reason why patients prefer seeking yaoqian is not only to drive away evil supernatural things, but also to describe to the deity the difficulties they have experienced, and to pray for peace.

Finally, maybe clinical medicine is not yet fully accepted in China. Once a woman in her 60s came to temple. She told me that she just come back from a authoritative hospital because of a large bruise from above her knee to mid-thigh. After several CT scans, took a lot of blood, she didn't get a diagnosis immediately, but was told to go home waiting for the results. She was dissatisfied with the treatment process, even thought the hospital was just cheating her out of money. So she turned to ask for yaoqian, hoped it will be fine soon.

Generally, yaoqian has its own wisdom, and it's not just a complementary medical treatment in the era of multi-medicine coexistence. Also there are some tensions between the "tradition" represented by folk medical beliefs and the "modernity" pointed by clinical medicine. Perhaps we should not use science as a single standard to examine modernization. In other words, modernization may take many forms, and we should try to understand multiple modernizations.

Vision of Revolution: The Global Context and Historical Roots of Eye Massage as a National Policy in Post-1949 China

Mingxuan ZHENG

Eye massage (Yanbaojiancao, 眼保健操, literally gymnastics for eyes' health) is a nationwide health measure that has been used against near-sightedness in communist

Chinese schools since the 1960s. Students were required to massage the acupuncture points on their faces under the rhythms broadcasted through the school radio systems with a voice saying “Protect eyesight for the revolution!” This unique practice combined traditional Chinese medical understandings of the human body with a modern disciplined exercise via massive electronic technologies and thereby attracting much scholarly attention from historians of medicine and researchers of STS. Nonetheless, we know little about its origins in post-1949 China.

This paper argues that the birth of eye massage actually has a global historical context. As anxiety about civilization degeneration and skepticism towards sensory deepened in Europe, surveys of schoolchildren's eyesight were carried out on a large scale. Schoolchildren's eyesight became a major concern of public health. Japan and China quickly accepted the link between myopia and civilization. Anxious to improve the “quality” of their populations and be recognized as “advanced” by enhancing public health, China took measures to counteract the condition even though myopia's prevalence was not high then. After entering the communist period, China was influenced not only by the outcomes of Japanese ophthalmic scholarships but also by the Soviet principles of school health. Thus, this seemingly insignificant measure, widely considered to be distinctive to China, is part of a global network of knowledge production and exchange.

The emphasis on myopia, and the invention and implementation of eye massage, interwove multiple "hygiene" traditions. As many scholars have pointed out, in twentieth-century Chinese society, "hygiene" became the embodiment of civilization, modernity, and science. However, eye exercises blurred the boundaries of the Eastern/Western and traditional/modern dichotomies encompassing multiple health traditions. What is more evident in eye exercises is the tradition of fatigue control in addition to bacterial inhibition and environmental modification. This tradition not only has long historical roots in Chinese medicine but can also be traced back to the practice of fatigue control to improve productivity in capitalist societies. At the same time, in Communist China, fatigue control was also associated with revolution as a metaphor for overcoming the moral degradation of the population, and fortifying the revolution against betrayal.

In Search for the Right Point: Refashioning Acupuncture with Experiments and Standards

Wen-Hua KUO

This paper looks at attempts in the late twentieth century to make acupuncture a standardized therapeutic for study and for clinical practice. A peculiar way of treating people via meridians inside their bodies punctuated by regulatory points, acupuncture has been used as a therapy for thousands of years, without losing popularity after the wide acceptance of bio-medicine in East Asia. Furthermore, its popularity increases in the world. Alongside institutional efforts to set standards for acupuncture, such as those made by the World Health Organization or the International Standard Organization, this paper focuses on the endeavor to lay a scientific foundation for acupuncture. Guided by Joseph Needham’s contemporary account on acupuncture that treats it as both experience-based and clinically oriented, this paper will make its focus on the career and work of Jaung-Geng Lin, the first physician of Chinese medicine elected as an academician at Academia Sinica. Departing from a simple

interpretation of Professor Lin's personal diligent characters, this paper casts him and his achievement in a larger context that attempts to make this non-biomedical tradition scientific with experiments and standards. It will show that while absorbing general acupuncture research trends that use animal models to seek physiological mechanisms of acupuncture or test its therapeutic effects with clinical conditions, what makes Professor Lin and his team a research enterprise relies on his professional training in the 1970s Taiwan, his insight as an active acupuncturist, and his networking to turn acupuncture an inviting field for scientific research and a respectable clinical specialty. Tracing and evaluating Professor Lin's research career, l argue, not only allows us to see the changing meaning of this living tradition as it is disputed among researchers and experts to make it comparable to biomedicine; it also offers an opportunity to capture its refashioning that, as Needham might have expected, push acupuncture toward an ecumenical medicine in the future.

IP42: Science Policy and Institutions

An Exploration of Young Workers' Culture and Technology in Education at the Early Stage of Reform and Opening Up -- Centred on Shanghai's Small Third Line

Xiaofan LU

At the early stage of reform and opening up, the focus of the Party and the state shifted to socialist modernization, and the cultural and technical re-education of young workers became an important task. Shanghai responded positively and adopted a diversified working model in Shanghai's small third-line enterprises, carrying out cultural and technical re-education work based on political learning, with cultural and technical knowledge as the main content and economic basics as a supplement. Although there were problems in the process of carrying out this work, such as insufficient safeguards, insufficient teaching content and unbalanced treatment of new and old workers, it also raised the political awareness and production motivation of young workers, which in turn improved the economic efficiency of small third-line enterprises. This work not only summed up the shortcomings of the previous workers' education, but also provided practical experience for the subsequent work and strongly supported the construction of the four modernisations of the country.

A Handover in the Empire of the Air: China's Infrastructural State v. Cathay Pacific

Jiakai Jeremy CHUA

With the crown colony of Hong Kong poised to "return" to China, the future of Swire-owned Cathay Pacific lingered with much uncertainty in the air. In 1986, aviation bureaucrats at the Civil Aviation Authority of China (CAAC) had openly remarked to managers of Cathay Pacific that "some people…are advocating that non-Chinese may not own and run an airline in Hong Kong after 1997." Palpable and imminent, the threat revealed the PRC's problematic designs on what was a wholly foreign carrier.

Since the inception of its own airline industry in Republican China, succeeding governments in Greater China have seen the promises of Chinese culture, modernity, and national security as intertwined with its aviation complex. From withholding overflight and landing permissions, determining naming conventions in the frequent flyer programs in foreign airlines, and to more recently, COVID-19 restrictions, the PRC has leveraged levers

within global aviation networks to project and articulate its economic nationalism and technological mastery as part of its larger "infrastructural state" ambitions. As the handover approached in 1997, the PRC government increasingly exerted its influence over Cathay Pacific through political, corporate, and financial channels. This included appealing to British interventionist biases to maintain its legacy imperial networks, supporting Cathay's new upstart competitor, Dragonair, and leveraging "Red Chip" companies and China-friendly business elites to influence the constitution of Cathay's board of directors.

In response, Cathay Pacific adopted what John Wong called "flexible corporate nationality" to accommodate and negotiate the shifting forces of geopolitical power that had once threatened the management's legitimacy and license to operate beyond the handover. By assaying Cathay's corporate identity, equity distribution, competitive strategy, and its collaborative arrangements with China-backed airlines and other business entities from 1978-2000, this paper offers that the PRC's longstanding interests and investments in its aviation complex naturally extends beyond its domestic sphere, its political will facilitated by complex cross-border markets and equity holdings.

In the context of a century of aviation development in China, the Cathay case study also explains the critical importance of networks and infrastructure – as well as the financial ecosystems that make them possible – to the means and ambitions of the state machinery. The paper argues that Chinese ownership and development of aviation infrastructure must be read as a part of China's historical and contemporary statecraft, its technocratic anxieties about technology and borders, its curation of image and perceptions of control to the world, and more importantly, wider unease about its modern identity.

Rewards for young scientific and technological talents in China-A comparative study

Zhaoyang LIU

As a profession, scientists have had a development history of over a hundred years in China. However, due to the influence of Chinese historical traditions and practical factors, the functions of science and the role of scientists in Chinese society have undergone multiple transformations, and gradually formed a team of scientific and technological workers with Chinese characteristics. Among them, "technical cadres" refer to full-time technical personnel such as chief engineers, engineers, technicians, and technicians in state-owned factories. They possess both political and professional attributes, and are the link between party cadres and scientific and technological workers. They possess scientific knowledge and professional skills, which are related to the long-term development of the national science and technology industry. In 1952, the CPC put forward the policy of "returning technical cadres", which initially aimed to change the situation of "professional leaders" in various industries at the early days of the founding of the People's Republic of China through the overall deployment of cadres scattered in non economic sectors with a high degree of education and some work experience to work in economic sectors. This policy has been implemented in China for nearly thirty years, but in the actual implementation process, technical cadres face different outcomes of returning to technical positions and engaging in party and government work, as well as problems such as using non learning, departmentalism, and inertia. The content of the policy of 'returning technical

cadres' is very simple, but its implementation is a detailed and complex task, involving the switching of work fields and workplaces, the multi-level relationships between cadres themselves, the units of transfer out, the units of transfer in, and various levels of government departments, as well as the complex interaction between the dual discourse of technology and politics in the science and technology policies of the first thirty years of New China.

IP20: Surveying Techniques and cartography

Hydrographic Survey and Tide Control of the Qiantang Estuary During the Qianlong Reign of the Qing Dynasty

Shen WANG

The Qiantang Estuary is one of the largest macro-tidal estuaries on the East China Sea coast. In history, the fierce tidal bore carried a large amount of sediment into the estuary, which accumulated in the riverbed, making it very unstable and causing rapid changes in the hydrological environment. The estuarine environment like this has posed a serious threat to the people living in the low-lying plains on both sides. People of all generations have tried to defend against floods and tidal bores by building seawalls, but often with limited success. During the Qianlong reign of the Qing Dynasty, the emperor began to order the Zhejiang officials to regularly measure the changes in the tidal bore, mud flat, and water flow at the Qiantang River estuary, and to draw the measurement results into a map, which was sent to Beijing every month through post stations. By using the hydrological measurement data from the Qiantang River estuary, Emperor Qianlong was able to stay informed of changes in the environment and issue instructions to his officials accordingly. This article explores the process and impact of the establishment of the hydrological observation and reporting system at the Qiantang River estuary, and argues that this was a practice of Emperor Qianlong's reliance on "scientific means" for national governance, which strengthened central power.

The Specific Operations of Squared-scale

A Traditional Chinese Mathematical Map Drawing Method Which Is Different From Western Map Projection

Qianjin WANG

In early times, map projection method was invented in the west which was based on the idea that the earth was a sphere. While in China, the spherical-earth theory had never played a dominant role in early times. Instead, the earth was thought to be a planar-square, and a squared-scale method (Ji Li Hua Fang, 计里画方) was developed. The method has been fully discussed except the specific techniques of how to draw maps. The author focuses on how to apply the techniques based on an extensive collection of ancient squared-scale maps, discussing the shapes, types, characteristics, advantages and disadvantages of the method.

A preliminary study of the methods of remote surveying developed in traditional Japanese mathematics

Wei-Ting YANG

Alexei K. VOLKOV

Treatises on traditional Japanese mathematics wasan (和算) published prior to the early 20th century contained a large number of mathematical methods devoted to remote surveying. The methods of this kind for the first time appeared in China in the beginning of Common Era and were later adopted and developed in medieval and early modern Korea and Japan. We shall

argue that historians of Japanese mathematics of the 20th century focused mainly on Japanese polynomial algebra and did not pay sufficient attention to the mathematical methods that were intended to be used for remote surveying; it can be shown that a large number of the original Japanese works dealing with this topic were not even mentioned in publications on the history of Japanese mathematics.

In our paper we shall briefly describe the early history of these methods in China and then present the results of our investigation of the Japanese mathematical treatises of the 17th-19th centuries dealing with remote surveying and preserved in Japanese libraries, in particular, in the Library of Tōhoku University 東北大学. We shall argue that these mathematical methods played an important role in the development of Japanese geodesy and cartography.

P20: Nature as Resources, Medicine and Landscape: Global Knowledge Exchange in Modern East Asia

Spa Treatment, Geothermal Resources, and Mass Consumption:Rediscovering the Hot Springs in Modern China

Fei HUANG

Providing an abundant source of fresh water and sensual warmth, hot springs have always exerted an attraction on people around the world from ancient times to the present. Since the second half of the eighteenth century Europe, mineral springs were scientifically explored and researched, institutionally controlled and managed, commercialized and mass consumed. The popularity of spa resorts and sanatoria reached its peak in Europe, North America, and other parts of the world just before World War I. The emerging idea of operating modern hot springs resorts, sanatoria, and commercially-run public bath houses ran parallel with the trend of the rediscovery of hot springs enshrined in modern knowledge about the body and the environment. This article focuses on three examples of academic and popular science writings of hot springs during the global knowledge exchange in modern China. In the long-standing interest in hot springs in pre-modern China, the knowledge of the multi-faceted character of hot springs has been accumulated under the umbrella of so-called traditional knowledge based on correlative cosmological thinking on the body and nature. During the early twentieth century, various educated Chinese individuals conducted a comprehensive survey of hot springs either in their hometowns or throughout China and even beyond. Their works are a sign of the growing interest in new academic explanations of hot springs, but also imply a strong desire or even the concrete actions taken to commercialize these natural phenomena, turning them into tourist resorts or leading to the construction of medical care centers. The overwhelming nineteenth- and twentieth-century foreign influence on the modern Chinese rediscovery of the hot springs, whether borrowed from Europe (especially German-speaking areas) or second-hand via Japan, is undeniable. Nevertheless, this article shows how these modernizing discourses had been appropriated from the various traditional frameworks and transformed into a new narrative. Furthermore, these newly discovered ideas had also been fantasized over by the public in each context in Western society itself. Rather than thinking that this new knowledge was transplanted from an advanced foreign model, these ideas were embedded through their translation, imagination, and appropriation in modern China.

Intersections of nationalism, scientism, and technical education at the Sino-French Institute of Lyon

Mary A. BRAZELTON

This paper considers the history of technical training for Chinese students as arranged by the Sino-French Institute in Lyon. A unique joint enterprise of the French and Chinese Republics, the Institute was established in 1921 to organise tertiary education in science, technology, and medicine for select Chinese students. Until its closure in 1951, the young men and women that the Institute sponsored staked their futures on the fields of scientific knowledge that they saw as key to averting national economic and political disaster for China. The intellectual world into which they had been born collapsed in the early twentieth century, signalled by the dismantling of China's imperial examination system: a framework founded on a classical canon and cosmology that guided education, government, and politics. The Qing dynasty itself fell in 1911, to be replaced by a Republic. Amid intellectual and political uncertainty, what assumptions and ideals shaped the choices of Chinese youths to study technical subjects abroad? And why did they choose to go to France? Examination of their French- and Chinese-language correspondence, publications, and theses provides an opportunity to learn what kinds of knowledge they valued, and why, amid radical epistemological uncertainty.

The Institute became a laboratory for Chinese modernity in which students evaluated and selected disciplines on the basis of their utility for the nation, even as they sought to master the intricacies of those fields. This paper focuses on the experiences of Chinese students who trained in the life sciences. Many of them sought to identify parallels and reconcile differences between French and Chinese environments in terms of local natural resources, organisms, and epidemiologies. Some students sought to apply French pharmaceutical and biochemical methods to the analysis of Chinese herbal medicines, shipped at great expense from East Asia; others travelled across France to study hydrotherapy, a medical treatment defined by environmental conditions, as a field with great utility for China and its landscapes. I suggest that these students' desires to use technical education to support China's national development required them to account for the ways in which the French environment that had supported the development of life sciences in Lyon could be productively read in terms of Chinese territories and ecologies.

A New Concept of Mineral Identification: Translating James Dwight Dana's Manual of Mineralogy in Late Qing China

Shih-Yu JUAN

Published in 1871, Jinshi shibie (Identification of Metals and Stones) was widely acclaimed by historians in the twentieth century for first introducing Western mineralogy to China. In the meantime, they were also disappointed that the book did not contribute to China's modernization because it was a mere translation. This article examines the nationalist and diffusionist narratives underlying this assessment. Echoing the global turn in the history of science, this article considers the dissemination of knowledge not merely as the transportation of texts but as a process of reproduction. Jinshi shibie was translated by American medical missionary Daniel Jerome McGowan (1815–1893) and Chinese mathematician Hua Hengfang (1833–1902) from Manual of Mineralogy (1848, Manual), which was written by American mineralogist James Dwight Dana (1813–1895). Dana, a proponent of natural theology, contributed Manual to the

intellectual climate of his time. American scientists challenged European scientific authority by embarking on expeditions to the Western United States and the Pacific Ocean in which they named and classified new species, including minerals. Dana encouraged his readers to go into the wild and discover their homeland as he did. However, when Manual was translated into Chinese, the translators did not convey Dana's intention. Instead, because the translators put the text in conversation with Chinese traditional mineral knowledge and the state's pursuit of Western science and technology, Jinshi shibie was more an adaptation of Manual than a translation of it. They removed most of the content of the U.S.' geological strata while adding principles and methods of analytical chemistry to the book. In so doing, they repackaged Jinshi shibie into an instruction manual for indoor experiments instead of a field observation guide as Dana originally intended. With these crucial changes, the term "jinshi" no longer meant just "metals and stones," a category in traditional Chinese medicine. Still, it also included the meaning of "Western minerals" that people could analyze and identify through scientific experiments. Thus, people with diverse backgrounds, such as businessmen, local intellectuals, and high-ranking officials, all utilized this new knowledge of minerals in order to search for mines. Not only did the new concept of mineral identification encourage businessmen to expand their personal profits, but it also gave intellectuals and officials hope to regain the state's strength and increase its prosperity.

To Be Natural or Being in the Nature? Reexamining the Genealogy of the National Park System in the Japanese Empire

Kuang-Chi HUNG

The polemics of conservation-preservation is an important theme in the contemporary field of environmental history. In the past decade, environmental historians have grown discontent with American exceptionalism, wilderness-centric theory, and diffusionism, and instead acknowledge that each society often holds unique views of nature, which are generally molded by knowledge exchanges and affect how preservation or conservation is implemented. It is within this context that this article focuses on the genealogy of the ideas of Tsuyoshi Tamura (1890-1979), "the father of Japanese National Parks," and analyzes how his 1928 trip to Taiwan influenced his thoughts. This article draws three conclusions. Firstly, environmental historians of the Japanese Empire and its colony Taiwan need to pay attention to the tension between "tennen," to be natural, and "shizen," being in nature, in addition to the debates between preservation and conservation. "Tennen" is the original state of existence encompassing all beings, including humans, while "shizen" denotes a nature that excludes humans and is managed by professionals with the aim to be appreciated. Secondly, if "wilderness" and "Landschaft" or "paysage" are the core concepts in the American, German, and French environmental history, then "teien," yard and garden, serve a similar role in understanding the environmental history of the Japanese Empire and its colonies. Thirdly, the unique landscape of Taiwan was not only essential in Japanese national parks proponents' imagination of a "grand landscape," but also became part of the Japanese Empire landscape after the announcement of the National Park Act in 1931 and turned into an object of appreciation for the subjects of the Empire and international tourists. This article contends that these three points are essential in understanding the history of colonial

Taiwan's national parks. Environmental historians of the Japanese Empire have moved from the perspective of exploitation and development to the preservation-conservation contention. This article hopes to further contribute to this direction by investigating the genealogy of Tamura's views of nature.

P58: Silk Road Technology Exchange

Scientific and Technical Examination and Analysis of Jun Glazed Wares Excavated from the Yanjialiang Site during the Yuan Dynasty

Mei YONG
Ke SHI

Yanjialiang site is a Yuan Dynasty site, located in Baotou City, Inner Mongolia. More than 10,000 pieces of various artifacts of different textures have been excavated from the site, among which porcelain is the most abundant. In order to explore the production techniques and provenance of the Jun glazed wares excavated from the Yanjialiang site, the chemical composition and microstructure of the glaze and tire layers of four samples of Jun glazed wares were determined using EDXRF, SEM-EDS, XRD, and combining archaeological data and related literature. The results of the analysis show that there are differences in the formulation process of the glaze layer of the Jun glaze ware at the Yanjialiang site, differences in the content of flux oxides in the glaze, especially calcium oxide, and that the glazes belong to calcium glaze and calcium-alkali glaze. All four pieces of Jun glaze ware have a fractal structure in the glaze layer; the glaze layer includes the glaze and fetal glaze reaction precipitation layer, and the structure of the precipitation layer is divided into two categories, one is that of the calcium feldspar precipitation layer and the mullite precipitation layer together constitute the fetal glaze intermediate reaction layer, and the other is that only the mullite precipitation layer exists, and the main reason for this difference is the GaO content in the glaze layer. The blue color of the glaze layer is the result of the combined effect of chemical and structural colors. Although the four samples are similar in appearance, there are large differences in the chemical composition and production process of the glaze layer, and among the four samples, Y2 has the crudest production process. The level of selection and processing of raw materials of porcelain tires is low, the panning process of billets is rough, the firing temperature is relatively low, and the mechanical properties of the tires are relatively poor. Based on the location of the excavation and the level of craftsmanship, it is inferred that Y1, Y2, and Y4 were used as tableware for entertaining customers in commercial areas. The analysis of the production techniques and uses of the Jun glazed wares excavated from the Yanjialiang site greatly enriches the archaeological research data on Jun glazed wares in Inner Mongolia and provides some scientific basis for exploring the status and role of the Yanjialiang site on the Grassland Silk Road.

The Maritime Silk Road in Qing Dynasty and Scientific and Technological Exchanges Between China and Japan

Suo BAO

The Qing Dynasty was at the end of the traditional society,but it was the peak of the development of the Maritime Silk Road in the traditional period - no matter the countries or regions that traded, or the types of goods and their trade volume were incomparable to other dynasties.This paper discusses the overall development of the Maritime Silk Road in the Qing Dynasty from the aspects of commodity trade,

cultural exchanges, and important figures. At the same time, it focuses on the trade, science and technology, and cultural exchanges between China and Japan along the Eastern Maritime Silk Road, with Tang ships as the carrier.

Research and Development of the First Heping type Steam Locomotive

Sudubilige

Steam locomotive is the symbol of the industrial revolution. The fabrication of Heping type steam locomotive has epoch-making significance to the development of China's locomotive industry. This paper discovers Heping type steam locomotive design and manufacturing process, discusses the sources of science and technology, mainly based on the articles of engineers and technicians, translation of the Soviet books related to steam locomotive, the ministry of railways internal data literature, to clarify the Heping type steam locomotive is not only a successful case of Soviet technology transfer, further study the route of the Soviet science and technology transfer, but also combines the existing practical experience and research results. At the same time, the research on Heping type steam locomotive is also of reference significance for the realization of technology independence from technology transfer.

Inspiration from Esaki's Semiconductor Research and the Cultivation of Creativity

Na Saren BAO

Esaki spent his college years in the midst of the war, and successively worked in Kawanishi Corporation (now Fujitsu Ten), Tokyo Tsushin Kogyo (now Sony) and IBM Watson Research Institute. It is called "Nobel Prize winner who has been working in many enterprises". In 1957, as an ordinary staff, Esaki found the abnormal negative resistance effect in the heavily doped germanium semiconductor PN junction, pointed out that the reason for this strange phenomenon was the "tunnel effect", thus discovered the Esaki tunnel diode, and won the Nobel Prize in Physics in 1973 for this. In 1969, Leo Esaki and Raphael Tsu of IBM jointly proposed the concept of superlattice. The literature related to superlattice is still frequently cited. In 1991, he was awarded the IEEE Medal of Honor for his outstanding contributions. In 1992, after returning to Japan, he subsequently served as the president of Tsukuba University, Shibaura Institute of Technology and Yokohama College of Pharmacy. In 2000, at the request of Prime Minister Obuchi at that time, he became the chairman of the National Commission on Educational Reform. He also served as the chairman of the “21st Century COE Program”. In 2004, Leo Esaki Prize was founded to honor and award people who have remarkable achievement in the field of Nanotechnology.

His educational experience, the scientific ideas of inventing the Esaki diode and supperlattice, and the educational idea of creativity cultivation need to be further studied. By digging archives and historical materials from the aspect of "people", "company" and "technology", we can present the research experience and explore his scientific ideas. Meanwhile, in the background of the educational reform carried out at the end of the 20th century in Japan, attention was paid to Esaki’s active participation. By using the methods of literature analysis, case analysis, comparative research, etc., the early experience, scientific research path and educational reform of Esaki were carried out in steps. It includes the following contents: (1) Analysis the reason for Esaki's success in the semiconductor field, his scientific contributions and ideas. (2) From

the perspective of "cultivation of creativity", this paper discusses his exploration of educational reform. (3) The enlightenment of Japan's semiconductor technology introduction and independent innovation process to China. The inspiration of Esaki's innovative spirit, scientific thinking and educational methods to the field of semiconductor is worth thinking about and learning from.

Introduction and local evolution of Griffin Pattern

Degang YI

Griffin is an important art theme in the area of cultural and artistic. By combining Griffin's physical objects with literature materials, the concepts of Griffin and winged beasts are clearly distinguished. The origin and propagation route of Griffin were discussed in this paper. According to the cultural relics, Griffin originated in ancient Egypt around the 3rd millennium BC, then spread to the Mesopotamia and Greece, and spread to the whole of Europe with the process of Romanization. Griffin spread into northwestern China during the Warring States period from the 4th to 3rd centuries BC through the northern route, and had exchanges and fusions with the local Chinese wing beast culture, creating the image of the wing beast with Chinese characteristics such as Tianlu and Bixie spirits. The ethnic integration during the Mongolian and Yuan dynasties brought the cultural exchanges between China and the West into a new peak. Western Griffin patterns appeared on Nasij and incorporated the characteristics of Chinese local patterns. China's weaving technology has also absorbed the lampas weaving technology from Central Asia and achieved new breakthroughs.

Research on compound bow making techniques in Xinjiang during the 1st millennium BC

Zhongyuan ZHANG

In Xinjiang, China, sophisticated techniques for making compound bows were developed during the 1st millennium BC. The earliest compound bow unearthed in Xinjiang is similar in age to Tutankhamun's compound bow unearthed in Egypt. The early composite bow technology in Xinjiang between 3300 BC and 2500 BC is directly related to the ∑ composite bow technology in Xinjiang between 2500 BC and 2200 BC, while the Niya type composite bow technology in Xinjiang between 2200 BC and the first AD is more influenced by other regions. This paper mainly discusses the production technology of ∑ type compound bow and Niya type compound bow in Xinjiang, and studies the technical connection between them. This paper also studies the technique of attaching materials in multiple directions to the ∑ type composite bow in Xinjiang, and the structural difference between the "L" shaped upper bow limb and the "C" shaped upper bow limb of the ∑ type composite bow. Explore the reason why the technology of multi-direction attachment material becomes the technology of the same direction attachment material in the composite bow production in Xinjiang.

Research on Shanghai's Support to the Wool Textiles Industry Construction in Inner Mongolia (1949-2000)

Jieping JIA

After the founding of the People's Republic of China, in order to improve the layout of China's wool textile industry, the old generation of wool textile industrial cities, led by Shanghai, supported the construction of a number of wool textile enterprises in the wool producing areas of Inner Mongolia,

Xinjiang, Qinghai and Gansu, which accelerated the process of industrial development in China's ethnic areas, raised the level of local economic and social development, and promoted national unity and integration. This paper summarizes the technical, technological, equipment, talents, management experience and other assistance provided by Shanghai to the wool textile enterprises in Inner Mongolia from 1949 to 2000, including the free equipment transfer of the first wool textile factory in Hohhot in the 1950s, the technical personnel training and production management of the second wool textile factory between the 1950s and 1960s, the equipment installation and commissioning before the production of the second wool textile factory in Chifeng in the 1980s, and assisted the bankruptcy and reorganization of wool textile enterprises in Inner Mongolia in the 1990s, providing clues for exploring the history of wool textile technology exchange and cooperation between the two regions.

IP2: Modern uses of East Asian astronomical data

On the restoration model of Nam, Byoung-chul's armillary sphere in the 19th century Korea

Kyounguk NAM
Daeyoung PARK
Sang Hyuk KIM
Byeon-hee MIHN
Hong-soon CHOI
Geoyoung HAN

The purpose of this study is to restore Nam, Byoung-chul(南 秉 哲, 1817-1863)'s Armillary Sphere(Honcheonui(渾 天 儀)) based on the literature of 『The Collection of Writings on the Scientific Instruments(Uigijipseol, 儀 器 輯 說)』 compiled by Nam, Byoung-chul in the mid-19th century Korea. The first volume of 『Uigijipseol(儀器輯說))』 describes the history and explanation of the armillary sphere 「Honcheonui-seol(渾天儀說)」, the making method of armillary sphere 「Honchoenui-jebeop(渾 天 儀 製 法)」, and the instructions for the use of the armillary sphere 「Honcheonui-yongbeop(渾天儀用法」). The structure and function of Honchoenui were designed by translating and analyzing the contents of 「Honchoenui-jebeop(渾 天 儀 製 法)」. The specific data such as the size, material, detailed structure, and drawings of Honchoenui were not presented, so it was restored by referring to the existing artifact of armillary spheres. In addition, to verify the restored model of Honchoenui, we reproduced the contents of 「Honcheonui-yongbeop(渾天儀用法)」. Nam, Byeong-cheol's Honcheonui is a representative scientific artifact that shows intellectuals' efforts to inherit and develop the armillary sphere, a forgotten traditional East Asian astronomical device, in mid-19th century Korea when Western observation devices were the main.

Translation and Application of Ancient Guest Star Records in China and Japan by Europe in the Early 20th Century: A Case Study on Lundmark's Research

Yuxin TIAN

Swedish astronomer Knut Lundmark recognized the astronomical significance of ancient guest star records from China and Japan. In 1921, he explored suspected novae in his work "Suspected New Stars Recorded in Old Chronicles and Among Recent Meridian Observations," using these records to solve problems related to celestial body evolution. This was the first time that ancient guest star records were used in astronomical research.

Prior to Lundmark, other researchers such as John Williams and Édouard Biot had sorted and translated ancient celestial records from China, providing methodological support for the subsequent use of these records in scientific and historical studies. The author uses Lundmark's work as a specific case study of the translation and application of ancient East Asian guest star records in early 20th-century Europe. This research discusses the origin and methods of Lundmark's study and highlights the specific value of ancient astronomical records from East Asia in astronomical research. Lundmark's study was related to his cultural interests and astronomical research, assisting in the resolution of problems related to galactic scale measurements, supernovae, and stellar evolution studies.

As Lundmark did not have access to the original historical materials, he relied on translations of East Asian historical texts by European scholars, such as Biot, Humboldt, and Williams' translation of Chinese records, and referred to the compilation of ancient astronomical records in Nahongi, which was translated by the British envoy to Korea, W. G. Aston, and sorted by E. B. Knobel. Due to the limitations of their access to the original texts and the significant differences between East and West's ancient and modern languages, and fewer of these translators had a background in astronomy, Lundmark inevitably made misjudgments and omissions when conducting his research based on these data. The research concludes that these errors had a less negative impact on Lundmark's astronomical research at that time. It was only when radio astronomy was introduced into the field of novae and supernovae research that the precision of the records needed to be improved to meet the requirements of relevant research, and the issues in his study were widely noticed.

After the 1950s, radio astronomy was applied to related research in the field of novae and supernovae, which prompted researchers to investigate the problems in Lundmark's study further and develop more accurate tables on historical novae. These researchers used similar methods to Lundmark's work, which indicates that Lundmark's work was methodologically groundbreaking.

Determination of the observational epochs for the major Chinese sky survey data

Sang-Hyeon AHN

We have positional data of sky surveys in the Chinese history of astronomical observations. Their positions were given in a sort of equatorial coordinate system. They have been analysed from the early period of the 20th century with methods such as chi-square minimisations and so-called Fourier method to obtain their observational epochs using the precession of equinoxes. There are a few ideas to estimate their errors such as bootstrap resamplings. However, since we have confronted a number of problems in this topic. In this presentation, we will present a precise mathematical formulation that explains previous methods, and then we apply the method to the major sky surveys.

P38: Digging the Earth: Mining and Geological Knowledge in East Asia from the Late Seventeenth Century to the Early Twentieth Century

Mining, Management, and Religion: Remarks on Adam Schall's Kunyu gezhi 坤輿格致 (De Re Metaltica)

Pingyi CHU

This paper is a brief note on Adam Schall's Kunyu gezhi 坤輿格致 (De Re Metaltica, Investigations of the Earth's Interior; 1640).

I will discuss some points that have been neglected by previous studies which focus mostly on the part of technology. This paper will first address the circulation of the manuscript. Its strange circulation among scholars may worth further investigations. Secondary, I would like to discuss the metaphysical foundation of mining technology, which is in tandem with the Jesuits' learning. It is also interesting to see how Schall ended this manuscripts by discussing the division of labors and financial management in mining industry, which he assumed to be the task of the state. Since mining was not only an economical or technological issue but also a moral problem in the late Ming, Schall did not forget to insert moral suasion in his treatises. By mixing the elements of technology, management, and religion, Kunyu gezhi marks a distinct feature and distances itself from contemporary texts such as Tiangong kaiwu 天工開物 (Exploitation of the works of Nature), Yanshan zaji 顏山雜記, and more modern text such as Shiya 石雅.

Transforming Mines into Ordered Spaces: Chŏng Yagyong's Statist Proposal for Mining Development in Early Nineteenth-century Korea

Jongtae LIM

This paper examines a statecraft reform proposal for mining industry presented by Chŏng Yagyong (丁若鏞, 1762-1836), a prominent Confucian scholar of late-eighteenth and early nineteenth-century Korea. I argue that Chŏng's proposal was an attempt to strike a balance between two conflicting goals of statecraft—increasing the state revenue through exploitation of mineral resources of the kingdom, while preserving the agrarian sociopolitical order that could be endangered by uncontrolled expansion of mining enterprises. Critical of the generally negative view of mining held by the kings and ruling elites of the period, who considered it only as a source of social disorder, Chŏng tried to show how developing and managing mines could be beneficial to Confucian state governance. Mining business, for example, could provide the government with sufficient revenue to implement the Well-Field (jingtian 井田) system, allegedly an ideal Confucian land allocation system of the Chinese antiquity. To develop mining industry into an essential tool for the agrarian state, Chŏng argued, mines had to be organized into ordered spaces, which were placed under strict control of the central government, thus excluding intrusion of private interests, whether it be from private entrepreneurs or local petty officials. To Chŏng, this required a set of new technologies. A new way of recruiting and organizing the labor forces had to be found, which placed workers under strict government surveillance. Also a method of managing mines in harmony with local agricultural enterprise would be necessary; to this end, Chŏng introduced the "Fire Sieving Method (hwado pŏp 火淘法)," an alluvial mining method to be implemented during the off-farming winter season.

An Analysis of the Formula of Filler Materials in the Ming-Qing Period

Hui-min LAI
Te-cheng SU

This paper compares the formulas of filler materials recorded in SongYingxing's (1587-1666) "Tiangong Kaiwu" and Zheng Fuguang's (-1780)"Jingjing Lingchi" to point out the changes in soldering technology in China from 17th to 18th centuries.

Song Yingxing once mentioned that soft soldering used the powder of tin-lead alloy, used copper-lead alloy powder for hard soldering (brazing)while using pure copper powder to braze silver utensils. The

difference among these formulas of filler materials lies in their melting points.

In the Qing Dynasty, silver-copper alloy had become a popular brazing filler material. The brazing technology at the Qing court used 60% silver and 40% copper. Zheng Fuguang, however, commented that reversed proportion of silver and copper would have created a better result. The latter formula generally has better fluidity and lower temperature, while the former can achieve better ductility at a lower cost. Also, Zheng's formula descriptions were far more complicated: adding auxiliaries such as flux, borax, diversifolius poplar resin, rosin, and salmiak. Those details were not mentioned in the "Tiangong Kaiwu." These ingredients have different kinds of functions, and some with pitfalls. This paper hypothetically suggests that the diversification of brazing technology could be attributed to the influence of European metallurgical technology and the need to make giant Buddha statues at the Qing court in the eighteenth century.

The Transmission of Victorian Geology in Late Qing China: A Case Study of Dili Quanzhi

Lijuan YANG

Geology, which became an independent discipline in Europe (particularly in Britain) in the nineteenth century, was introduced into China in the mid of 19th century through the translation movement. Dili Quanzhi (1853-1854), compiled by William Muirhead (1822-1900), a missionary of London Missionary Society, was the first book that introduced Victorian geology into China. Through detailed textual studies, the author points out that geological contents in Dili Quanshi were translated from Thomas Milner's The Atlas of Physical Geography (1850), Hugo Reid's Elements of Physical Geography (1850) and Mary Somerville's Physical Geography (1851), and analyzes the translation of geological terms in this book and its influence on later translated works on geology. By comparing the differences of the three editions of this work (1853, 1880 and 1883), the author attempts to explain the reasons why William Muirhead revised his work and the socio-cultural contexts of the transmission of geology in late Qing China.

Ferdinand von Richthofen's Geological Expeditions in Shansi China

Chih-wen KUO

Ferdinand von Richthofen conducted geological surveys of China's northern provinces in the period 1868-1872, with a discovery of the rich mineral deposits in Shansi. He used modern methods to map, plan, and cross-section these deposits, and studied the economic and transportation aspects of Shansi's coal mines. Richthofen's findings were published in his book China: Ergebnisse eigner Reisen und darauf gegründeter Studien (China: The results of my travels and the studies based thereon). In this book, he explained the structure of China's topography and gave top priority to economic issues closely related to geography. In this paper, I will examine Richthofen's geological analysis of Shansi and how he integrated this information with other fields to address the coal issues in the region. I will also investigate who else, in addition to Richthofen himself, was involved in translating and disseminating information about Shansi's mineral deposits to the central government and the public.

Japanese Geologists' Discourses on Mineral Resources in China from the Late Nineteenth Century to the Early Twentieth Century

Shigeo KATO

This paper explores Japanese geologists' discourses on mineral resources in China from the late nineteenth century to the early

twentieth century. Like Western geologists such as Ferdinand von Richthofen, several Japanese geologists travelled to China and published various academic and practical reports. The history of the geological explorations on coal mines in Manchuria by Japanese geologists and mining engineers was discussed in some previous studies. However, Japanese geologists' surveys on the other mineral resources such as iron, copper, tin, lead, zinc, antimony, manganese, and tungsten in China have not been well examined. In their surveys, strategic, economic, and academic objectives were intricately intertwined. This paper investigates both academic and practical aspects of Japanese geologists' surveys of those mineral resources in China. Particular emphasis is placed on the analysis of thought by OGAWA Takuji (小川琢治, 1870-1941), whose father was a Confucian scholar and he himself was conversant with Chinese classics and learned modern Western geology at the Imperial University, after that he conducted surveys of mineral resources in China several times. He studied geography in ancient China by critically reading the Book of Mountains and Seas and other sources, and published Studies on Chinese Historical Geography (支那歷史地理研究, 1928). Also, he developed a new geological theory for crustal tectonics in his book New Interpretation of Geological Phenomena (地質現象之新解釈, 1929). He proposed an academic theory on the Japanese archipelago's geological structure and also wrote political articles against the Chinese government at the time. This paper examines how these diverse discourses by Ogawa were reasonably connected in the context in which he was placed.

P7: Mapping South and Southeast Asia in Seventeenth and Eighteenth Century East Asia

Mapping the shape of Southeast Asia in Tokugawa Japan

Elke PAPELITZKY

When mapping Southeast Asia, a great number of Chinese mapmakers added several countries as little round islands somewhere south of the Chinese mainland. These Chinese maps then made it to Japan, where mapmakers incorporated parts of the information from the maps in their own material. However, they did not necessarily keep Southeast Asia in the form of little blobs. One such example is an untitled and undated manuscript map held by Kyoto University. It shows Ming China, the western half of Kyushu, as well as parts of mainland and island Southeast Asia. Toponyms and short descriptions for China match those on the 1555 Gujin xingsheng zhi tu 古今形勝之圖 (Map of advantageous terrains then and now) printed in Fujian. However, the Japanese mapmaker revised the coastline of southern China, adding information about harbours. Furthermore, instead of mapping countries in Southeast Asia as little round blobs as the 1555 map had done, the Japanese manuscript drew their shape and added information about the distance to Japan. This map is not unique. Other Japanese mapmakers took a similar approach to mapping Southeast Asia, showing the shape and relative location of the region. In this paper, I will discuss the Kyoto map as well as its related maps and what they tell us about the Japanese vision and imagination of Southeast Asia.

Drawing in the Subcontinent: The Mid-Eighteenth Century Qing Court Atlas

Mario CAMS

Between 1755 and 1758, after a struggle of decades, the Zunghar were finally conquered and annihilated by the Qing Empire. Former Zungharia and the desert towns to its south (the Altishar) now

became military protectorates, giving the Qing court in Beijing some control over the distant routes into Central Asia and the corridors that provided access to the Subcontinent. When the military campaigns were completed, the Qing court twice decided to send a team of mapmakers to survey its newly acquired territories (which would later become known as Xinjiang 新疆), on the basis of which it produced a large multi-sheet court map around the year 1760. However, this map included depictions of the Central Asian routes beyond Xinjiang, reaching down to Kandahar, Jalalabad, and Surat. Essentially, this large map constituted a second major revision of a pre-existing map dating back to 1718-21 that is known in the literature as the "Kangxi map" or "Jesuit atlas." This mapping of territories beyond those covered by actual surveys was not without precedent: an earlier update, dating back to 1728, included a depiction of the entire Russian Empire. In light of this material and epistemological context provided by a series of similar multi-sheet maps produced at the Qing court, this paper examines the production context of the 1760 update by zooming in on its depiction of the northernmost reaches of the subcontinent.

Detecting Early Impacts of European Expansion on East Asia through Maps of India

Hyunhee PARK

Once Europeans began to expand cross-cultural contacts to a global scale in the sixteenth century, world geographic knowledge began to accumulate in Europe. In turn, they transmitted new forms of understanding back to ancestor societies worldwide, especially to East Asia, whose strong mapping traditions originally informed them of Asian geography. Jesuits were key to communicating these new forms: first, through new mapping technology, and second, through information and techniques previously unfamiliar to East Asians. India provides a good example of this process. Early modern India, as (in Goa) the base of operations for the Jesuit's Asian enterprise, acted as a hub for geographical knowledge, a development observable in European works. However, political dynamics in the process of European expansion into Asia appear to have hindered new streams of European knowledge from entering China; consequently, Chinese could only rely on Jesuits like Matteo Ricci for limited access to new information, which they combined with traditional knowledge inherited from previous generations of Chinese scholars. Thus, new sources of information—signs of cross-cultural knowledge transfer—require careful comparative analysis to identify. This paper compares major geographic works on India produced in East Asia by Jesuit, Chinese, Korean, and Japanese authors by the seventeenth century in order to detect these subtle signs of early knowledge transmission. Through images of India, then, we can better understand the early impact of new forms of global knowledge on East Asian societies.

Syncretic Spatial Considerations in an Eighteenth-century Chinese Maritime Chart

Richard A. PEGG

A unique Chinese manuscript maritime chart from the MacLean Collection Map Library utilizes numerous wayfinding technologies that align terrestrial and celestial coordinates in order to conceptually locate a specific port within the western Pacific. The chart is in the form of a folded album leaf painted in ink and color on paper that can be dated to the late eighteenth century during the Qing dynasty.

This chart presents three different manners of orientation for the small-imagined ship in the center that the viewer is meant to interpret as its captain. The chart is pie-cut into twelve equal sections. Outside each colored section is a small dot with the character for each of the twelve directions of the Chinese compass, while the outer band presents the constellations associated with a particular direction, and just inside the outer band are toponyms, all with ports of East and Southeast Asia that are accessible from the South China Seas, along with a brief description.

The viewer/captain has a choice of twelve maritime directions as understood using three different conceptual frameworks, one directional/temporal, one celestial and one geo-spatial. If the viewer/captain has a clear sense of a circle around the ship they can orient themselves to generally "see" the course to a particular destination.

This essay will unpack the Chinese historical and scientific practices and discuss viewer engagement of Pacific maritime networks of the eighteenth century found using this unique manner of cartographic presentation.

Remapping Buddhist India in South East Asia in 17th and 18th Century Japan

D. Max MOERMAN

For Japanese Buddhists throughout the centuries, India represented an obscure object of religious desire, a land of origins from which they felt hopelessly removed. Buddhist India, known as Tenjiku in Japanese, was not the South Asian subcontinent of modern geography. Its borders more fluid and undefined, Tenjiku represented a faraway realm, a land beyond the known world of the Chinese cultural sphere and the site of sacred history. The earliest and most detailed Japanese representation of this realm is a fourteenth-century manuscript map, depicting the itinerary of the Chinese monk Xuanzang's seventh-century pilgrimage through Central and South Asia, which was transcribed and preserved in temples across Japan for the following five hundred years. However, with the arrival of Iberian traders and Jesuit missionaries in the late-sixteenth century and the expansion of Japanese maritime trade in the seventeenth century, this classical Sinitic image of Buddhist India was radically transformed and transposed to South East Asian landscapes. This presentation examines sixteenth-century Jesuit letters, a seventeenth-century Japanese map of Angkor Wat, and an eighteenth-century Japanese castaway narrative popularized in encyclopedic reference works, woodblock prints, and the kabuki stage to trace the shifting and capacious cartography of Buddhist India across South East Asia within the Japanese geographic imagination in the seventeenth and eighteenth centuries.

P67: The Historical Background in China and Southeast Asia of Resource Extraction and the Contemporary Environmental Crises of Deforestation and Biodiversity Loss

Loss of Indigenous Knowledge Equals Both Deforestation and Biodiversity Loss:The History of the Trade in Aloeswood and its Contemporary Consequences

C. Michele THOMPSON

Aloeswood is produced from trees of the genus Aquilaria. Aloeswood was a trade item, prized for its fragrance, carried as far as the Mediterranean by the time of the Roman Empire. Aloeswood was also an item of tribute demanded by Chinese rulers. The Chinese received aloeswood primarily

from Đại Việt and Champa and they acquired it from highland minority peoples in Vietnam. The aloeswood from Aquilaria trees is produced when they are infected by a type of mold and, in response, the tree sends sap/resin to the affected area imbuing it with scent. The chunks of infected wood can become quite large if the tree that is producing them is not cut down. Aloeswood was a sustainable item of trade for over a millennia while harvesting remaining in the hands of minority peoples who possessed the knowledge to determine if a tree was infected and the wisdom to leave it alone until the aloeswood had grown as large as possible. However, in recent times ethnic Vietnamese are moving into the highlands and cutting down any tree of the correct species hopeing that the tree contains aloeswood. This tree poaching is adding to deforestation and the loss of these trees is also leading to loss of life forms supported by Aquilaria. This paper will explore how the loss of indigenous knowledge regarding aloeswood is contributing to the environmental crises of deforestation and biodiversity loss in Vietnam and southern China.

The Contradictory Dynamics of Water Control in Late Imperial China

David A. BELLO

The extraction of resources during China's imperial period was the achievement of centuries of administrative organization by successive dynasties. The sustained efficacy of these extraction regimes was the basis of imperial expansion, culminating in China's last, and most extensive, dynasty, the Qing (1644-1912). This paper will examine some of the contradictory dynamics and outcomes of a fundamental practice of imperial resource extraction—agrarian exploitation of rivers—as a form of destabilizing cooperation between center and locality. Destabilization was particularly manifest in the unintended production of systemically destabilizing silt and flooding, which were inextricably linked to the intentional and artificially high concentration of water. These contradictory dynamics fully emerged during the Qing as a legacy of "successful" Ming (1368-1644) imposition of an environmental infrastructure for water control. The result was a complex system (that might also be termed a "hyperobject"), the full historical consequences of which could not be fully anticipated or controlled by either dynastic regime.

Carbon Politics, Nationalism and the Gazogene in Saigon

David BIGGS

In 1930s Indochina, especially in and around Saigon, imported petroleum became scarce and a once-plentiful, living carbon alternative, wood charcoal, became expensive. Contrary to global histories of the Anthropocene, coal and petroleum did not play major roles in urban-industrial growth in Southeast Asia until after 1945. Instead cities like Saigon, Manila, and Jakarta got by on mountains of charcoal, fueling steam-powered factories, trams, boats, stoves, kilns and foundries. During the Great Depression, facing severe shortages of petroleum, the Saigon government began explorations of a wood-gas-fired internal combustion engine known as a gazogene as an alternative. During World War II under Japanese occupation, the production of charcoal and the building of gazogenes became a top government priority; and this "politics of carbon" led colonial and nationalist actors alike to reconsider historic, ethnic-Chinese dimensions of this once-invisible "carbon trade" in a new context of ethno-national and energy independence.

Changjiang boats and deforestation: A long-durational exploration on the loss of

forests, boatbuilding technologies and indirect government pressure

Nanny KIM

Boats on the Changjiang river system operated the main transport artery of premodern China. At the same time, the lowland regions along the middle and lower river were long deforested, while deforestation advanced along the Upper Changjiang through the late imperial period. This paper draws on depictions of freight boats in art and modern scale drawings in conjunction with the historical geography of land use and environmental change for an assessment of interrelations between boatbuilding technologies and deforestation from the 10th to the early 20th century. The imperial center appears to play no role in this process, as the state was not directly involved in shipping. It operated the courier and patrol boats for transportation of officials policing purposes, as well a fleet of grain boats on the Grand Canal, but the number of boats is trifling compared to those of individual skippers and shipping companies. Moreover, technological transformations in boatbuilding took place in private wharves, whereas state wharves selectively followed developments by adopting and defining established boat types. At the same time, however, state promotion of agricultural expansion, requisitioning of private boats for state transports, and timber procurement for imperial buildings directly and indirectly affected shipping. Against this backdrop, the paper explores the trend to boat types that minimised timber as well as metal parts, and of organizational patterns that combined high flexibility with high risk for the men who worked the boats.

What's so Traditional About Animal-Based Medicines ? : Faunal Medicalization as an Asian and Global Industry

Gregory CLANCY

This paper will introduce an ongoing research project intended to historicize the use of animals in Asian "traditional" medicines (TM). TM communities have long approached faunal medicalization as a problem of sustainable supply, while the wildlife conservation community sees it as a problem of species extinction. With the pandemic, the link between the animal trade and zoonotic disease has expanded this arena of concern to include public health. Despite all this attention, an historical and evidentiary-based picture of the regional use and trade of medicinal animals has been lacking. The marketing, trading, and regulation of medicinal animals in Asia is predicated on consumer assumption that their use is "traditional". This is true in many instances, as animals are well-documented in Asian medical canons, but in others it is not true, partially true, or questionable. We're working to bring greater clarity to the issue by creating a "TM Faunal Resources Database", which will provide a more geographically and historically compressive picture of how "medicinal animals" have risen and been transformed as consumable products since 1950, why, and by whom. In doing so, we're addressing questions about the changing shape, patterns, and drivers of faunal medicalization and zootherapies, to the benefit of scholars studying TM, the TM community itself (practitioners and consumers), conservation biologists, and policy-makers and regulators tasked with transitioning TM into a "green" (i.e. sustainable and ethical) future.

II. 11:00 – 12:40

P16: Crisis and the entanglement of science, domestic politics, and transnational relations in East Asia, 1950s-70s

"What crisis was at stake? Sterilization and social order in Japan after World War II"

Aya HOMEI

'It was no longer post-war (mohaya sengo dewa nai)', the opening sentence of the Japanese government's Economic White Paper in 1956, is remembered to have marked the end of the post-war socioeconomic crisis in popular historical accounts in Japan. Yet, as this presentation shows, the discourse of crisis continued to shape domains of medicine and public health that were linked to population management and determined the reproductive future of many men and women who were sterilized involuntarily throughout the post-war period.

In this presentation, I will examine the hitherto unexplored archives that recorded the implementation process of the Eugenic Protection Law (EPL) and explore discourses of crises that exhorted the government to promote involuntary sterilization under the auspices of the law. EPL was established in 1948 in response to the discourse of racial crisis emerged from the rubbles of the war. With the aim to improve the biological quality of the Japanese population, it authorized 'eugenic surgery' (yūsei shujutsu) to the people who were deemed to have 'inferior' biological traits. Between 1949 and 1996 when the law was in place, approximately 22,486 'eugenic surgeries' were conducted. I will study applications for 'eugenic surgeries' made by doctors, families, or guardians between the 1950s-70s when the number of 'eugenic surgeries' peaked, and analyse rationales made in favour of the surgeries. I will show how the applicants were motivated by fear for various types of crises they saw. In the case of a family member who made the applications on behalf of the individual who would be subject to 'eugenic surgeries', it was a personal or family crisis that they saw the individual or his/her families might have had without a 'eugenic surgery'; in this case, the family member was motivated by the desire to protect the individual or family welfare. In the case of some doctors, it was the crisis in the social order that the reproduction of 'fertile' individuals could have inflicted on the medical institutions they served. In the eyes of the government authorities, it was the socioeconomic crisis that these individuals as a collective might bring to the future prosperity of Japan. By depicting this variegated articulation of crises, I will show how actors saw the legally sanctioned medical sterilization as a technological quick fix to the problems that otherwise would have required a fundamental reorganization of socioeconomic structures for solution.

Nutritional Science in China during and after the Great Leap Forward

Yi-Tang LIN

Focusing on the development of nutritional science in China during and after the Great Leap Forward (GLF), this paper seeks to grasp what roles scientists played during the crisis and how the crisis left traces on scientific research locally and internationally. If the food substitutes praised by the Chinese Communist Party during the GLF is an oft-mentioned episode in the history of China, it has not been systematically analyzed from the perspective of the history of science. The beginning of the GLF interrupted the publication of Acta Nutrimenta Sinica, a key scientific journal on nutrition. With few exceptions, contemporary nutritional

scientists restarted academic publications only in 1963. Based on the documental traces they left behind, nutritional scientists were mobilized by the government to provide insights and resolutions to the food production shortage directly. Although they remained silent on scientific publications, their work could be found in The Summary Information of the 1959 National Nutrition Survey, in which each detailed nutrient intake based on surveys in schools, factories, and villages across different provinces. They treaded carefully to describe the lacking of nutrient intake. While the government publicly lauded layman's know-how in food production, Chinese scientists closely followed the latest Western scientific findings. The Summary Information cited and used Western research as reference points for the Chinese situation. Tellingly, one rare nutritional scientific publication between 1958-1960 was Chen Rendun's 1960 translation of H. E. Robinson's article in the JAMA the same year. The food shortage crisis also made a lasting mark on Chinese scientific research. The research on substitute food such as chlorella, previously dominating US public imaginaries in solving the looming world food crisis and was gradually abandoned in the late 1950s for a range of technical difficulties, became the center of attention of Chinese scientists from 1958 because of the food provision crisis. Tellingly, in 1963, one of the very first nutritional scientific articles post-GLF was signed by a group of researchers at the Academy of Military Medical Sciences on the effectiveness of chlorella, detailing their experiments of producing and feeding it to experiment participants and lab rats. The global impact arrived fifteen years later when some researchers of this group acted as consultants for the United Nations' food programs.

Bird Banding for What? Military Entomology, Ornithology, and the Rise of Nature Conservation in Cold War Asia

Jaehwan HYUN

The Migratory Animal Pathological Project (MAPS, 1963-1973) was a long-term trans-Asian bird-banding project that the US military scientists initiated and that ornithologists and entomologists from "free-world" Asian countries, like Japan, South Korea, and Taiwan, took part in. This paper examines how MAPS was devised and developed together with concerns about two crises in the 1950s-60s: the US military health crisis on the Asian front and the environmental crisis in Asia. It originated from the US military scientists' epidemic research on the role of migratory birds in spreading Japanese encephalitis in Asia. This military entomology focus came to be expanded when Japanese ornithologists, like Nagahisa Kuroda (1916-2009) at Yamashina Ornithology Institute, became involved with the early planning of MAPS. While helping in recruiting Asian participants and fieldworkers via their networks of the International Council for Bird Preservation (ICBP), the Japanese ornithologists connected their bird conservation interests to the military entomology-centered project. Focusing on the academic and public careers of local fieldwork leaders in Japan, South Korea, and Taiwan and the transnational networks they formed with US military entomologists as well as US conservationists, this paper will illuminate two points: first, MAPS contributed to raising conservation-minded ornithologists in Taiwan and South Korea and to supporting Japanese ornithologists' conservation campaigns; second, ornithologists in the three Asian countries often hid the military entomology aspects of MAPS while emphasizing its contribution to the rise of environmental awareness in Asia, specifically related to endangered

birds. Throughout this study, this paper will shed new light on the complicated relationship between the military, science, and environmentalism in Cold War Asia.

IP7: Assessing Body and genes in modern East Asia

Thrust of New Concepts and Crisis of the Old: Understanding the Human Body and Health in Early 20th-Century China

Liping BU

Modern sciences of biology, physiology and bacteriology revolutionized the understanding of human body and redefined the approaches to disease and health. With the establishment of germ theory to pinpoint the causation of disease in the late 19th century, bioscience caused a fundamental shift in medical thinking and health. William T. Sedgwick, the American champion of public health, claimed that before 1880 we knew nothing and after 1890, we knew it all. Doctors, scientists and social reformers in Western societies, armed with the knowledge of medical science and germ theory, began to emphasize a new understanding of human body and hygiene to prevent disease and improve health as an integral part of the advancement of society. Such thrust of scientific knowledge and social progress extended from the West to China at the turn of the 20th century with an influx of new concepts and theories that led to radical transformation of medical thinking and social reforms of public health. The enthusiasm for new scientific knowledge to tackle diseases and improve the society posed serious challenges to traditional concepts of disease and medical knowledge in China. Moreover, new medical concepts of health gave rise to new ideas of social reforms beyond the medical and health realms. This paper draws on archival and visual materials to discuss Chinese learning and interpretation of the new concepts of medical science and public health, particularly those regarding the human body, medicine and health. In the larger political and cultural context of Chinese modernization and social changes, the transformation of medical and biological thinking developed in parallel to new ideas of social reforms and revolutions. My study shows that the circulation of medical knowledge is not a simple process of transmission, but a complex social and cultural appropriation and integration that was influenced by local socio-political concerns as well as medical rethinking. It illuminates the broader relations of medical science and social transformation.

One Drop of Indigenous Blood: the Rediscovery of Taiwanese Ancestry and Genealogical science

Yu-Yueh Tsai

The development of genetic genealogy in the twenty-first century has important implications for national and racial construction. In Taiwan, it was shaped by the intimate relationship between the development of biomedicine and new identity politics has involved not only racial/ethnic issues but also national identity. After the rule by martial law ended (1945-1987), scientific research on the origin and the genetic make-up of Taiwanese began to emerge. Professor Marie Lin, M.D., widely known as “the mother of the research of Taiwanese blood,” has devoted herself to unveiling the mystery of the origins of the ethnic groups in Taiwan. Based on her research findings, Lin argues that 1) 85 percent of Taiwanese have indigenous genes; 2) the Han Taiwanese people (Hoklo and Hakka ethnic groups) are mainly the descendants of the Yue people from southern China; 3) a major part of blood attributes of the Han Taiwanese people is derived from plain indigenous people and 4)

the indigenous peoples in Taiwan have multiple origins. These arguments pose a radical challenge to the dominant Chinese nationalist ideology of the period of the authoritarian rule, which is still lingering now. By taking Sheila Jasanoff's concept of co-production between science and politics, this article pushes the concept further by exploring the inward invasion of social factors into scientific production of Taiwanese genealogy and the outward spillover of scientific findings to Taiwan's society. This article aims to show how genealogical science regarding multi-origins, hybridity and the percentage of indigenous blood in Taiwanese and Taiwanese national identity "co-produce" each other. It also intends to evoke epistemological and methodological problems inherent in genealogical evidence.

A historical study on the measurement of physiological standards in the Late Qing Dynasty and the Republic of China

Ziyue ZHANG

This study focuses on the measurement of physiological standards in China during Qing Dynasty and the Republic of China.

From the primitive society to the Qing dynasties, traditional Chinese medicine gradually improved and formed a unique system, which has always been in a dominant position. After the Opium War, with the introduction of western medicine, new ways of gazing the body and treating diseases appeared. The western medicine had a huge conflict with traditional medicine. What kind of medicine should be adopted in China and how should Chinese people treat their bodies is not only a medical issue, but also a social issue.

In traditional Chinese medicine, the contact with the body is limited to observation, auscultationand olfaction, inquiry, and pulse diagnosis. And there is no way for measuring the body. While western medicine is good at exploring the body with various tools and techniques. From the second half of the 19th century to the early 20th century, technologies such as anthropometry and measurement of physiological standards developed rapidly around the world, but in China, people generally rejected Western medical technology. Against this background, the measurement of physiological standards was carried out in full swing. Organizations such as missionaries, the Chinese Physiological Society, and the The American Bureau for Medical Aid to China successively carried out research on the height, weight, chest circumference, blood pressure, and pulse of Chinese people. How this technology and thought, which is different from traditional medicine, came to China, and why it was promoted, and finally accepted by the Chinese people has been rarely explored. This study mainly uses historical archives, research papers, newspapers and other materials to clarify this issue. The study found that the development of measurement in the late Qing Dynasty and the Republic of China was a process in which foreign technical concepts were rooted in China. This was not a one-way input, but a two-way interaction. It is not a simple rejection or acceptance, but a struggle with traditional Chinese medicine. The measurement of physiological standards in China is not only based on the needs of missionaries who come to China to learn about the race, nor is it limited to the Chinese people's desire to understand bodies and strengthen the country, but also comes from the establishment of medical standards, national physical fitness assessment. The demand for social environment investigation is the interaction and synthesis of multiple factors.

IP43: Science between philosophy, propaganda and politics

The Making of Shenjing Shuairuo in Chinese Medicine: the Emergence of an Actor-category in Republican China

Windson J. LIN

By the 1930s, Shenjing Shuairuo had became a prevalent diagnostic term in urban China. The diagnosis was derived from the American neurological condition “neurasthenia” and eventually came to cover a wide range of symptoms including mood disorders, somatoform symptoms, digestive problems and venereal diseases.

The proposed paper intends to contextualize the indigenization of neurasthenia within the modernization of Chinese Medicine, as indigenous practitioners responded to the existential crisis posed by the alliance between Western medicine and the newly founded nation-state. This paper investigates the definition, classification, symptomatology, treatment and prevention of Shenjing Shuairuo by presenting sources from the publications of diagnostic manuals, newspapers and advertisements. Arguably, Shenjing Shuairuo created a space for practitioners of Chinese Medicine to develop theories and treatments based on their healing practices when they adopted a diagnosis that embodies the aesthetics of biomedicine and modern urban lifestyle. By converting the “disease (bing)” into “symptoms of illness (zheng)”, Chinese doctors managed to map the widely accepted diagnosis into their more conventional medical practices, such as well-documented herbalist prescriptions and practice of nourishing life (yangsheng).

From the perspective of Actor-Network Theory, the proposed study regards the agency of Shenjing Shuairuo as its capacity to pattern relations within the local network of human and non-human actors. As Chinese practitioners responded to the crisis of modernity, Shenjing Shuairuo found its niche between the two distinctive ontologies of medicine: the nervous system based on the Western anatomy and the meridian system based on the Chinese concept of vital energy "qi". The paper investigates the hybridization of Shenjing Shuairuo between nervous exhaustion and Chinese therapeutic practices, as it negotiated the legitimacy of Chinese medicine between the pharmaceutical industry, China’s modern nation-state and the rise of Nationalism in the May-Fourth discourse.

Between Science, Propaganda, and Politics: a Study on the Wang Manxin Affair (1981-1990)

Shuo ZHANG
Weimin XIONG

Based on various materials, including archives, interviews, letters, news, and reportages, this study reviews a significant scientific controversy in China, the Wang Manxin Affair. In the early 1980s, a temporary worker, Wang Manxin (王曼新), with only elementary school education, announced his invention, namely Artificially Transplanting Nitrogen-Fixing Root Nodules of Non-Legumes (人工诱发非豆科植物固氮根瘤, Artificial Nodules). This technique was reported to be capable of forming symbiotic relationships between a kind of rhizobium and 60 to 120 different non-legume plants rather than a certain species of legume, and of transplanting nitrogen-fixing root nodules to the non-legumes. Thus, it was initially treated as a major scientific advance by Chinese Journal of Nature (《自然杂志》). Despite strong criticism from mainstream scientists, Wang Manxin garnered a number of supporters, including a media circus, government

officials, and the great scientist Qian Xuesen (钱学森), along with the alternative scientific community（类科学共同体）. Moreover, the technique made a headline in People's Daily. Later, it was promoted to more than a dozen provinces and cities across China, with financial support from China's Government Administrative Council of about two million yuan. As a result, the decade-long scientific controversy has been dubbed a remarkable public case in the history of science in the People's Republic of China.

How did a science fan（民间科学爱好者）reach Premier Zhao Ziyang's ears? The study reveals important groups involved in the scientific affair. These are Wang himself, his ghostwriter, the alternative scientific community, government agencies with their officials, and the conventional media. The analysis is done of their intentions, deeds, and interactions. Facing powerful dissenters, the worries, behaviors, and dilemmas of the scientific community, who took the opposite side from beginning to end, are illustrated as well. In the early days of reform and opening up, although scientists' status improved significantly, their channels of dialogue with government leaders were still lacking. Nonetheless, these channels could not be more crucial as they move toward autonomy and rights.

Psychology as a Bridge between Philosophy and Science: using the Example of Hans Driesch´s Lectures on Problems of Modern Psychology (1923)

Shan DIAO

In the spring of 1923, the German biologist and philosopher Hans Driesch (1867-1941) gave seven lectures on the problems of modern psychology at Peking University, mainly introducing "new" psychology such as the psychology of thinking, psychical research, and psychoanalysis. Driesch criticized behaviorism for focusing on the physical level and neglecting the spiritual level, and for its one-sided experimental method of observation, which should be combined with an introspective approach. At the same time, unlike behaviorists who blindly scientize psychology and dephilosophize it, he believed that psychology is a bridge between the two. One must not only protect the philosophical tradition of psychology but also actively investigate phenomena that cannot be explained by existing science, so one can achieve progress in knowledge. From a holistic perspective, in his theory, the dichotomy between science and philosophy would be broken, the so-called "superstition" would be redefined, and research in various fields would form an organic relationship in a complementary dialogue. However, his insights were not accepted by everyone. Many people considered his theory not as psychology, but as "metaphysics" or "superstition". Taking into account the parallel controversy between science and metaphysics, this paper argues that this series of lectures provides a new clue to the outbreak of the debate. The intellectuals' evaluation of the various schools of psychology actually reflected the belief and doubts about science in that era. It was out of different understandings of science that Driesch´s psychology was interpreted differently.

IP36: Printing and Visibility

Comparison of the Technology and Dissemination of Early movable Type Printing in China and Germany

Tiande YANG

Johannes Gutenberg (1400-1468) and Bi Sheng (972-1051) are known as the inventors of movable type technology in

ancient Germany and China respectively, but their inventions had completely different consequences and implications - why did Bi's invention remain obscure while Gutenberg's movable type spread around the world, and how did the technological level and social factors of their time behind their respective inventions select and eliminate them.

This article will address these questions by comprehensively analyzing Johannes Gutenberg's and Bi Sheng's movable type technology in relation to the social and technological factors of the time. This article will also compare the two types of movable type technology's links to techniques at the time, including metal smelting techniques, wood and metal engraving and plate making, ceramic processing and the composition of printing materials. This article will also analysis from social and economic perspectives, such as financial support from Johannes Fust, and important promotion and facilitation from Peter Schoefer, etc. to explain why Bi's printing technology was bound to disappear without being accepted by book Industry , while Gutenberg's movable type printing technology could be a great success.

The paper will also introduce several newly discovered early Chinese movable metal characters in recent years, including the 'Song-Yuan movable metal characters' sold to Japan by a Qing scholar Luo Zhenyu, and the movable metal seals of the Yuan dynasty in 'Phags-Pa Script, as well as the presence of a movable character groove on a copper plate used to print banknotes in the Zheng-You third year of the Jin dynasty (1215), etc. The work is based on a personal analysis of the results of recent academic research and the historical factors of science and technology, and ultimately proposes a new view of the origin of early East Asian movable metal printing technology as a combination of metal stamps from the same period, providing new ideas for the study of early movable type printing.

Under the Microscope: Visible Minerals in Mineralogy and Popular Science in Modern China

Xi MA

The revolutionary roles of the microscope in understanding properties and nature of materials in Europe have been recognized, but symmetrical analyses of the introduction and use of microscopes in non-Western contexts remain few. This paper explores the relationship between microscopes and the production and circulation of mineralogical knowledge in late Qing and Republican China. When introduced into China in the late nineteenth century, mineralogy was presented in the form of translation, independent of the microscope, the scientific instrument crucial for its development in Europe. These translated works however had to incorporate the knowledge acquired through lenses in laboratories and illustrate it with texts and images. The use of microscopes in mineralogy proved its significance by the last years of the Qing, when new generations of mineralogists returned from overseas and initiated anew education and research of mineralogy in laboratories, research institutes, and universities. Microscopes were hence integrated into systematic studies of minerals as the essential equipment for identifying and classifying them. They produced outcomes appearing in textbooks, treatises, reports and popular publications, and gained a close connection with mineralogical knowledge. Through the connection, microscopes generated a new mode of visibility of minerals, expressed in textual descriptions and pictorial illustrations, which served to secure the

accuracy and science in mineralogical knowledge; yet at the same time, the visibility of minerals was proliferated in various forms along with the development of printing technology, and further reinforced the modern conceptualization of mineral in both the scientific community and the broader public.

The choice and activation of metal type printing in early Joseon: Focusing on metal type printing records and characterization of metal type printed books

Hwaseon KIM

This study aims to examine the factors that led to the choice and activation of metal type printing technology in the early Joseon Dynasty. To do so, we will analyze the articles in the『the Annals of the Joseon Dynasty, 朝鮮王朝實錄』 and the metal type printed books in the early Joseon Dynasty. Although China was the first to introduce the concept of type printing, it is undeniable that Joseon chose and activated metal type printing despite the limitations of its writing system(漢字).

It is difficult to determine with certainty when exactly type printing began in Korea, but it is generally believed that metal type printing has been practiced since the early 13th century.

Aside from the level of Goryeo type printing technology, it is enough to show that type printing was practiced not only in the center but also in the provinces.

During the early Joseon Dynasty, metal type printing was at its peak in the history of Korean printing technology. On the other hand, there is no record of why Joseon chose metal type printing. As a result, researchers on printing technology have proposed the following reasons for the choice of metal type printing technology.

1. Metal type printing is a suitable method for printing a wide variety of books in small quantities compared to woodblock printing.

2. Metal type printing can produce books quickly. These are the reasons for the choice of metal type in Joseon under the circumstances faced in the early years of the Joseon Dynasty. The experience of printing metal type in the Goryeo period was meaningful to the rulers of the early Joseon Dynasty, and this experience continued into the Joseon Dynasty. Therefore, this presentation aims to examine how this experience could be sustained. To do so, I will analyze early Joseon metal type printing records and printed books, and use the results to show why Joseon chose metal type and how it was used.

The results will show that in the early Joseon Dynasty, the volume and nature of books did not play an important role in the choice of technology. It will also reveal that the rulers of Joseon considered metal type to be a technology that could print anything they needed.

IP19: Botany and sericulture in China

A Preliminary Study on the History of Plant Expedition in Ho-lan Mountains ——1871 to 1940

Wurchaih
Khasbagan

In the 19th century, western countries carried out extensive vegetation survey and plant collection around the world, that is laying the foundation for modern botany in China through the expedition of the region. The expedition area includes Ho-lan Mountains, the hub connecting the flora of the Qinghai-Tibet Plateau and the Mongolian Plateau. Its special geographical location and geographical environment shape its unique plant population. Research

its plant expedition history has important reference value to provide basic and necessary literature for the study of botanical expedition history and compilation of flora. The research on the flora of Ho-lan Mountains, its botanical development process, comparison of ancient and modern plant lineages, and making scientific and reasonable suggestions for climate and vegetation change, plant resource protection, and sustainable utilization of resources cannot be separated from tracing the history and development context of plant expedition in Ho-lan Mountains. This paper, based on the collection, literature review and textual research of the expedition records, achievement reports and relevant studies, aims to make a preliminary study of the history of plant expedition in Ho-lan Mountains began from 1871 to 1940. The article combed the relevant information about the time, days of investigation, route, specimen storage location, taxonomists who identify specimens and achievements of the scientific exploration activities at that time. The plant expedition of Ho-lan Mountains lasted for 70 years, investigation for 12 times. The scientific explorers were come from Russia, Germany, America and China. These scientists have different status and positions, including Explorer, Tourist, Archaeologist, Sinologist, Historians of Science, Zoologists and Botanists, Foresters and Forestry Administration. The natural science examination results of Ho-lan Mountains at that time were relatively rich, and its natural environment, vegetation characteristics and flora division are recorded in detail; Many new species of plants have also been found, with a total of 42 species according to existing statistics.

Today, a century later, the author is committed to describing the history of the expedition of Ho-lan Mountains, laying the groundwork for answer questions related to the exchange and mutual reference during the expedition process, that is, the world's understanding of Ho-lan Mountains vegetation and the application of its achievements, to present the vegetation distribution and plant diversity composition at that time. And also try to explore and appraise the important influence and value of the plentiful and substantial harvest of the Ho-lan Mountains plant scientific expedition on the development of China's flora and even the world's flora research.

On the Techniques of Mulberry Planting and Silkworm Growing in South China

Luling WEI

Abstract: South China has longer frost-free time all year round, which gives mulberry trees and silkworms longer time for growing. Forefathers in South China created the techniques of mulberry tree planting and silkworm growing, different from those of the valleys of the Changjing River and the Huanghe River. The techniques, such as dealing with silkworm eggs, protecting against Parasitic flies and against silkworm diseases, are local for South China and fit for the climate here. This thesis is about the traditional techniques of mulberry tree planting and silkworm growing in South China, based on the ancient documents of mulberry trees and silkworms.

On the Knowledge,Usage and Distribution of Fish Line Silkworm In History

Genjin NI

Fish-line silkworms (Eriogyna pyretorum Westwood) were local in South China, different from silkworms (Bombyx mori Linnaeus) and TUSSAH silkworm (Antheraea pernyi Guerin - Meneville). They feed on camphor trees, three-leaf maples,etc..The records about fish line silkworms were as early as in the Tang

Dynasty but clear references can be found in books such as "Guangdong New Record" (《广东新语》)and "South Yue Diary" (《南越笔记》) in the Qing Dynasty. These references show that the people then primarily knew the life, usage and distribution of fish.line silkworms.The people in South China used fish-line silkworms in order to produce fish lines from early on. Later, during the time of the Republic of China, people of Japan and Britain bought the fish.lines and made them into surgical sutures or weave them into parachutes. From local gatzeteers of the Qing Dynasty and of the Republic of China as well as from investigation reports of the Republic of China it becomes clear that there were many fish-line silkworms living in the mountainous areas in Guangdong, Guangxi, Hainan, Jiangxi and Hunan, where camphor trees and three-leaf maples grew.In the late 20th century, fish-line silkworms declined and disappeared from the records. As for the cause of the decline of fish line silkworms, the decline of camphor trees and three-leaf maples is one reason, and the other reason is the change of the market---- the need declined. The nylon fishing line replaced the fishing lines made from silkworms.

IP28: Agriculture and plants

The Development of Tea industry in the Southwest China during the War of Resistance against Japanese Aggression

Huichuan FAN

Since 1938, due to the fall of the East China region, the Nationalist government urgently needed to increase tea production to meet the needs of the barter trade. The Ministry of Economic Affairs ordered its subordinate Chinese tea Company to lead the development of tea industry in the five southwestern provinces. China Tea Company has carried out systematic research on Sichuan, Xikang, Guizhou, Yunnan and Guangxi, and promoted the development of tea industry in Southwest China from the aspects of setting up tea factories, tea research-center and tea banks. This tea industry development was an important events, because most tea experts are involved and they did a lot of work such as using New Machine tea making technology, built tea science research institutions. And most important, China's first university department of tea science was established during this time because the China Tea Company need more professionals to support their development matters. The Development of Tea industry in the Southwest China not only accelerated local tea industry, but also promoted the modernization of China's tea science and New Machine tea making technology.

Qijia Xixue and the Introduction of Western Agricultural Knowledge in the Late Ming Dynasty

Yuanming SONG

At the end of the Ming Dynasty, missionaries came to China to bring a large amount of new knowledge of Western science and technology. The book Qijia Xixue co-authored by the Italian Jesuit Alfonso Vagnone and Chinese scholars in Jiangzhou, Shanxi Province contains a large number of agricultural knowledge is one of the earliest Western agricultural texts introduced to China. The book mainly includes agricultural management concepts, farming, sowing, grain storage, water conservancy, animal husbandry, and other content. Although the book is called Xixue, it contains not only Western agricultural knowledge, but also a lot of traditional Chinese agricultural knowledge. According to the author's own understanding, the knowledge of Chinese and Western agronomy has been integrated and arranged.

The book cleverly explains Western knowledge using traditional Chinese theories. For example, the book mentions the method of arranging tree planting time based on the moon's ups and downs, which originated from the West, but is explained by the theory of yin（阴） and yang（阳） in the book. The analysis of the agronomy part of the book will help us deepen our understanding of the agricultural management and production in China in the late Ming Dynasty, especially in Shanxi, and also provide us with unique materials for understanding Western agronomy at that time and making a comparison between Chinese and Western agronomy.

Exploring the Rice Cultivars in Large-scale Chinese Local Gazetteers: A Computational Approach

Anhao LIU
Hui LI
Chinese local gazetteers have long been widely used by scholars to investigate the local products, culture, economy, and much more. By extracting the plant information embedded in local gazetteers, researchers can uncover more evidences about the history, origin, and evolutionary process of plants. Confronted with large-scale digitized resources nowadays, researchers can explore historical texts in a novel way. In this paper, we propose a computational approach in order to perform large-scale quantitative analysis of plant knowledge embedded in Chinese local gazetteers. We select the typical rice cultivars by their occurrences in the records, investigate their common features, make a differentiation between "group" names and "individual" names, set up metadata standards of rice records on the basis of modern data standards, and interpret the choices of our ancestors on rice cultivars from a historical point of view. We conduct a case study on a dataset of records of rice cultivars over 8 centuries in Jiangsu Province, China. We find that although planting early-season rice in Jiangsu province was the common practice, the local rice farmers also cared about the color, quality and uses of cultivars than its sowing time. In addition, not all the rice varieties mentioned frequently in records are local plants. Plants imported from other provinces or countries were also highly recorded because of their good quality and special characteristics. Our study shows, people in pre-modern China cared more about the usages of the whole-plant of rice and they are more interested in certain traits and attributes of rice rather than the place of origin. Our study offers a practical guide and reference to history study as well as useful clues for modern agriculture.

III. 14:10 – 15:50

P4: Cross-cultural astral texts and images in Central and East Asia

Representations of Lunar Mansions in East Asia: Their Introduction and Evolution

Jeffrey T KOTYK
The Chinese originally had a model of twenty-eight lunar mansions or stations (xiu 宿), but these were only depicted as asterisms in uranographical forms. Buddhism, however, introduced the concept of twenty-eight deified nakṣatras (lunar mansions), which were technically different from the Chinese model but were treated as functionally equivalent. The early appearance of the nakṣatras is seen in the Garbhadhātu-maṇḍala, which was transmitted around the year 724 into China, but is only preserved in an adapted form in Japan, but therein we see the nakṣatras as

masculine bodhisattva-like figures. We have other examples, however, in which the nakṣatras explicitly represent Vedic deities. In other instances, we see heavily Sinicized forms that also incorporate zodiacal elements. This study will begin to examine the complex history and features of these icons from the eighth to sixteenth centuries with reference to Chinese and Japanese examples.

The spectrum of East Asian astral imagery in the VoH database

Rana BRENTJES

In my talk, I will present the goals and structure of the VoH database and discuss the opportunities that it offers for research on the dissemination, changes, and contexts of Visual astral knowledge across Eurasia. My special focus will be on selected examples from our East Asian material, which includes funerary objects, tomb decorations, objects of worship, and scholarly illustrations. I will present how this material can be analyzed and displayed with a number of different DH tools. Moreover, via a specific case study, images of the "Western" zodiac, I will demonstrate how the systematic collection of a broad array of objects with astral imagery can help to interpret pictorial changes and determine their intellectual and cultural contexts.

Astral and Other Sciences in the medieval Uyghur Kingdom of Qocho (Turfan)

Adrian C. PIRTEA

Together with the large corpora of Buddhist, Manichaean and Christian religious texts discovered in the early 1900s in the Turfan area, several manuscript fragments in multiple languages also attest to a lively interest in the astral sciences, particularly in celestial omens. This paper will first give a brief overview of the various types of texts with technical or scientific contents (astrology, medicine, pharmacology, logic) extant from the larger region (including Turfan, Dunhuang and other sites). This survey will then allow for an in-depth study of a few, partially illustrated fragments in Sogdian, Syriac, and other languages, which depict and/or interpret celestial phenomena (e.g., eclipses). The aim of the paper is thus to determine the sources and the function of omen literature within the political, religious and cultural context of the Uyghur Kingdom ruling in Qocho/Turfan from the mid-ninth century CE, but also explore broader questions about the transfer of astral iconography and astrological knowledge between Central and East Asia.

IP37: The Localisation of Modern Medicine

Making up Modernity：Lead-free Cosmetics and the Construct of Ideal Beauty in China, 1910-1937

Qinghua WEI

The early twentieth century has witnessed an increasing concern about the toxicity of lead globally. Imported cosmetics, like Hazeline Snow, boasting of being lead-free, conveyed a modern standard of beauty and hygiene. However, this modernity implied Chinese being deficient both physically and mentally. To compete with foreign companies, the national bourgeois elites then set up factories to manufacture lead-free cosmetics. But they did not challenge the underlying power of hygienic modernity. Instead, they assimilated this epistemological violence and shifted it to women. While making themselves up as incarnations of scientific truth, Chinese elites could hardly avoid appealing to Qi and Xue to rephrase the toxicity of lead to

domestic audience. It turned out that on lead poisoning none of TCM and scientific medicine stayed static and they shared many similarities during the period. By combining modern toxicology with TCM terms, cosmetic companies constructed an image of beauty, ideal for both east and west. Meanwhile, due to the conspicuous correlation between women's Qi, Xue and reproduction, even making up was coded into the grand narrative of saving the seed and nation.

Localization of Dentistry in Modern China --- Taking The journal of dental medicine as the center

Weijiang ZHANG

Under the dual effects of colonialism and religious forces, western medicine gradually entered China. And further with the medical practice of missionaries, dentistry started to spring up in China. In 1908, Dr. A. W. Lindsay, as the first dental missionary in China, started his dental work in western China. Take this as a sign, modern dentistry was first introduced to China.

During the process of western medical development, medical journal, has highlighted its unique social role as an academic position of medical knowledge and medical technology communication.

The journal of dental medicine---a professional journal of dentistry founded by the China dental medicine association, has great influence on modern dentistry, and vividly illustrates the development process of modern dentistry. Its establishment, has played an indispensable role in the construction of modern dentistry knowledge and the promotion of modern oral public health.

The China dental medicine association has organized various dental health education activities to arouse the public's attention to oral health. In April 1948, the China dental medicine association cooperated with Guangzhou Education Bureau, popularized basic oral knowledge to more than 90,000 primary school students in the city, which was the first time in China.

Under the advocacy of local dentists, modern dentistry began to pay attention to basic oral disciplines such as anatomy, pathology, physiology, and the relationship between the oral cavity and other human systems. The division of disciplines is increasingly sophisticated, which is close to contemporary oral medicine.

IP44: Constructing technological and scientific monuments

Making China's Monuments: Transnational Travellers, Travel Patterns, and Famous Sites, 1840-1930

Yi-Fan HU

Owing to the colonial background, the acquisition of knowledge for the possibility of finding new resources to quest for imperial advantages (power and wealth) was one of the most characteristic features of Western explorations across Asia during the late nineteenth and early twentieth century. Western expatriates in China were no exception in this context, as exemplified in their collection on the fauna, flora and artifacts provided by the official scientific and archaeological collecting trips, individual or collective trophy game hunting and big-game hunting activities, as well as tours. It was also a period when monuments of a country becoming accessible to visitors from another culture due to the increasing international travels. Before the Chinese accepted modern definition of monuments preservation and started to conduct a survey of Chinese historical monuments at a national level in 1930, discourses describing Chinese

monuments in foreign travellers' writings had already been widely circulated at that time. Their selections of sites played a critical role in establishing the category of "China's monuments" in a foreign vision, signalling an important milestone in the foreign appreciation history of Chinese cultural landscape. Based on expeditionary discourse, art history and archaeological monographs, travel accounts, and sports notes, this article implements an interdisciplinary approach that combines natural language processing, geographic information system, and network analysis to investigate how the travel patterns of these individual and collective travels as well as the improving transportation influenced the selection mechanism of the famous sites and the travel routes. This analysis will contribute to our understanding of the processes through which China's monuments became famous sites for transnational travellers, objects for art history research, and the cultural heritages of universal values.

Mining Industry Structure and Mining-Metallurgy Works in the 18th and 19th Centuries China: Focusing on "Dian nan kuang chang tu lüe"

Yiqing LIN

Mining and metallurgy books from different historical periods provide supportive sources for investigating the generation, dissemination and acceptance of mining and metallurgy knowledge. The content of these mining and metallurgy books generally includes three types of interrelated knowledge with different emphases: mining environment and equipment, metallurgy and casting, and mining organization and management structure. Unlike in pre-industrial Europe, where were largely anonymous technicians, in China, the authors of mining and metallurgy books were basically officials and literati. Meanwhile, the production of Chinese mining-metallurgy books is inseparable from a network which consisted of personnel from miners to managers. The main body of mining and metallurgy practice is ordinary miners and technical personnel in mines, while the main body of mining and metallurgy knowledge dissemination and text generation is officials who are in charge of mine supervision and literati. From the framework of the mining industry which was described in mining and metallurgy books, we can deduce the generation and dissemination process of mining and metallurgy knowledge, that is, how officials at all levels convert miners' jargon into official texts, and how the publication of mining books, in turn, participates in officials' social network construction. The content of "Dian nan kuang chang tu lüe [sketches of mines in Yunnan]", which was written in the middle of the Qing Dynasty, reflects the process of transforming mining and metallurgy knowledge into text. The author Wu Qijun continued the tradition of local officials compiling monographs on mining affairs in Yunnan. Based on this, Wu refined the book as a manual of mining and metallurgy knowledge for officials. This article focuses on "Dian nan kuang chang tu lüe" and discusses the relationship between mining-metallurgy publications and the structure of mines recorded by the former. The most senior regulatory officials are also the named authors of mining-metallurgy publications. By studying the authors' identities, we can see how the reality of mining and metallurgy practices is transformed into texts through the system of mine operations, and how the phenomena described in the texts reflect the co-existence of the state and localities in exploitation.

IP26: : Traditional Technologies of China

Scientific and technological analysis of glazed pottery dog excavated from Capital city of the Zhu state, Zoucheng, Shandong Province

Puwen SONG
Shandong University, Jinan, China
A glazed pottery dog from the early Warring States period was unearthed in the smelting area of the Capital city of the Zhu state in 2021.This paper presents the analytical results of chemical compositions ,Lead isotope and manufacturing technology of glazed pottery dog by applying various techniques. Our analytical results show that the glazed dog uses lead-barium glass glaze, the coloring elements are iron and copper. The lead isotopes in the glaze and the composition of the ceramic mold indicate that glazed dogs were probably locally produced.This glazed pottery dog provides new research materials for studying the origin of low-temperature glazed pottery in early China

Study on surface sizing of traditional Chinese Xuan paper: effect of bone glue on the properties and stability of Xuan paper

Yujing LU
Biao CHEN
Yanwei DING
Animal glue plays a vital role in changing the ink-wash effects of Xuan paper, a unique kind of Chinese senior art paper. Surface sizing is a traditional processing way for Xuan paper that is still manually performed by artisans with specialized skills and has significant cultural value and practical manufacturing needs. The effects and mechanisms of animal glue on the stability of Xuan paper are related to the security and durability of paper use and preservation. We characterized and evaluated the composition structure and properties stability of the sized Xuan paper with various concentrations of bone glue. Thermal analysis provides a wealth of information about the compositions of paper and its physicochemical structure and properties. Organic elemental analysis enables rapid quantitative analysis of the bone glue content of the sized Xuan paper and provides information on the composition structure of Xuan paper along with thermogravimetric analysis. Dynamic vapor sorption analysis provides detailed monitoring of differences and changes in the moisture environment adaptation of Xuan paper. Surface pH measurements are used as a direct monitor and predictor of the lasting security of Xuan paper. Scanning electron microscope to obtain the surface morphology images of Xuan paper. The results provide an important theoretical basis for the studies on the durability and conservation of the sized Xuan paper and its calligraphy and painting, as well as an essential practical guide for the scientific and appropriate use of bone glue in Xuan paper sizing.

Origin of Blue-and-White Porcelain Production in Ancient China

Weidong LI
A large amount of evidence has shown that blue-and-white porcelain was successfully produced as early as the Tang Dynasty (618-907 A.D.) in China. Though only very small quantity of Tang blue-and-white porcelain shards were discovered from the Tang stratum of Gongyi kiln site which covers Baihe kiln site and Huangye kiln site, they are precious especially in validating the producing area and birth time of Tang blue-and-white porcelain on the basis of archaeological stratigraphy.

In this study, the unearthed white porcelain and blue-and-white porcelain shards of Tang dynasty from Gongyi kiln site were selected as research objects. Glaze and body compositions are examined by energy-dispersive X-ray fluorescence. X-ray diffraction is employed to identify the crystalline phases in body. Microstructure and micro-area composition is studied using electron probe microanalyzer and field emission transmission electron microscope equipped with EDS. Firing temperature of body is examined by dilatometer. Chromaticity is analyzed by Spectrophotometer. Bending strength of body is tested by universal testing machine. Apparent porosity, water absorption and bulk density of body are measured according to the corresponding national standard. Multivariate statistics method is applied to analyze the experimental data to investigate the regularity of the origin and development of blue-and-white porcelain.

The results show that white porcelain was derived from celadon on the basis of deliberate selection and disposal of raw materials, modification of body and glaze recipes, improvement of firing technologies, and unremitting practices. Until the late Tang dynasty, blue-and-white porcelain came into being based on the mature technology of white porcelain production. The body and glaze compositions of blue-and-white shards are close to the white porcelain of late Tang. The type of cobalt pigment used is similar to the pigment used for the upper-glaze blue decoration on the white-glazed pottery. The well-developed white porcelain production provides body and glaze recipes and high temperature firing technology for the invention of blue-and-white porcelain. Blue-and-white porcelain breaks new ground for the under-glaze cobalt decoration, laying foundation for the prosperity of blue-and-white porcelains in the later Yuan, Ming and Qing Dynasties.

IP18: Medicine between tradition and modernity

Discussion on Traditional Chinese Medicine's Right to Apply Modern Medical Technology from the Stethoscope Prohibition

Qi CHEN

Since the stethoscope was invented by the French physician Rene Laennec in 1816, it has gradually become a symbol of medicine. In the middle of the 19th century, the stethoscope was introduced into China along with Western medicine. In the early 20th century, with the rise of scientific trend of Traditional Chinese Medicine(TCM), some TCM practitionersbegan to use stethoscopes in clinical practice. This practice caused concerns among western medicine doctors and the health authorities, who believed that TCM practitioners lack basic medical knowledge such as anatomy and physiology, and thus were impossible to correctly interpret the information conveyed by the stethoscope. They believed that TCM practitioners used stethoscopes only to make patients to think that they are doctors who understand both TCM and western medicine, which will mislead patients and delay their treatment. As a result, the health department has issued some decrees prohibiting Chinese medicine practitioners from using stethoscopes and other methods of western medicine. The ban reflects not only the qualification criteria of doctors, but also the different understanding of the body between TCM and Western medicine, and whether TCM could apply modern medical equipment and technology. These viewpoints still have an influence on the development of contemporary Chinese medicine. In contemporary China, many people are still skeptical about whether

TCM doctors could correctly interpret the medical examination results, such as blood tests, CT, MRI, etc.

Conquering "National Quintessence": the Management Policy of Traditional Chinese Medicine Practicing Certificates in Peking During the Japanese Occupation

Xiang JI

In the face of the onslaught of Western medicine, traditional Chinese medicine (TCM) practitioners proposed that TCM was the "national quintessence" of China and that they were the "guardians" of traditional Chinese culture. However, during the Second Sino-Japanese War, the Japanese-supported "Provisional Government of the Republic of China" used the TCM practicing certificates to control these "guardians" and change the medical knowledge of the TCM practitioners. Before Peiping was occupied by the Japanese, the municipal government of Peiping had initially established criteria for recognizing and licensing the practice of TCM by referring to the Regulation on Traditional Chinese Medicine (zhongyi tiaoli). In 1937, Peiping became the capital of the occupation state and was renamed Peking. The newly established Peking Municipal Government, by issuing the same administrative regulations as the former regime again, recognized the qualification of certified TCM practitioners and independently judged whether to directly grant the qualification of practicing medicine to graduates of TCM schools in Peking. After the regime became stable, the Peking Municipal Government required the holders of the TCM practicing certificates to participate in the Medical Workshop (yixue jiangxihui) and learn western medical knowledge. This paper argues that by inheriting the Nationalist Government's policy of regulating the TCM practicing certificates, the occupation state, while granting Peking TCM practitioners the legitimacy to practice medicine, also established its authority among TCM practitioners, seeking to prove the legitimacy of its regime to the TCM practitioner community. When the regime stabilized, the occupation state chose to work with local collaborators to transform TCM with the Japanese experience, ultimately influencing the post-war transformation of TCM.

Polyglot Asian Medicines: A Digital Environment for Studying the Past, Present and Future

Michael STANLEY-BAKER

This paper introduces a multi-disciplinary collaborative research platform for the history, ecology and clinical use of Asian medicines. "Polyglot" here refers to the ways that Asian medicines traverse not just region and time, but language and different epistemologies and practice communities. This site provides resources and tools for research into multiple dimensions in three main clusters:

Digitised, tagged, searchable manuscripts.

Multiple corpuses, representing Malay, Chinese and Peranakan traditions are available, some with manuscript images. Housed in DocuSky, they facilitate close reading as well as searched and organisation by classifying characteristics at a corpus level, as well as exporting into large-corpus data analyitical software.

Digitised historical maps of the Bencao traditions

These searchable interactive maps reveal the geolocation of sites of production of bencao materia medica, affording novel views of the landscape, local economies, and historical change. Current layers

include 2nd to 6th century editions, with more in the pipeline.

Multi-lingual Drug Name Synonymy

Includes 30,000 Chinese primary and secondary drug terms, and 3,000 Malay terms, as well as over 7,000 scientific names updated and verified by Kew Gardens. This Synonymy also include historical provenance of the terms, including the date, author and author's birthplace (with geotags) (where known). Links from the Chinese and scientific names extend to molecular bioactivity databases, biodiversity heritage, biodiversity maps, allowing for much more rigorous qualification of botanical identities of plants than available before.

Taken together, these tools and resources afford a new generation of historical and contemporary research on Asian medicines. Please view this video for an overview:
https://youtu.be/ruWqMxy2TbQ

I would like to demo some of these features, highlight some novel research insights and teaching uses that have been made possible through the site.

P63: Women and Medicine

Women and Medicine

Hyunsook LEE
Noriko SATO
Yongyuan HUANG
Ji-myung KIM

History tells us that women's role in medicine and medical practices has been different from that of men. Only men could be trained in medical school and become medical practitioners, and women were excluded from the system. There has been class and sexual discrimination against engagement in medical practice. Since the mid 19th century, the introduction of Western medicine and biomedical reform have increased opportunities for women in East Asia to receive formal medical training and practice medicine. Even under such transformation, female medical practitioners in East Asia faced difficulties establishing a position comparable to male medical doctors. This panel explores the roles and medical practices of female medical experts and midwives who have experienced socio-medical transformation in Korea, China, and Japan. The discussion includes a culture of biomedical systems surrounding female medical practitioners in East Asia related to biomedical and social hierarchies.

The Development of Midwifery in Modern Japan

Noriko SATO

This paper examines the transformation of medical practices and the role of midwives in the changing demands of perinatal care in Modern Japan. Similar to other North-east Asian countries, Japanese midwives' role has been restricted to discretion over normal pregnancy and delivery to care for pregnant women. Under such circumstances, the analysis of this paper shows that Japanese midwives are building cooperative relationships with obstetricians by expanding their medical field while establishing their role as perinatal caregivers. The role of midwives is to help a pregnant woman who makes her aware that she is responsible for her fetus's well-being (they call it a baby). Once a Japanese woman has conceived, her body is transformed into a mother's body (botai). The knowledge given by Japanese medical experts and socio-cultural beliefs of botai care strengthen such ethno-theory and midwives' medical practices. The midwives' expertise makes pregnant women enjoy body monitoring and be confident in creating the mother's body. Midwives and pregnant women commit to decision-

making processes regarding how the mothers prepare for their childbirth and what perinatal care midwives can offer them. It is midwives' creative and dedicated medical practices which transform the relationship among obstetricians, midwives and pregnant women.

The Discrimination of Women's Doctors in the middle of the 20th century Korea

Hyunsook LEE

In 21st-century Korea, the number of female medical doctors has been rapidly increasing, although they still suffer from gender discrimination from internship and residency to obtaining a professorship. In 2022, the author participated in a project for 'Oral history of the Women's Doctors in the middle of the 20th century Korea' sponsored by the National Institute of Korean History. This paper aims to introduce ten interviews of elderly Korean female doctors and explores gender discrimination against them from their college days. They are in their 80s and 90s, born in the Japanese colonial period and studied in medical colleges in the 1940's~1950's. The eldest doctors were born in the 1910s. In the summer of 2022, when the author conducted the interviews, many doctors who qualified before World War II were already dead. Thus, the author interviewed their son and daughters who remember their mothers' professional careers. Three of the interviewees are female doctors. Therefore, the author recorded the experiences of gender discrimination of two generations, mother and daughter. Although discrimination has gradually eased on the surface, it went on clandestinely. Many interviewees vividly testified about gender discrimination while working as medical doctors. The paper aims to report the memories of female doctors who have been groaning about sly and shameless gender discrimination in the medical field.

Soft Hearts for the World: The Hackett Medical College for Women and the Localization of the Female Medical Profession in Modern China

Yongyuan HUANG

In 1899, Dr. Mary Fulton, an American Presbyterian medical missionary, founded the Canton Woman's Medical College in Xiguan, Guangzhou, which was renamed the Hackett Medical College in 1902 and was one of the earliest medical schools for women founded in modern China. The Hackett Medical College for Women has an affiliated Hackett Medical Center and a matching Julia M. Turner Training School for Nurses, which was an early adopter of seven-year medical education and is a national leader. By the time it was incorporated into Lingnan University in 1936, the Hackett Medical College for Women had produced 31 classes of graduates with a total of 246 graduates. Many of the graduates have pursued careers as physicians and have had a significant impact on the formation of a professional female medical community in Southern China and nationwide. However, as a missionary medical educational institution, Hackett Medical College for Women has a strong religious flavor. At the same time, the students' study and practice of medicine, interwoven with the discourses of nationhood, feminism, and gender norms, present a complex tension reflective of modern society. This study aims to investigate the mechanisms and characteristics of the localization of the female medical profession in modern China under the influence of multiple factors by examining female medical education at the Hackett Medical College for Women as well as graduates' careers and self-identities.

The Diseases and the Treatment of Empress Min (1851-1895) in the 1882 June Diary

Jung-wook HONG
Ji-myung KIM

This article introduces the <1882 June Diary> discovered in 2015. This record is the only one that accurately tells the whereabouts of Empress Myeongseong (1851-1895)'s evacuation. The diary is an eight-page book made of traditional Korean paper measuring 14.7cm in width and 20cm in length. It contains a brief description of 51 days of her refuge, her health status, weather, food, the people whom she met, and her travel routes. The empress evacuated to seven or eight places, including Seoul, Gyeonggi-province, and Chungcheong-province. The person who wrote the diary seems to have considerable knowledge of medicine, either a physician or a confucian doctor. The records show that Her Majesty suffered from a sore throat and boils of leg, etc. The writer recorded how to cure the diseases of her majesty. The article examines and discusses in detail what kind of treatments the royal women received in an emergency as private by a Confucian doctor or rural physician, not by a court physician in the late 19th century Korea through the diary.

P30: The Asian-Euro mutual learning and interpenetration of the civilization of science and technology in the early modern period

European's Understanding on Chinese Printing from the 16th to the 18th Century

Hui XIE

Between the 16th and the 18th century, as the western missionaries came to China one after another, the Europeans got a clear knowledge about Chinese printing. For missionaries, Matteo Ricci and those who came to China earlier were already familiar with printing. But as far as we know, the most detailed records came from João Rodrigues Tçuzu, which contained woodblock, movable type and rubbing. For the European scholars never came to China, they had some brief description about Chinese printing even before Matteo Ricci. After that, Athanasius Kircher came to know woodblock. Then Jean-Baptiste Du Halde described woodblock, movable type and wax plate, which made a notable impact in Europe. In this time, most of European scholars agreed with that the invention of Chinese printing is early than European. Comparing with western typography, the Chinese woodblock printing has many advantages. It has high efficiency and accuracy. The blocks can be used many times, and easy to made correction. It also can print books in all sorts of languages.

An Analysis of the Translation of Chinese Euclid's Elements' Book X in 1858

Jingbo CAO

During the translation of Book VII-XV of Jihe Yuanben, Li Shanlan(1811-1882) and Alexander Wylie (1815-1887) carried forward Xu Guangqi (1562-1633) and Matteo Ricci (1552-1610)'s translation style and format in Book I-VI of Chinese Euclid’s Elements. The Chinese translation of "incommensurable quantity" is taken as a case to analyse the translation of Chinese Jihe Yuanben. Alexander Wylie and Li Shanlan the translators tried to create new terms from traditional Chinese vocabulary in Book X. Although there may be some failure, the terms they created are reasonable and accurate in general, especially He Xian (和线), Jiao Xian (较线), Tong Zong (同宗) and so on.

A preliminary study on Alexander Wylie's work regarding the Sino-Western names correspondence of the fixed stars

Zhihui CHEN

Alexander Wylie (1815-1887), one of the most famous British sinologists in the 19th century, had been in China for decades and was very concerned about the history of mathematics, astronomy, compass and other science and technology in ancient China. His work on the Chinese and Western correspondence of the stars names is reflected in his “List of Fixed Stars”. Having been investigated, the “List of Fixed Stars” by Wylie, which received less attention, was completed in the late 1870s, and identified the Chinese and Western names of 2871 stars (including variable stars and nebulae). The stars maps and catalogues that Wylie mainly utilized were: The Fixed Stars Maps with Equator, Longtitudes and Latitudes by the Chinese scholars Li Zhaoluo 李兆洛 (1769-1841) and Qian Weiyue 錢維樾 (1808-1867); The Stars in Six Maps on the Gnomonic Projection (first edition in 1844) revised by William Dawes (1799-1868) and published by the Society for the Diffusion of Useful Knowledge, and the Society deeply influenced Wylie; “Flamsteed's British Catalogue of Stars, Corrected and Enlarged” (1835) edited by the British astronomer Francis Baily (1774-1844), the two Catalogues of Nebulae by William and John Herschel, and so on. Before the List was completed, James Legge (1815-1897), Gustaaf Schlegel (1840-1903) had explained in detail the ancient astronomical phenomena in Chinese classics such as the Yao's Canon in the Book of Doucuments 尚書堯典. It was proboble that Wylie had been inspired by them and completed this job of work. This verification of the stars names was very important for the modern application research by using of the astronomical records in ancient China, and was one of the fundamental tasks for the mutual learning of Chinese and Western astronomical civilizations.

European Orientalists' Discovery, Review and Translation of "Alberuni's India" in the 19th Century

Yue PAN

An Arabic manuscript without the author's name was found in La Bibliothèque Royale de France in the last years of the 1830s. It is entitled Tārīkh Hind and is called “Ducaurroy Manuscript”. Joseph Toussaint Reinaud (1795—1867) and Salomon Munk (1803—1867) agreed that this work belongs to Medieval Muslim scholar Al-Bīrūnī (973—1051). In the April of 1843, Munk announced his plan to translate this work into French. Reinaud published the French translation of three chapters of this work in 1845. However, the complete French translation was never finished. Charles-Henri-Auguste Schefer found another manuscript of this work called “Schefer Manuscript”. In the 1860s, the translation work was taken over by Franz Wöpcke (1826—1864) and William McGuckin de Slane (1801—1878). With the former’s dying at an early age and the latter’s getting older, there was still no progress on the translation project. Edward Sachau took over the project in 1872. The English translation of this work was at last finished in 1888, and it is entitled Alberuni's India.

French understanding of Chinese ornamental horticulture and horticultural culture in the 19th century: focusing on the translation of the Mirror of Flowers in France

Yan WU

The Mirror of Flowers (Hua Jing, 花镜) by Chen Haozi (陈淏子 ca. 1612-?), published in 1688, was a Chinese horticultural classic. Its publication marked the beginning of Chinese ornamental horticulture. Mirror of flowers was circulated in the 18th century Japon. In 1900, French version of Mirror of Flowers, based on the Japanese engraved edition, was published in Paris. This paper, focusing on the translation of this book in France, compares the differences between the origial work by Chen Haozi and its French translated version, investigates the French understanding of Chinese ornamental horticulture and horticultural culture in the 19th century.

P68: Indigenous Resources and Medicines of the Borderlands in Russia and China: Preserved Knowledge, Cross-Regional Science, and Exploited Nature

Medicines of the Qinling Mountain Range: Scientists tackling indigenous resources of a Northwestern-Southwestern borderland in China

Lena SPRINGER

Qinling 秦岭 mountain range constitutes a major north-south demarcation in the landscape of natural resources in the Western part of present-day China, and as a topography of highland/lowland ethno-pharmacy. This paper uses materia medica surveys in this borderland of dramatic natural and indigenous differences as the basis to investigate efforts by Chinese scientists of the Maoist period and the 2010s at reaching out to traditional knowledge holders. Claiming to serve national strategies of gaining pharma-economic self-reliance, they aimed to extract natural resources and ethno-pharmaceutical technology from the indigenous praxes and medicinal cosmologies. The extent differed to which holders were either erased from the surveys of their decontextualised resources, or were recontextualised and highlighted in these new archives of science. Main materials for this study are articles in Chinese scientific journals since the 1950s, and published materia medica surveys up to the 2010s, as well as local fieldwork and interviews with traditional knowledge holders, materia medica scientists and heritage preservers.

This case elucidates indigenous resources of ethnic borderlands, based on natural habitats and regional science, rather than limited to contemporary national or provincial political territories, such as Russia versus the People's Republic of China (PRC), or ahistorical official ethnic classifications, i.e., the idea of a Han majority versus minority nationalities. The mountain range spreads into both northwestern and southwestern PRC provinces, both of which produce separate surveys. Despite political classification as ethnic Han region, ethnicity both within and beyond Han characterises the multiple folk cultural, religious Daoist and scientific heritage of medicines in a Qinling ethnopharmaceutical region.

Due to the broader regional shifts of cultural and political power in China since early modernity, the Qinling lost its role for orientation in ethno-pharmaceutical regions and frontiers of high culture and knowledge that is recognised by scientists, while the north-south demarcation of the Yellow and Yangtze Rivers became predominant until today. This paper challenges these contemporary and early-modernity-centred versions of historical science cartography to highlight scientists tackling their own medieval history of materia medica in the West; exchange with strategies in the Soviet Union; and ideas derived from regional ethnic (minzu) or folk (su) contexts. Different scientists aimed to demonstrate

the multiple layers of indigenous knowledge, praxes, natural resources and existing literature within the dense, layered histories and richly biodiverse Qinling territory.

Saiga Antelope Drink: A History of the Trade and Supply of Saiga Horns for Chinese Medicine

Liz P.Y. CHEE
Hong ZHENG

The population of the Saiga Antelope species in the Central Asia region has greatly declined since the early 1990s. Among the factors driving its decimation, one is the Chinese medicinal drink made from the animal's horn. Chinese consumers drink it for its supposed cooling effect. According to the World Wide Fund for Nature (WWF), the great decline took place in the early 1990s when hunting for this species became widespread. The fall of the Soviet Union resulted in a lapse in surveillance for the species, so exacerbated the situation further. Since then, efforts to conserve the species has had led to extensive research and investigation work. For instance, NGO investigators and conservation scientists interviewed consumers in China (Wildlife Conservation Society), Singapore and Malaysia (TRAFFIC) since these countries have been identified as the key importers of Saiga horns legally and illegally. 21st century conservation scientists too emphasized the need to understand consumer behaviour and patterns.

Bitter Essences: the Pharmacopolitics of Artemesia

Tatiana HUDAKOVA

This paper explores how a genus of plants—in this case, artemisia—becomes reconfigured in relation to a single defining chemical compound, in different places and times. It seeks to demonstrate how the production of value and values around a plant like Artemisia has depended, in Western scientific and medical imaginaries, on defining plants in relation to a singular, "essential" phytochemical component—essential in multiple senses, both as technique for extracting and concentrating volatile oils, and as the locus for the production of social values. Focusing on four historical vignettes—the use of artemesia Frigida in Buddhist medicine in Buryatia (a Russian area bordering China); the moral panics around Artemisia absinthium in 19th century France; the reclassification of Artemisia astrahanica as a precursor to camphor in the production of celluloid during the Soviet 1920s and 30s; and the contemporary debates about the role of Artemisia annua in the treatment of malaria— this paper traces a partial cultural history of Artemisia, and asks what this genus of plants might tell us about the politics of empires on the one hand, and about the politics of empiricism on the other—and how the two might be put into dialogue. I suggest that the disparate imaginaries of artemisia's potencies and value—pharmaceutical, economic, and industrial—are predicated on and constitutive of processes of scale-making that materialize the state's infrastructural relationships and the political and social processes through which these relationships are enacted, as much as they reflect new discoveries about what constitutes a plant's "active ingredients".

Herbal Medicinal, Natural Resource, and Global Commodity:Transformations of Liquorice Root in Modern China's Northern Borderlands

Yubin SHEN

Liquorice root (gancao 甘草, “sweet grass") is one of the most typical traditional Chinese herbals. Mainly distributed in China's northern frontiers (mainly Inner Mongolia and Gansu provinces) to Russia, liquorice root is still widely used in Chinese therapy, but during the early 20th century, it experienced significant transformations from a medicinal into a profitable natural resource for state building, and into a global commodity as sweetness and flavor agent for tobacco products. This paper argues such transformations resulted from the following factors: Japanese and Chinese pharmaceutical scientists working on materia medica, such as Zhao Yuhuang (1883-1960), provided new scientific and commercial meanings to the indigenous liquorice root; Chinese governments promoted liquorice root as an important Chinese natural resource and encouraged the development of liquorice root enterprises to integrate and those frontiers, and in particular state-led massive immigration, railway construction, and transnational commercial networks in north and northwest China rendered Chinese liquorice root accessible to the global market.

P17: Early modern mapping of East Asia- multicultural and multidisciplinary perspectives

Western maps of China from Ortelius to d’Anville- East Asian models and European adaptations- a genealogical and chronological perspective

Marco CABOARA

Based on the author’s Regnum Chinae: The Printed Western Maps of China to 1735. Leiden: Brill, 2022, the first monograph on the topic, this paper will cover the main types of Western maps of China, their relationship with their Chinese models and the timing and patterns of their diffusion on the European market.

I will present the main Chinese models of Western maps and introduce the main genealogical groups covering most of the maps of China published in Europe.

By examining the map groups and their publication chronology, it will become apparent how maps of China printed in Europe between 1584 and 1735 did not appear slowly and progressively, following the gradual expansion of Western commercial and missionary contacts; but rather came in waves.

The first wave (1580-1590) followed upon the unification of Portugal and Spain and the sudden openness of previously well-guarded Portuguese sources about China; not to mention the simultaneous take-off of the Jesuit mission in China. The first map by Ortelius kept being circulated across European countries with minor, though influential, and clearly recognizable variations.

A second wave (1640-1650) arrived with the fall of the Ming dynasty (1368-1644) and the travel back to Europe of Jesuit missionaries such as Martino Martini and Michał Boym, who brought with them Chinese atlases and maps which they translated into Latin and converted into Western maps. That these maps were soon published, in whole (Martini) or in part (Boym), and circulated widely was due to a new openness of the Catholic Church towards printing and dissemination of information via the Protestant publishers based in Amsterdam.

The eighty years that followed correspond, albeit not with chronological precision, to what Paul Hazard has defined as “the crisis of European consciousness”. It is also known as the ‘golden age’ of the “Republic of Letters” – a Europe-wide circulation of maps and information about

China across countries and religious confessions.

The third wave came in the 1730s, with the publication in Paris of the French adaptation by d'Anville of the Chinese survey atlases on which the Jesuits had collaborated in the previous twenty years.

Copying as Dialogical Knowledge-Making: Japanese Versions of Matteo Ricci's 1602 World Map Kunyu Wanguo Quantu

Radu LECA

Discussions of the importance of Matteo Ricci's world map 1602 Kunyu Wanguo Quantu tend to overshadow studies of the map's later impact. Japanese and Korean manuscript versions of Ricci's map are thus often treated as derivative and secondary in importance. This paper counters that view though close analyses of a number of Japanese versions of Ricci's map. The focus is on two elements: material translations from woodblock print to manuscript formats such as the folding screen; and the pairing of Ricci's world map with other intellectual artefacts: various maps of China or astronomical maps. The versions under discussion exemplify a model of knowledge production in which copying plays a generative role, as it has done throughout the cultural history of East Asia. To characterise this process, I borrow the term 'dialogical' from Mikhail Bakhtin, in the sense that each manuscript copy of Ricci's map re-negotiated an intellectual position within the cultural landscape of East Asia, and it did so through its very materiality. This paper thus contributes to the reappraisal of manuscript production as integral to a global history of knowledge.

The Kreyer books' collection as an example of technological knowledge exchange in Qing dynasty: maps from 广舆图（康熙) to 航海金针（清朝 1853)

Arianna MAGNANI

If each map is a projection of the self and each self a projection of the culture to which one belongs, then it is interesting to note when the notions of the maps are transported and translated between different cultures. This aspect is clearly visible in the book collection created by the missionary and diplomat Carl Traugott Kreyer (1839-1914) during his stay in China and in Europe, a collection donated by Kreyer's heir to the current Museum of Oriental Art "Edoardo Chiossone", located in Genoa. The paper intends to focus on the Chinese works of this collection that show particular attention to geographical studies, as well as the technological exchange between Chinese and Westerners through the help of maps: from the text Guangyu tu《广舆图》(Maps of Extended Territory) drawn by Luo Hongxian 羅 洪 先(1504–1564) to the nautical charts of Hang hai jin zhen《航海金针》(the Navigator's Golden Needle) by D. J. MacGown (1815-1893) in 1853, a collection of texts that demonstrate the use of such images for cultural and mutual scientific exchange.

Reconstructing the Jesuit Making of Maritime Knowledge in Seventeenth-Century China: On the Marine Animal Images in the Kunyu quantu (Ferdinand Verbiest, 1674) at the Scheepvaartmuseum, Amsterdam

Zhifan LIU

坤舆全图 Kunyu quantu (1674), known as the Verbiest world map, has long been the focus of early modern Jesuit mapmaking and geographical knowledge transmission between Europe and China. In addition to the well-discussed examples in Uppsala,

Paris, and London, the Scheepvaartmuseum in Amsterdam keeps the only specimen in the Netherlands but remains undercover in international academia.

The paper focuses on 14 marine animal images in the Verbiest world map (1674) based on the copy at Het Scheepvaartmuseum in Amsterdam, with the theoretical tool examining different stages of transcultural remediation, as proposed by Prof. dr. Astrid Erll (Goethe-University Frankfurt). The case study reveals the diverse sources and complex process Verbiest referenced in producing maritime knowledge for Chinese audiences. By rediscovering the provenance and perception of the Amsterdam copy, the paper reconstructs a less biased view of the map's afterlife in its global circulation. Furthermore, the research builds a fundamental database for differentiating original and later editions of the Verbiest map by gathering and investigating examples from various collections.

Mapping through Alphabets. Studying the Romanization of Chinese toponyms on maps of China

Emanuele RAINI

The study of the Romanization systems employed in the renderings of the toponyms in different Western maps of China can offer important clues to understanding different phases of the compilation process.

The analysis of Romanized toponyms can help in ascertain or confute the alleged authorship of a map, or even suggest the possible authorship and date of compilation of anonymous and undated maps; it can also shed light on the homogeneity or the variety of the sources used by their compilers.

This paper shows some examples of how to gather this kind of information on Western maps of China by studying their Romanization.

IV. 16:10 – 17:50

P61: How people understood and practiced mathematics? The Diversity and Unity of Mathematics from 13th to 17th centuries China

Generality in the 13th-century Chinese Mathematical Works Written for Beginners

Célestin Xiaohan ZHOU

In the past decades, some research in the history of mathematics in China shift from the perspective of finding achievements comparable to those in modern mathematics to that of finding the intrinsic characteristic features testified to by the extant mathematical documents. Against this historiographical background, mathematical works that are not representative of the highest level of mathematics of their period are reappraised by modern scholars. From the 13th century, the popularization of practical mathematical knowledge and practice stands out in the development of the social economy, and the related works compose the main body of the corpus of my study. Being contract to the general viewpoint that the practice-oriented works are merely composed of preliminary mathematical concepts and practices as well as concrete problems in assumed situations, this presentation is devoted to demonstrating that, taking examples from Yang Hui's Mathematical Methods (Yang Hui suanfa 1274, 1275 C.E.) and Introduction to Mathematical Study (Suanxue qimeng 1299 C.E.), the generality of mathematical algorithm is partly considered and consciously delivered to their audiences by the author of works. Firstly, mathematical problems in these works are not collected randomly and to be solved individually, but they are in large

part representative of problems with similarities, and they are delicately organized into certain categories according to the methods used to solve them. Certain problems are introduced as paradigms for their readers as mathematical learners due to the consciously designed numbers and conditions. Secondly, analogical problems are sometimes supplemented to the problems quoted from the former sources, and they demonstrate the 13th-century author's intention to extend the applicability of a certain algorithm, and thus the scope of the algorithm's generality changes along with this analogy. Besides, in Yang Hui's diverse methods for multiplication and division, except for the general ones which could deal with all sorts of cases in terms of the different number to be calculated, he also emphasized the flexible ways to simplify the process of calculation. And the premise of using certain simplified ways constitutes Yang's criteria of dividing methods of multiplication and division into subcategories. Lastly, facing the algorithm given in the former mathematical Canon for calculating the area of a certain shape, Yang pointed out the limited applicability of this algorithm and put forward his own solution which is more suitable to the case in study.

Mei Wending on Fangcheng and Gougu as two most profound algorithms in Chinese traditional mathematical system

Siyu CHEN

The system of Chinese traditional mathematics was basically formed as the classic The Nine Chapters on Mathematical Procedures (Jiuzhang suanshu 九章算术), which was completed in around 100 B.C.. But on the basis of extant sources, the compilers of the classic along with its well-known commentators did not account for the reason why the nine chapters were arranged like that. It was probably because of the lack of justification for the arrangement of the nine chapters that mathematicians in later periods paid much attention to explicate the relationship between different chapters. Mei Wending (1633-1721), a prolific Chinese mathematician in Qing dynasty (1644-1911), was the most informative one of them. Mei tried his best to demonstrate that Fangcheng (a system of liner equations) and Gougu (two sides of right-angle triangle) are two most profound algorithms in the Chinese traditional mathematical system. To demonstrate the generality of Fangcheng algorithm, Mei firstly improved the procedures of Fangcheng algorithm by respectively setting up a uniform rule to designate a number positive or negative and to eliminate the unknowns, which made them a consistent system; and then, Mei carried out his consistent and systematic Fangcheng algorithm to handle all the mathematical problems that were classified into the category named mathematical methods (suanshu 算术). With regard to Gougu algorithm, Mei likewise demonstrated that it was the most profound algorithm in the other category named measuring methods (liangfa 量法). Besides, Mei also applied it to solve a variety of mathematical problems in spherical trigonometry. The successful application of Gougu algorithm to spherical trigonometry not only justify its wide applicability but also gave Mei sufficient reasons to claim that trigonometry was able to reduce to Gougu algorithm, which, from Mei's point of view, made clear that Western mathematics and Chinese mathematics had the same mathematical reasoning (suanli 算理) as their basis. In the whole course of Mei's arguments, we are able to figure out that in Chinese traditional mathematics it is the ability to solve mathematical problems that determines an algorithm to be profound

or not, which is totally different from the logical standards in western tradition.

P31: "Magic and Medicine in Early Imperial China"

Magical Medicine in Early Chinese Excavated Manuscripts (3rd – 2nd centuries BCE)

Eléonore CARO

History of Early Chinese medicine has known major breakthroughs thanks to the archaeological discoveries of the last decades in China, which revealed a great number of medical texts preserved in tombs and non-funerary archaeological sites. Studies of these manuscripts show that medical practice between the third century BCE and second century EC was not uniform and not yet completely theorized. Amongst the practices evidenced through excavated literature, “magic” medicine, as it has been named by scholars, was one of the less known, and gave way to numerous studies. However, it is not clear which medical practices come under this denomination, and for what reasons.

In this presentation, we shall try to analyze the “magic medicine” documented in the excavated manuscripts and question the relevance of the use of “magic” as a medical category in Early China.

The order of the heart as the first of the five organs in early medical classics

Man GU

A series of inscriptions engraved on the back of a lacquered meridian figurine excavated from the Lao Guan Shan Han tomb at Tianhui township in Chengdu, Sichuan, reads "Heart, Lung, Liver, Stomach and Kidney", referring to the back-shu points of the five organs. The order of the inscriptions, Heart, Lung, Liver, Stomach, and Kidney, according to Professor Donald Harper, should be arranged in the mutual restraint order of the five phases of fire, gold, wood, earth, and water. This order is also found in the contents of the bamboo medical manuscripts excavated at the same tomb as the meridian figurine, and resulted in the order of the four seasons in the manuscripts not following the usual order of spring, summer, autumn and winter, but with summer taking precedence. This order is also found in some chapters of the received medical classics such as Suwen, Lingshu, Nanjing, and Jiayijing of Acupuncture and Moxibustion. It is inferred that in the early medical classics of the Warring States, Qin, and Han dynasties, there must have been a theory of the heart as the most important of the five organs, which was later challenged by theories that placed more emphasis on the liver or the brain.

Objects for Healing - an Archaeological Approach to Medical Devices in Han Dynasty Tombs

Margareta M. PRÜCH

Beginning with two lacquerware basins specified in the inscriptions as for decoctions discovered at the tomb of Marquis of Haihun, at the outskirts of Nanchang, Jiangxi province, this presentation looks at the types of medical related material buried in Han dynastic tombs and theorizes their function and meaning from an archeological perspective. While the focus will be on lacquerware objects— such as dishes, eared cups, human acupuncture models, etc.—the question of whether acupuncture needles and other medical devices are also included in tombs will be touched on.

Manuscripts & Matters of the Heart in Early China

Constance A. COOK

Drawing from manuscripts dating from the 3rd – 1st centuries BCE, this presentation focuses on the early legacy of the treatment of illnesses of the "heart" (xin). Different approaches are taken to alleviate ailments, such as "heart pain": decoctions, invocations, physical choreographies, among others. Attention is drawn to the slow emergence of named ailments as well as the effects of what in the classics might be deemed "perverse qi" from the surrounding environment. Attention is also drawn to the persistence over the centuries of certain recipes and approaches.

P50: History of Metrology: A Special Perspective to Understand the World

On the Compilation of Origins of Temperament and Calendar: A Perspective from History of Metrology

Yuyu DONG

In the 18th century, the Emperor Kangxi of Qing Dynasty organized a project of compiling an important metrology work Origins of Temperament and Calendar（律历渊源）. As an important scientific activity, the project had an special effect on the innovation in astronomy, mathematics, survey and so on of Qing Dynasty. By analyzing the factors of politics, science and technology, culture and religion, the paper focuses on how the compilation of the metrology work caused the innovation in imperial science. The paper draws a conclusion that it was Emperor Kangxi who carried out the project on the motivation to deal with the cultural conflict and power compete of rites controversies between Chinese and Western in the Period. The aim of the project was to construct the theory of "Western Learning Originated from China" (西学中源). From the view of metrological management, the project was of the rationality as well as the reality urgency in that time. The project was also a new knowledge integration strategy based on West and East knowledge.

A Comparative Study of Traditional Chinese and Japanese Medicine Dosage inthe Context of Metrological Culture: Based on Classical Chinese and Japanese

Rina SA

The paper explores the relationship between the traditional Chinese and Japanese medicine measurement from the perspective of metrological culture, evidenced by some classic works on Chinese and Japanese medicine. Most of drug dosage units used by traditional Chinese and Japanese physicians have varied with the transformations in metrology. However, there are some that have maintained their historical traditions and do not change. If later generations of physicians intend to fully understand the units of dosage in ancient medical books, they need to have a comprehensive grasp of the variations in weights and measures in different dynasties, or to have an in - depth analysis of the specific methods used by physicians in different historical periods. By comparing the traditional drug metrology in China and Japan, it helps to find the inheritance relationship between them, and further reveals that the development of drug metrology in different countries and times is also influenced by the social, human and economic aspects of the time, whereas from the perspective of metrological culture, these two are essentially related, and both have the objective need to pursue standardization and precision.

Early Concept of Angle and Its Application in Kao Gong Ji

Zengjian GUAN

Since there was no 360° central angle system in ancient China, how did the ancient people deal with the angle problems encountered in their life and technological production? The answer could be found in the ancient book Kao Gong Ji. Kao Gong Ji is the oldest known book on technologies in China, and It is also a part of an important classical work of Confucianism. Since a considerable part of the book was produced 2500 years ago in the Spring and Autumn Period (770-476 BC) and the Warring States Period (476-221 BC), Kao Gong Ji is also the oldest technical book in the world. Through careful studies, we find there were already some proper nouns representing any angle in Kao Gong Ji, and there are some specific angles used as technical specifications. These specific angles are generated by geometric operation of special angles such as Gui(规) or Ju（矩）. What the so called the contradiction of Jugou Qingzhe does not exist.

What is the Shape of Earth? A Comparative Study on Chinese and Mesopotamian Sources

Yuzhen GUAN

The shape of earth has always been an important issue in the metrology of time and space in ancient civilizations. From the late second millennium to the Hellenistic Period, a variety of cuneiform sources reflect a continuous tradition of the Mesopotamian view of the universe, with noticeable distinctions in different aspects from different texts. While in China, different treatises also provided extensive opinions and details on the issue. This study aims to discuss the traditions of the Mesopotamian and the Chinese view from the perspective of metrology, with particular interests on analyzing the similarities and distinctions on views of the shape and size of earth.

P45: Many Faces of Health in Modern China

Medicine for Multispecies Communes: A Social History of Infectious Animal Diseases in Maoist China

Jongsik Christian YI

Did Maoist China protect the health of nonhuman animals? If so, how? This question sounds strange given that China currently looks like a trans-historical epicenter of trans-species diseases where animals may have suffered all the time. In the midst of the ongoing COVID-19 pandemic, global health experts and citizens across the globe have been convinced that the virus SARS-CoV-2 first emerged in and spread from wet markets in the city of Wuhan, Hubei Province. Even before the current pandemic, the idea of China as an epicenter of trans-species diseases had already gained currency at least since its post-socialist reform. It is understandable, therefore, to presume that animals in the Maoist period (1949–1976), too, were either destroyed for the sake of human health or left for dead. But can this speculation be historically validated?

By examining how Maoist China protected the health of nonhuman animals, this article explores how Mao-era China responded to major epizootic and zoonotic diseases. It foregrounds a series of patterns in fighting contagious animal diseases—lockdowns, quarantines, disinfection, mass animal vaccination, mass education, and prioritizing the treatment of infected animals over mass culling which were together called the "Comprehensive Prevention and Treatment." Shedding light on this understudied topic and building upon the literature on multispecies biopolitics and the history of the People's Republic of China, I argue that in the course of fighting animal diseases, human-animal

relations were disciplined in accordance with the Maoist state's priorities for making local collectivized communities self-reliant multispecies communes which must heal and save livestock from contagious animal diseases on their own.

The Meteorology of Medicine: Colonizing Weather and Disease in Treaty-Port China

Francis NEWMAN

From the mid-nineteenth century, as treaty ports enabled lucrative trade that sustained European wealth, medicine and meteorology met on the Chinese coast. Since ancient times, European physicians had been interested in how "airs, waters, and places" shaped the body; by the late nineteenth century, colonists' understandings of weather were changing alongside shifting notions of disease. I examine interrelations between medicine and the new discipline of meteorology in Chinese treaty ports in the 1860s and 1870s. Focussing on the medical records of the Chinese Maritime Customs Service, I illustrate how many practitioners of biomedicine saw meteorology as a core and necessary ingredient of modern medicine, through the sub-discipline of "medical meteorology". This had consequences for the way in which doctors went about their business; it also shaped how they thought science, measurement, and statistics played into medical practice. Furthermore, analyzing how these practitioners related to the places in which they were situated – the treaty ports – reveals how anxious colonists were to build their authority by use of this discipline. As meteorology became scientific, winds and waters changed from being irrepressible forces of nature to measurable and quantifiable aspects of the world. In medical meteorology, therefore, colonial medical practitioners foresaw a way of understanding, taming, and controlling both weather and disease. In their attempts, however, they found that neither bodily sensations nor disease etiology necessarily cooperated with the theories that their thermometers and barometers espoused.

Learning from Colonial Medicine: Japan-Ruled Korea and China's Medical Reform in the 1910s

Meng ZHANG

In 1922, the Chinese central government sanctioned the first modern Chinese national regulation on physicians. They deliberately built a medical hierarchy in which graduates receiving their education in the modern western style of medicine occupied the superior position with licenses titled "Medical Master"(Yishī 医师) while those trained in traditional apprenticeship, i.e. native Chinese medical doctors could only be called "Medical Practitioner" (Yishì 医士). From then on, relying on a parallel medical system to govern both Chinese medicine and Biomedicine became a core idea of successive Chinese medical administrations. In a time of radical anti-tradition movement and embracing western modernity, it looks quite extraordinary that Chinese intellectuals would prefer to preserve traditional Chinese medicine.

How did this national regulation come into being? This paper argues that among many influential factors it was Japanese colonial medicine in Korea that played a significant role in informing China's national medical reform to include Chinese medicine in the 1910s. Although many Chinese reformers looked to western modern nations for role models in national salvation since the Late Qing period, others were skeptical of its practicality. They were worried that implementing Euro-American medical laws directly in "backward" China would incur unexpected political disasters. They were also attracted by Japanese

propaganda and tended to see the Japanese colonial policy in Korea as benevolent in nature and more inclusive. It was against this backdrop that the Japanese colonial administration emerged as an alternative path toward modernization.

In this presentation, I will first discuss why the modern Chinese state wants to control the development of Chinese medicine. Second, I will talk about how Japanese colonial medicine in Korea captured Chinese medical authorities' eyes through various governmental diplomatic activities. Third, I will focus on an elite Chinese physician, Dr. Tang Erhe who visited Korean Keijo (now Seoul) in 1917 to study the colonial medical policy as a principal delegate of the Chinese Educational Bureau. Furthermore, I will argue that for Dr. Tang and other Chinese physicians of western medicine, it is the failure rather than the success of the Japanese colonial endeavour in Korea that leads to their belief that the Chinese government should integrate Chinese medicine into its national health systems in 1922.

P33: Environmental History and Climate Change in Asia: Examination of Historical Records on Weather, Climate Crisis and Analysis of Historical Entanglement (Session 1)

The Jesuits of Ermita: The Manila Observatory, 1865-1945

Kerby C. ALVAREZ

This paper presents a history of the institutional development of the Observatorio Meteorológico de Manila/Manila Observatory, a scientific agency founded and supervised by the Jesuits in 1865. The scientific endeavors of this institution contributed to the advancement of modern instrumental sciences in the Philippines – meteorology, seismology, astronomy, and terrestrial magnetism. The observatory served not only as a repository of advanced observational and recording instruments that were purchased abroad and invented locally but also as a center of pioneering studies in environmental science – specifically on meteorology and climatology. From their observation complex located in the Ermita suburb of Manila, their advanced and groundbreaking scientific work ushered in the transition of science confined in the laboratories to the public sphere, as different public sectors of Manila, the international scientific community, and the neighboring colonial territories in Asia took part in the global and inter-island scientific projects from the late nineteenth to the early twentieth century.

In the context of the quincentennial celebration of the first recorded and globally recognized circumnavigation of the world and the Catholic Church-acknowledged year of the introduction of Christianity in the archipelago (1521-2021), this study attempts to contribute to the discourse by presenting a story of an observatory run by a group of missionary scientists, how they contributed to the development of science in the Philippines, and how the story this scientific institution engages us to revisit and rethink about the legacies of colonialism and the formation of the Filipino nation from the point of view of science.

Climate data rescue since the late 19th century in Asian monsoon region

Jun MATSUMOTO
Tomoshige INOUE
Hisayuki KUBOTA
Masumi ZAIKI
Ikumi AKASAKA
Nobuhiko ENDO

Climate changes in the past are of vital importance for understanding environmental history in a specific region. Most of the South and Southeast Asian countries, modern meteorological observation started during their colonial period. These observation data during the colonial period were kept in data books if they are published or the original data sheets in the meteorological office except some exceptional cases. They rarely utilized for the climate change studies in the Asian monsoon region. Under the monsoon climate, rainfall is one of the most essential climatological elements in order to understand their environmental history. Our Japanese group has digitized such old paper or image format data since decades ago. In most countries, meteorological observation started in the late 19th century, and they increased the number of observation stations until World War II. There were big data gaps during and after World War II in many countries, and they developed new observation system gradually after their independence. In addition to these in-situ observation data, meteorological data recorded in ship-log documents sailing over the western North Pacific provided precious weather information, but little have been utilized for our past climate reconstruction. We have also conducted digitization of such ship-log observation results. In this presentation, we will briefly summarize the history of meteorological observations and their data situation in Asian monsoon countries. Some past climate reconstruction results will also be introduced.

This paper is also co-authored by Fumiaki Fujibe of Tokyo Metropolitan University, Shigeru Kobayashi of Osaka University, Fumie Murata of Kochi University, Togo Tsukahara of Kobe University, and Atsushi Ota of Keio University, Japan

Seasonal changes in rainfall and surface wind at Manila for the late 19th century

Ikumi AKASAKA
Masumi ZAIKI
Hisayuki KUBOTA
Jun MATSUMOTO

This study investigates relationship between seasonal changes in rainfall and surface wind at Manila from 1868 to 1900. In the Philippines, the first regular meteorological observation was made by Spanish Jesuits at Manila in 1865 and was taken over by the U.S. administration around the beginning of the 20th century. However, the old meteorological records have been under-utilized in climatic research of the Philippines. We found the pieces of these records, archived in paper medium in different countries (e.g. the U.K., the Netherlands, and Japan). To study the long-term variability of the Philippine climate, we digitized some meteorological factors from these records under our data rescue projects.

From the digitized data, this study used hourly or 3-hourly wind direction (WD), wind speed (WS), and daily rainfall from January of 1868 to December of 1900, included in the monthly bulletins “Observatorio Meteorologico de Manila”. To investigate characteristics on seasonal cycle of the surface wind, we calculated the appearance ratio of WD within one pentad and the pentad mean WS for the period 1868–1883 and 1890–1900. There have not been found the monthly bulletins from 1884 to 1889 in our research. To analyze relationship between seasonal changes in rainfall and surface wind, the onset and withdrawal of summer rainy season were also determined by using pentad rainfall, calculated from daily rainfall: the onset (withdrawal) pentad corresponds to the first pentad when the pentad rainfall exceeds (falls below) the long-term mean pentad rainfall since April (August).

The results show that the seasonal change in the appearance ratio of the southwest (SW) monsoon closely corresponds to that in the pentad rainfall. The onset of the rainy season occurred around mid-May when the appearance ratio of the SW monsoon exceeded 20%. Around the early October, both the appearance ratio of the SW monsoon and the pentad rainfall amounts dropped steeply, and the appearance ratio of the northeast monsoon started to increase. There was the distinct dry season from February to April with the high appearance ratio of the trade wind (E–SE winds), exceeding 60%. The pentad mean WS had the peak from July to the early September when the peak of the rainfall amounts in the rainy season and higher appearance ratio of the SW monsoon appeared.

History of instrumental meteorological data records in the ship logs of foreign vessels sailing along Japan waters during the 18th to 19th century

Hisayuki KUBOTA

European and US ships sailed in the vicinity of Japan waters before the weather station network was established in Japan during the eighteenth and nineteenth centuries. Here we focus on the ship log weather records made on vessels sailing along Japan waters during this period. This study is based on the international activity of data rescue called the international Atmospheric Circulation Reconstructions over the Earth (ACRE) initiative. Data rescues over Asia are conducted by ACRE Japan, which is one of the regional branches of the ACRE. The oldest weather records in the vicinity of Japan were found to be recorded on the ship of the third expedition of James (Caption) Cook in 1779. Unfortunately, he was passed away before arriving in Japan waters. French explorer La Pérouse sailed along the Japan Sea in 1787. British navy Her Majesty Ship Providence came to Hokkaido of northern part of Japan in 1796. During the eighteenth-century weather records came mostly from the expedition cruises. In the nineteenth century, weather records were found from the US Navy and other ships came to Japan to open the country to the wider world. US Navy ship Morrison came to Edo Bay a former Tokyo in 1837. However, they failed to open the country. In 1846, US Navy ship Vincennes came to Edo, but they also failed to open the country. US Navy ships of Admiral Perry's fleet called the "Black ships" came to Edo in 1853 and 1854 and finally opened the country. We briefly introduce these old meteorological data based on ship logs of foreign ships in the vicinity of Japan waters.

Weather records observed by meteorological instruments on board are useful to understand the climate before the weather station network was established. When the ship stayed on port, especially navy ship kept weather observation and therefore they play a role as a weather station. In this study we focus on tropical cyclone observed by vessels. Three tropical cyclone (TC) events are introduced in the vicinity of Japan during the period from 21 to 25 July 1853 observed by seven US Naval Japan Expedition of Perry's fleet, on 23 and 24 September 1856 observed by Medusa of Dutch Navy ship, and on 15 and 16 August 1863 during the bombardment of Kagoshima in Japan observed by eleven UK Navy ships. Tracks of TCs are analyzed based on the ship log weather records.

IP39: Popularisation of Science

Enlightenment and Imagination: The Dissemination and Influence of Mars in Modern China

Ting CHEN

The latest scientific understanding and imagination of Mars in modern West spread widely in China through Chinese newspapers and periodicals in the late Qing Dynasty and the Republic of China, and aroused Chinese discussion, observation and independent creation. This process showed a distinct "Response to Communication" mechanism. Based on systematic combing of this case, it can be found that: firstly, Martian knowledge in modern China has gone through different stages from sporadic translation to systematic translation to Chinese intellectuals joining discussion, observation and independent creation; secondly, the Martian scientific issues concerned by Chinese intellectuals and the styles of Martian novels are deeply influenced by the previous translation and have innovation and development at the same time . With the mass dissemination of Martian knowledge, scientific discussion and imagination, Chinese intellectuals got rid of the traditional view of Mars and realized the enlightenment of Martian scientific understanding.

Nobel Laureate Who Had Worked in Many Companies -A Case Study of Leo Esaki

Sarenna BAO
Mei YONG

Because of the weight of the Nobel Prize in Science, it has attracted worldwide attention. Therefore, there are many studies on Nobel Prize. Among them, most Nobel laureates come from universities or research institutions, while few come from companies. Leo Esaki is a rare case.

Esaki spent his college years in the midst of the world war II, and successively worked in Kawanishi Corporation (now Fujitsu Ten), Tokyo Tsushin Kogyo (now Sony Group Corporation) and IBM T.J. Watson Research Center. He is called "Nobel Laureate who has been working in many companies". In 1957, as an ordinary staff, Esaki found the abnormal negative resistance effect in the heavily doped germanium semiconductor PN junction, pointed out that the reason for this strange phenomenon was the "tunnel effect", thus discovered the Esaki tunnel diode, the first quantum electron device and won the Nobel Prize in Physics in 1973 accordingly. In 1969, Leo Esaki and Raphael Tsu of IBM jointly proposed the concept of semiconductor superlattice. The literature related to it is still frequently cited nowadays. In 1991, he was awarded the IEEE Medal of Honor for his outstanding contributions. In his career, he won lots of prizes and also established the Leo Esaki Prize in 2003 to award those who have remarkable achievement in the field of Nano Technology.

Leo Esaki, after his fifty years of research work, he proposed "five don'ts" rule for youth. Wherein, rule number two -- "Don't allow yourself to become overlay attached to any one authority in your field" embodies his scientific spirit of exploring and innovating, persistently seeking truth, and daring to challenge. Rule number five—"Don't forget your spirit of childhood curiosity." indicates important source of his creativity. By digging archives and historical materials from the aspect of "people", "company" and "technology", we can present the research experience and explore his scientific ideas. The paper includes the following contents: (1) Esaki's research path. (2) Analysis the reason for Esaki's success in the semiconductor research field, his scientific contributions and ideas. (3) The inspiration from Esaki's scientific spirit and creative mind.

Popular science for who? constructing audiences and knowledge in Republican China

Noa NAHMIAS

This paper asks who were the audiences for an increasingly wide selection of popular science publications printed in China's urban centers in the 1930s, and reveals the tension between editorial intent and reader's desires in deciding what constituted "popular science" (tongsu keuxue 通俗科学) during the Republican era.

In the aftermath of the May Fourth movement, "scientizing" the Chinese people was an important endeavor for educators and publishers, who viewed science as a vital component of people's daily lives. Newspapers and periodicals carried science news and columns, publishing houses translated foreign popular science works and researchers mounted exhibitions to expose the public to their fields of study. However, the actual audience for these endeavors was often different from the idealized readers that publishers and editors hoped to target, and educate, with their publications.

In this paper, I draw on print culture studies to explore the dynamic cooperation between readers and editors in one publication, Science Pictorial (Kexue Huabao 科學畫報), published by the China Science Society from 1933 to 1953. While the editors set out to attract children, farmers and workers, the dialogue created with the readers throughout the two decades of its publication reshaped the editors' agenda. Through a deep-dive into the Letters to the Editor section, I aim to provide a sketch of the types of people who read Science Pictorial and how they defined what constituted popular scientific knowledge. Ultimately, I argue that throughout the journal's history, changing editorial policies and geo-political circumstances determined the extent to which audiences had a voice in shaping the magazine. Uncovering the readers of this magazine allows us to understand what kinds of scientific knowledge were considered necessary, appropriate and useful for which audiences. By understanding the audiences for popular science, we can evaluate what kinds of knowledge were seen as useful and necessary, and reconsider what was "popular" about popular science.

IP21: Dealing with psychic problems and emotions in traditional China

Managing Anger as an Occupational Hazard in the Ming (1368-1644)

Ying ZHANG

This paper studies "anger" in officials' lives in Ming China as a mental, emotional, medical, and professional problem. These classically educated men, while serving in the government, were expected to manage their emotions and could be disciplined for unprofessional behaviors caused by anger. Ming medical publications document how often they received treatments for illnesses triggered by anger. Meanwhile, the emperors' explosive expressions of anger toward officials fill Ming historical writing across dynastic, local, and personal genres. Managing anger was an everyday task for the ruling elite at the intersection of professional and personal lives. By examining official records, medical casebooks, personal writings, and local histories, this paper explores how anger was managed among officials. How were personal angry feelings channeled in the bureaucratic routine? How did their family members express anger differently? How did they cope with the emperor's rage? On

the one hand, there was a shared understanding that anger should be controlled. On the other hand, these educated men intellectualized anger by reconceptualizing the analogy between anger and natural phenomena in Confucian scholarship, thereby giving it a proper place in their professional lives.

Mild Breezes and Ravaging Storms: On the Parallelism of Weather and Emotions in Medical Literature

Minh Khai MAI-THI

In Chinese medical literature foundational theories about cognition and emotions were often framed by a comparison to climate and weather conditions. The juxtaposition of emotions and weather may seem like simply a sorting of phenomena according to models of correlative cosmology, macrocosm-microcosm. This paper argues that the comparisons also served other, more specific purposes.

Closer examination of passages where such juxtaposition occurs, reveals that the likening of weather and emotions could take different forms. In the Yellow Emperor's Inner Canon – Basic Questions (黃帝內經素問), some passages emphasise a direct correlation between climatic and psychological phenomena. In other passages, the comparison is expressed through parallel sentences without the same degree of correspondence. Rather, these parallel structures draw attention to certain similarities yet also important differences between weather and emotions. This type of parallelism thus clarifies and expands the meaning of medical emotion theories in other ways than correlations which stress direct correspondence.

The difference between these two modes of comparison becomes clearer by looking at a later text, Chen Wuze's A Unified Treatise on Diseases, Patterns, and Recipes According to the Three Causes (三因極一病證方論, 1174). In the treatise, Chen retains the structure of correlative thinking on a meta level. When detailing his emotion theory, however, the mode of parallelism dominates. Direct correlation as in earlier sources, is almost completely absent. Instead, Chen uses the comparison of emotions and weather to elaborate the distinctiveness of each ontological category. Furthermore, he utilises these distinctions to develop a new aetiological framework, his doctrine of the 'Three Causes' (三因). The doctrine designates cognitive and emotional excesses as 'Internal Causes' (內因), while climatic excesses are referred to as 'External Causes' (外因). This parallel distinction is then implemented on all levels of diagnosis and treatment.

Comparative analyses of such parallelism in the Basic Questions and Chen's treatise suggest that this mode of reasoning facilitated at least three types of development. First, it provided a structure for defining the basic features of emotions. Secondly, it helped clarify the distinction between normality and crisis, healthy and unhealthy psychological phenomena. Thirdly, it influences the repertoire of diagnostic and treatment methods. Undoubtedly, different modes of comparison coexisted and overlapped in the literature, but ultimately, they encouraged and lead to the development of different theories, interventions, and practices.

Sound and Movement in Mourning: The Regulation of Vocal and Bodily Expression in Times of Emotional Crisis

Ulrike MIDDENDORF

Chinese tradition developed an elaborate mortuary ritual system to properly express culturally coded and emotionally laden responses to life crisis such as the death of a family member, friend or colleague.

Mourning rituals helped to cope with the grief (ai 哀) of bereavement and were thought to have a positive impact on the social and psychological well-being of individual and community.

This paper explores the regulation of vocal and bodily expression of emotion in early Chinese death ritual, as found in the San li 三禮 (Three Rituals), their commentaries, and various related texts, including medical, philosophical, and historical sources. Starting with an analysis of the vocalization (ti 啼, ku 哭) of grief and pain and continuing with emotional motor components like beating the breast (pi 辟), stamping/leaping (yong 踊), and the ways of touching the corps (ping 馮, fu 撫, zhi 執, etc.), we finally consider the practice of ritual exposure (tan 袒) and its meaning in mourning. Evidence suggests that the ritual code serves as a means of stepwise down-regulating high focus, direction, intensity, and arousal in grief of the chief mourner and the ritual participants, observing gradation of mourning obligations by kinship proximity, gender, and age. On the paradigm of li 禮 as an "artificial" (human-made) system of social and psychological control that properly adjusts "natural" (nature-given) qing 情—emotion and other types of valenced reaction classified as affect (moods, attitudes, interpersonal stances, dispositions) —intrinsic regulation (self-regulation) and extrinsic regulation (other-regulation) of sound and movement are always targeted at right measure (jie 節) complying with change in the emotion experience.

We argue that the regulation of emotional expression and emotion/affect in general serves therapeutic purposes and allows the chief mourner to appropriately fulfil his filial piety (xiao 孝), while the other ritual participants are able to aptly perform their role-defined duties towards the deceased on various levels of filial devotion, confirming the essential social value of this virtue and its centrality to Confucian role ethics as well as to personal health.

IP23: Natural environment and ecology

Two reports published late in China: Limits to Growth: A report to the Club of Rome (1972) and Only One Earth: The Care and Maintenance of a Small Planet (1972)

Qin YAO

China has produced many thoughts related to natural protection in the course of thousands of years of development, but the thought of environmental protection is exotic. In the 1960s, the global environmental protection wave rose. In the 1970s, China was exposed to environmental protection thought. It is worth noting that the time was Chinese Cultural Revolution period - a special historical era. During the period, massive aspects of China's business were stagnant, people's thoughts were conservative, to explore the issue of environmental pollution was regarded as exposing the ' dark side ' of society, but why environmental protection thought had the germination opportunity at that time? Except is the thought of environmental protection widely spread in society? Although previous research had analyzed some reasons, such as the facts of environmental pollution, the work of Premier Zhou Enlai, important environmental protection conferences, etc., these reasons still cannot explain well why environmental protection thought are allowed to spread. Therefore, this paper collects and collates the texts, newspapers and environmental science books related to

environmental protection published in mainland China in the 1970s, than to examine the birth process of environmental protection thought in China's special historical period from the perspective of internal reasons, that is, environmental protection thought itself.

Forests and Borders: A Study on the Investigation of Forestry Resources in the Yalu River Basin Before the Russo-Japanese War

Qifang WU

The ecological transformation of forest resources in the Yalu River basin in modern times has been both endogenously driven and stimulated, collided and embedded by a series of exogenous factors. Since the late Qing Dynasty, the forested borderlands, as a buffer zone, have attracted both Japanese and Russian forces to expand forestry on both sides of the Yalu River basin. Since the implementation of Russia's Far Eastern expansion policy, it has repeatedly explored the forest resources of the Yalu River basin in the name of botanical expeditions, borrowing land for road construction and establishing "barriers", with the intention of using "Manchuria" as the basic "sphere of influence "The Yalu River basin was used as a buffer zone and the Yalu River Forestry Rights Corporation as a base to prevent Japan from entering Manchuria, thus conflicting with Japanese interests. In the three subsequent Japanese-Russian negotiations centred on the "Manchurian exchange theory", the issue of Yalu River forestry rights became an important means of fomenting war sentiment by the Japanese war masters. There were multiple reasons for the outbreak of the war, but the right to forestry on the Yalu River was one of the major contributing factors. The interaction between nature, people and the state is developing in a complex way in the Yalu River Basin and beyond the boundaries of the Qing Dynasty and Korea. The struggle over the Yalu River's forestry rights inspired China's frontier-building enthusiasm, mobilised the nationalist imagination of Korea, stimulated the colonial imperial enterprise of Japan and Russia, and promoted the modernisation of the Northeast Asian region.

Josiah Dwight and Chinese Geology

Dingding HONG

Josiah Dwight Whitney was an outstanding geologist in the United States. He began his professional work when New York State geologically an unknown land and he took part in scientific exploration of the nearer West of America, and He helped to advance geology from small beginnings into the modern science. In the 1860s, Whitney successively recommended and supported Pumpelly and Richthofen in their geological exploration of Asia and China, and promoted the development of Asian geology, especially Chinese geology. Whitney did not conduct a field survey of Asian geology throughout his life, but he participated in the discussion of Pumpelly and Richthofen on Chinese geology, and he continued to focus world attention on the development of geology in Asia and China. At present, scholars have researched into the process, results and influence of Pumpelly and Richthofen geological investigations in Asia and China. However, a few articles have expounded the process of Whitney's contribute to geological investigation in Asia and China. Based on Whitney's relevant letters, memoirs, diaries, academic achievements, this paper combs the contact history of them, and expounds Whitney's important academic contributions to Asian geology, especially in the history of Chinese geology.

IP46: Appropriating science and technology in Post-WW II East Asia

The Early Founding of Computational Mathematics as a Discipline in the People's Republic of China

Tao WANG

With the invention of electronic computers in middle 1940s, a new discipline called computational mathematics or numercial analysis was formed and developed in a few countries firstly such as United States and the Soviet Union. In view of the importance of computational mathematics in Scientific and Engineering Computing, some mathematicians of the People's Republic of China began to establish institutions to teach and research it in the era of learning the Soviet Union comprehensively in the mid-1950s. Based on the archives, oral interview and other original materials, this paper focused on the early period of the establishment of computational mathematics research and teaching institutions in P. R. China. In other words, this paper will review the start-up process of computational mathematics as a discipline in P. R. China from the perspective of Sino-Soviet scientific communication in the field of the mathematics.

Neutrino Physics: a comparative study of reactor experiments for neutrino oscillation in Asian countries

Jinyan LIU

Neutrino physics plays a crucial role for human understanding the basic structure and the fundamental interaction of elementary particles. In recent periods neutrino physics has been going through a revolutionary period. For instance, physicists using neutrino oscillations as a vital tool for probing neutrino mass and other fundamental properties of neutrinos. Asian counties, such as Japan, China and Korea, have conducted several renewed experiments to make precision measurement of the neutrino mixing angle. In addition to a introduction of the China's Daya Bay experiment, which including its experimental design, key technologies and the main factors for promoting its high efficiency accomplishments, a brief comparative study of Korea's Reactor Experiment for Neutrino Oscillation (RENO) and Japan's neutrino study are also included in this talk.

The V-2 Technology Transfer from the USSR to China

Fang WANG

V-2 technology was transferred from Germany to the Union of Soviet Socialist Republics (USSR) and then on to China. The USSR imitated the captured German V-2 rocket, and independently developed the R-2. Later, China imitated the R-2 rocket provided by the USSR, and independently developed the Dong Feng-2 (DF-2). It took China three years to accomplish the copy of the Soviet R-2, which was a crucial step on the way of pursuing the rocket technology. China also established its own team for rocket research, design, manufacture and testing which generated impetus for the construction and development of the domestic bases of rocket research, manufacturing and launching, thereby consolidating the foundation for later independent research and manufacture of ballistic rocket.

P26: Medicines outside the Box: Transformed and Transformative Materials in Medieval and Early Modern Japanese and Chinese Medicine

Reinventing Zhu (Atractylodes Rhizome): Recipes, Market, and Healing Culture in Song China (11th–13thCenturies)

Hsiao-wen CHENG

Zhu (atractylodes rhizome) has been an important medicinal substance in both Chinese materia medica and the Daoist healing and cultivation traditions. Contemporary Chinese medicine distinguishes two kinds of zhu—the dark zhu(cangzhu) and the white zhu (baizhu)—in every recipe. Such a distinction only became salient since the eleventh century, when the editors of two major medical compilations commissioned by the Song imperial court asserted that white zhu was the better kind and that all references of zhu in pre-Song recipes were white zhu. Around the same time, the Song state established dispensaries to procure raw drug materials, to process them based on the recipes that its own commissioned editors compiled, and to sell the public processed medicinal compounds. The distinction between dark zhu and white zhu that occurred during the eleventh century was important because by the twelfth century, commentators observed a surge in white zhu's market price. Meanwhile, a few practitioners and amateurs began to criticize the popular preference for white zhu over dark zhu.

This paper pays particular attention to the materiality of zhu and its processing methods recorded in Song and pre-Song texts. I argue that both kinds of zhu were used frequently in pre-Song medicine, whose practitioners had noted their difference in texture (and hence different processing methods) but did not distinguish their properties or grade. What happened during the eleventh and the twelfth centuries was indeed an event where the state's medical institutions, the market, and the larger medical practice intertwined. I conclude by noting the ways in which medical writers reinvented zhu during the Song, as well as the ways in which the cheaper and easy-to-get kind of zhu played important roles in Song people's everyday life.

Divine Scents and Aromatic Medicines: Ruxiang (Frankincense) from the Red Sea to China

Margaret Wee-Siang NG

Ruxiang (frankincense) was one of the main materia medica used as pain medication during traumatic birth recorded in Song formularies. Frankincense was one out of many other resins and gums used in drugs, spices, perfumes and incenses. Within the tradition of aromatics, i.e. xiang, by middle period China, foreign materia media such as camphor, benzoin, storax and frankincense, had become important aspects of Chinese medicine and perfumes. In fact, frankincense was so important that it became a key state monopoly in the Song dynasty's Indian Ocean trade. Imported from the Red Sea region (mainly the Hadramaut or Somaliland) to China in the middle period (Tang to Song), its uses were associated with religious and divine forces from its place of origins were also imported to China. Frankincense was offered as incense to gods in Arabia and also in purification rites at funerals. It was also mixed with other spices to embalm corpses. Yemenite Jews used frankincense to hasten and alleviate the hardships of a woman giving birth, and again after childbirth for purification. This paper examines how frankincense appeased the divine in the ritually polluting act of childbirth and alleviated the pain of childbirth. It will trace how an aromatic came to be used in medicine for ingestion.

Daikon as Drug: Eating Against Medicine in Early Modern Japanese Dietetics

Joshua SCHLACHET

This paper seeks to historicize and interrogate the idea, common both in

popular and academic characterizations of East Asian medical systems, that 'food and medicine are one.' While often cited historiographically to emphasize a contrast with Western biomedicine, such an assertion also runs the risk of conjuring, or being subsumed within, an Orientalizing gaze of 'Eastern' medicine as alternative to, or apart from, the supposedly verifiable health claims of modern science. Through an examination of competing representations of foodstuffs and herbal medications in early modern Japanese nourishing life (yōjō / weisheng) guidebooks, this chapter explores how advocates of diet as a superior health strategy exhibited a growing antagonism between food-based prevention and drugs as a retroactive, violent intervention in the natural workings of the body.

Nourishing life guides reveal a tension between diet, as a preemptive program of health maintenance, and medicine—particularly herbal and patent medications—as a potentially harmful last resort to undo bodily damage accumulated through insufficient self-care. Despite their shared origins in materia medica guidance, both were often set as oppositional categories, and nourishing life authors deliberately sought to distance the dietary regimens they recommended from 'medication,' even when discussing the prevention of specific diseases. By tracing the socio-medical biography of daikon radishes, often portrayed as a sort of miracle cure in eighteenth- and nineteenth-century Japan, I argue for a renewed attention to the fault lines between foods and drugs in a transforming Japanese materia medica that increasingly came to position eating against medicine.

P66: The Impact of Place on the Production in Early Modern East Asia (1000-1900)

New Perspectives on the Production of Metallurgy Knowledge

Keli GAO

Raozhou prefecture (in present-day Jiangxi province, southern China) was the stronghold of metallurgy and mintage starting from the Northern Song (960-1127), and it held the imperial agency supervising the industry of metallurgy at the national level. This paper examines how the production of metallurgical knowledge was related to various social factors of Raozhou as a place. Da ye fu [Great prose poem on metallurgy]) by Hong Zikui (1176-1236) is rare piece on the history of metallurgy: It provides an overview of metallurgy and mintage before and during the Song dynasty and especially elaborates the processes of mining, smelting, and minting. This paper raises the following question: if Confucian scholars rarely showed interests in technology, then why did Hong Zikui compose such a piece? Actually, Da ye fu was almost unknown to Hong's contemporaries, and received only a few comments until the twentieth century. It was written during the most difficult times in Hong's life when he was appointed to a low position at a local academy in Raozhou prefecture. However, Raozhou, as the center of metallurgy and mintage, lent Hong the opportunity to access the insider knowledge in the industry. As the teacher of the local academy, Hong was acquainted with Gong Rong (13th century), the superintendent of the imperial metallurgy agency. Meanwhile Hong's academy was also close to the office of mintage. The first part of this paper will examine the social contexts of the writing of this piece. The second part will examine how Hong could have formulated his social

networks and gained the knowledge from officials and workers in Raozhou. The third part will discuss why Raozhou, as a place, had an impact on the production of knowledge in his piece.

Maps of Jingdezhen: Three Faces of the City in the Qing Dynasty

Yijun HUANG

Jingdezhen, a small town in Fuliang county (in present-day Jiangxi province, southern China), was mostly renowned for porcelain industry in late imperial China (1368-1911). However, little attention has been paid to the geographical understanding and cartographical imagination of the site itself. This paper examines how three Qing (1644-1911) maps depict the city of Jingdezhen and how porcelain production is positioned in their envisioning of the place. From different perspectives and measurements, these maps present three types of spaces: The first map in Fuliang xianzhi [County Gazetteer of Fuliang], presenting Jingdezhen only as a town in the administrative space of Fuliang county, should be considered in the context of administrative maps; the second map from Jingdezhen taolu [Records of the Jingdezhen Porcelain Kilns], a treatise focusing on the technology of porcelain production in Jingdezhen, depicts the workspace of imperial kilns and the living space of kiln workers; the third map, rendered on a blue-and-white porcelain tabletop, is an innovative drawing based on the above two maps and fashions Jingdezhen as a scenic site and a scholarly space. In conclusion, I argue that, in order to foreground their themes, these three regional maps consciously incorporate different types of techniques in mapmaking and landscape painting, and skillfully manipulate locations, directions, and measurements, and construct porcelain production of Jingdezhen in various different discursive contexts.

Compromised Empiricism: Visual Culture of Materia Medica in Song China

Fan LIN

Zhenglei bencao (Verified Materia Medica), an encyclopedic project of materia medica orchestrated by the Northern Song (960-1127) government, captures the conundrum faced by the central state in attempting to systemize local knowledge. The information presented in the book draws on two sources: materia medica from previous dynasties and, and more importantly, local knowledge of the Northern Song period. This paper, focusing on the latter case, explores how the empirical practice in illustration making was compromised by the rapture between the state's demand for standardization and the disparate nature of knowledge in various local regions. The central government did not request real entities, but only ordered the local governments to submit the illustrations, which served the idea of distinguishing local varieties rather than providing an accurate representation of their physical appearance. The entry of every item in Zhenglei bencao is accompanied by its alternative names and illustrations of its appearance in various prefectures. The first part of this paper examines the ways in which the central government requested the illustrations of local products; the second part uses digital tools to explain why the illustrated items from certain prefectures were more visible than those from the others; the third part investigates what locality meant to the "universal" knowledge. I argue that the juxtaposition of illustrations from various local regions is a visual metaphor of, on one hand, the attempt of the central state to incorporate local regions into a homogeneous system of knowledge, and on

the other hand, an unavoidable glitch of the imperial enterprise. In sum, the Northern Song project of illustrating the Zhenglei bencao contributed to an epistemic shift, and more specifically, a "visual turn" that mobilized the increasingly institutionalized mechanism of the empire building.

Brick Kilns in the Three Ming Capitals: Firing Technology, Supply Networks, and Transmission

Lianyu JIN

In comparison with the abundant research on porcelain kiln sites in the Ming dynasty (1368-1644), brick and tile kilns are much understudied. This paper examines the ways in which the construction of the three Ming capitals (Nanjing in Jiangsu province, Zhongdu in Anhui province, and Beijing) accelerated the development of ceramic technology with a focus on bricks. It especially pays attention to essential role of the three capitals as the drivers of breakthroughs in both productivity and technology of brick manufacture.

The founding of the Ming dynasty demanded a large number of building materials, especially bricks. Therefore, a massive number of bricks and tiles were produced to build the three capitals. During this process, kilns played a key role in technological advancement. As official kilns were producing bricks for the three capital cities, the structure and firing technology of kilns had reached unprecedented level in East Asia at the time. Mainly based on the most recent archaeological discoveries, this paper aims to understand the driving forces for disparate features of brick-firing technology in different regions. The first part of this paper will examine the supply network system of bricks for the three capitals; based on different kiln structures, the second part will focus on brick-firing technologies in three areas: the middle and lower reaches of the Yangtze River, the area along the Weihe River, and the Linqing area; the third part will analyze the similarities and differences in kiln shapes and firing technologies in these regions; the last part will discuss the differences between kiln structures and management methods in these regions, identify the basic modes and supply system at official brick kilns, and investigate and transmission of brick kiln technology of the Ming dynasty across the empire as well as in East Asia.

Renegotiating notions of place and prosperity in urban knowledge of whales and whaling in early modern Japan

Doreen MUELLER

While writings about whales were produced in the capital area of Edo (present-day Tokyo) by scholars of Chinese and Western learning, the practical knowledge of whales came from the whaling communities in Southern Japan. In this sense, Southern Japan as a place was crucial to the so-called metropolitan knowledge which deemed the universal standard. Knowledge of whales and whaling were closely intertwined and deeply local in early modern Japan. As Jakobina Arch (2018) has shown, village communities based in southern Japan and near the inland sea in western Japan undertook enormous efforts to bring whales ashore, catching and processing them on site. Whale products benefitted local communities by providing sustenance even in times of crop failures and famine. Illustrated scrolls documenting whales and whaling practices for local tax offices and domain lords showed the close ties between whales and local people, demonstrating that the local nature of knowledge of whales and whaling was grounded in the auspicious connotations that whales held for local communities. However, notions of place and prosperity acquired different meanings as urban dwellers took an interest in whales

and local whaling practices in the late eighteenth and nineteenth centuries. They re-envisioned whales, whaling, and local communities as visual spectacles and as subjects of scientific inquiry. Printed illustrated travel guides and scholarly works registered whales and whaling as signifiers of local practices and products, and within the universalising frameworks of Chinese and Western medical knowledge. This paper will investigate how urban knowledge of whales and whaling renegotiated the meanings of place and prosperity by considering the Nihon Sankai Meibutsu zue (Illustrated Guide to Famous Products of Land and Sea in Japan, 1797), produced by a group of amateur scholars, and Geishiko (Whale History, 1808), authored by Ōtsuki Heisen (1773-1850), a scholar based in the capital of Edo.

August 25th

III. 14:10 – 15:50

P28: Medicine, Hygiene, and Nursing in Modern China

Remolding the image of midwives by the concept of sterilization in childbirth during the Republic of China

Cheng ZHEN
Yuntian HU

In the late Qing Dynasty and the early Republic of China, Western obstetrics was introduced into China, and knowledge of childbirth disinfection could effectively reduce the occurrence of postpartum infection. During the Republic of China, the maternal and infant mortality rates were high, most of which were caused by puerperal fever and neonatal tetanus. Therefore, traditional Chinese midwives were regarded as "dirty". To improve the health status of women and infants, the government of the Republic of China developed midwifery. Traditional midwives were included in midwifery education. Traditional midwives played an important role in promoting new methods of delivery and the concept of disinfection in childbirth, and their image was reshaped. In this process, the important value of the government's policy on midwife training and the national characteristics of midwifery education development in the Republic of China were also shown.

Key words: disinfection; traditional midwife; new methods of delivery; midwifery education

Fund: Beijing Social Science Fund Project (21LSA001)

Cora Eliza Simpson and the beginnings of modern nursing in China

Zijing WU
Cheng ZHEN

In 1907, one American nurse called Cora Eliza Simpson arrived at Fujian Province of China. She founded the Florence Nightingale School of Nursing in Fuzhou and applied the American teaching model. The school tried its best to improve the teaching quality of the students in the three aspects of “mdical knowledge”, “clinical operation” and “humanistic quality”. Her theory of equality between doctors and nurses liberated nursing from the handmaid's status of medicine, closely integrated science into the nursing practice, and made nursing truly become an independent specialty. Simpson was a co-founder and the general secretary of the Nurses' Association of China (N. A. C.). She represented China at international nursing conferences in Finland, which increased China’s reputation in international nursing affairs. Whether Cora Eliza Simpson was in China or the United States, she has always cared about the nursing establishments of China. Combined with historical materials, this paper analyzes the multiple images of Cora Eliza Simpson as the pathfinder for the nursing profession, the organizer of Chinese nurses and the messenger between Chinese nursing circles and the world.

Key Words: Cora Eliza Simpson; History of nursing; Modern China

Fund: National Social Science Fund of China Program (22VJXT010)

The influence of healthy lifestyle behaviors on cognitive function among older Chinese adults across age and gender: Evidence from contemporary China

Taozhu CHENG
Jing GUO

We examined the combined effect of healthy lifestyle behaviors on cognition and explored the potential age and gender differences among older Chinese adults from a contemporary perspective. This study utilized data from the Chinese Longitudinal Healthy Longevity Survey (CHARLS) dataset and constructed four waves (2008-2018) of panel data of 9805 individuals over 60 years. Fixed-effects regression models were used to analyze the relationship between healthy lifestyle behaviors and cognition. Controlling for social and health-related factors, we found that older adults with higher healthy lifestyle scores were associated with better cognition (β=.549, SE=.100). Older age (β=.023, SE=.006) and female gender (β=.258, SE=.134) could increase the effect of healthy lifestyle behaviors on cognitive function. Meanwhile, older age could also promote the impact of diet (β=.050, SE=.013) and exercise (β=.072, SE=.010) on cognitive performance. Our findings indicated that healthy lifestyle behaviors could help prevent cognitive decline among older Chinese adults. Older age and female group may enhance the protective effect of lifestyle behaviors on cognition. Our study suggests that the government needs to launch campaigns and health policies on healthy lifestyle promotion interventions to reduce health inequality and health burden for older adults.

Key words: Lifestyle behavior; Cognition; Fixed-effects model

Nursing History in the Fujian Soviet Area

Ying HUANG

Abstract: In the Central Soviet area, both the Red Army and the Soviet government attached great importance to nursing work and formulated and promulgated many health laws and regulations to establish and improve nursing work. Nursing staff are

trained through various means, such as nursing schools, training classes for female nurses, and the recruitment of nursing students in Red Army hospitals. To compensate for the serious shortage of nursing staff, local people were also widely mobilized to organize nursing teams to help the medical personnel of the rear hospitals to care for the wounded and sick. Among the students who graduated from the nursing school, outstanding students were selected to continue their studies in the Red Army Medical School and gradually stepped into the medical front of the war. Some shed their last drop of blood for the revolutionary cause, and some took up important leading posts or professional backbones in the medical field in the construction of the People's Republic of China. Through this research, this paper not only reveals the importance of nursing work during the war but also reflects the revolutionary spirit of nursing workers who are not afraid of sacrifice, are willing to sacrifice, master professional skills, and serve medical practice.

Key words: Fujian Soviet Area; Nursing; History

A Leap From Practice to Theory: Evolution of Orem's self-care Theory in China

Xiaoyun ZHAO

Orem's self-care theory was introduced to China by Zhang Ming and Li Guanchao in 1982. In 1992, Zheng Xiuxia applied the theory to patient discharge guidance. In 2000, the application of self-care theory increased rapidly, and then similar studies showed a curve rising trend and became the main research direction. After Zhao Yu studied the application effect of self-care theory in maternal and infant wards in 2002, research on the self-care theory effect (evaluation) has become another major research direction. In 2009, Zhang Jianli's research on the correlation between orthopedic patients' self-care ability and nursing needs was the beginning of deepening self-care theory research. In 2018, Chang Mingming studied the influence of self-care theory on self-care ability and analyzed the weight of influencing factors, which further deepened the research on self-care theory. In addition, Ding Biao in 2004 and Yang Silian in 2011 made valuable and beneficial philosophical reflections on self-care theory. In 2013, Chen Yue tried to construct a new theory based on self-care theory. In summary, Orem's self-care theory has existed for 40 years in China. It took 18 years from the introduction of the theory to its full application, which was mainly related to the recovery of nursing research in the early stage of reform and opening-up. After 2000, the number of studies increased, but the research direction was very singular, including basically only application and effect evaluation research, indicating that academic thinking was not sufficiently broad. Encouragingly, recently, there has been a trend of deepening the research of self-care theory, and some scholars have carried out philosophical thinking and sought theoretical innovation. This reflects the development trend of nursing from practice to theory in China.

Key words: Orem; Self-care theory; Nursing science

China's Health Education in Schools in the Second Half of the 19th Century

Disi GAO
Cheng ZHEN

China's health education in schools began in the latter half of the 19th century, in the last decades of the Qing Dynasty. In a desperate effort to save itself from collapsing and maintain its rule, the Qing government launched the Self-Strengthening Movement to import Western

science and technology. As modern-style schools of various kinds emerged across the country, school health education came into being, with clear requirements for students' health and hygiene habits. School health education in the early stages was aimed at strengthening the body and thus building a powerful nation. The knowledge taught involved both traditional Chinese medicine and Western medicine, and a path of independent development of teaching materials was embarked on. The role of school doctors was, at that time, assumed primarily by people called yiguan (medical officer), weishengguan (health and hygiene officer), yiyuan (medical personnel), or yishi (medical professional), who served as the protectors of the basic health of the students. By reviewing the development of school health education in China during this period and analyzing it in terms of its goals, approaches, and contents, this study examined the characteristics of the way knowledge of medicine and health was imparted in the country during this period in terms of educational philosophy, concepts of the human body, and concepts of health and wellbeing. It was found that an absolute educational philosophy caused by the ambition to strengthen the country by improving the health conditions prevailed, accompanied by a contradictory idea of the human body regarding it as belonging to both the individual and the state and the shift of the mentality of health and wellbeing from health maintenance in the traditional context to the Western notions of health.

Key words: school; health education; educational philosophy; concept of human body; concept of health and wellbeing

Fund: National Social Science Fund of China Program (22VJXT010)

P53: Crises, Resilience, Local Practices: the Field Allocation System and the Reinvention of Cosmology in Late Imperial China (17th-20th century)

Tracing Western Learning in the fenye chapters of Qing dynasty local gazetteers (mid 17th – mid 19th century)

Huiyi WU

It has often been argued that the introduction of early modern European cosmology by Jesuit missionaries (encapsulated under the generic term of Western Learning, xixue 西學) at the turn of the 17th century signalled the demise of traditional fenye theory, as the concept of Earth's sphericity and the widened sense of world geography are fundamentally at odds with the Sinocentric worldview on which rests the fenye theory. However, fenye chapters from Qing dynasty local gazetteers suggests a different story: the proportion of gazetteers containing a fenye chapter has risen, not diminished, compared to Ming gazetteers; these chapters rarely set themselves against Western Learning. Instead, they most often invoke Western Learning as part and parcel of the imperially sanctioned astronomy to be reckoned with, even a remedy to existing defaults of traditional fenye techniques, leading to a plurality of discourses in which the Sino-Western relation becomes entangled with the imperial-local tension. This phenomenon is particularly visible in the peripheral regions of the empire, such as Guangxi, as they are traditionally marginalized by the Sino-centric cosmology of the fenye system. This paper explores these discourses to answer the following questions: What were the agendas which Western Learning were made to serve in these gazetteers? How did these local endeavours relate to the court-sponsored

imperial projects? What were their source of knowledge on matters of Western Learning, and how can we map out the geography of Western Learning based on these local sources?

Slow Progress: The Change and Decline of Fenye Knowledge in Chinese Local Gazetteers after the Introduction of Western Sciences

Jiajing ZHANG

Scholars used to consider that, after the introduction of early modern Western sciences of astronomy, geography and cartography, the long-prevailing fenye theory in China declined, and eventually disappeared by the late Qing period. However, using digital tools developed by the MPI to analyze over 800 late Qing gazetteers (1796-1911), we make three observations that complicate this linear narrative, showing the change from the traditional to the modern cosmographic system was a slow protracted process.

1, As the fenye theory provided the framework for situating locations on Earth with reference to areas in heaven, it remained popular during the late Qing period, with no sign of decline;

2. Even after a change of attitude occurred at the court level, local-level actors were slow to follow suit. The court's attitude was revealed in the 1781 Imperially Sanctioned Rehe Gazetteer (Qindin Rehe Zhi, 钦定热河志), as it replaced the fenye section by the "Gnomonic degrees" (Guidu, 晷度) section, arguing that the longitude-latitude system were more precise than the traditional Heaven-Earth correspondence of the fenye system. Despite the precedent set by the imperial court, only 90 gazetteers in later decades of the Qing dynasty adopted the longitude-latitude system, and most of them preserved the fenye section at the same time.

3. Only a small number of gazetteer maps incorporated the new longitude-latitude system and adopted data from the "Gnomonic degrees" (Guidu, 晷度) section, while traditional mapping techniques remained current in the majority of gazetteer maps.

Digital Analyses of the Field Allocation Sections in Chinese Local Gazetteers

Shih-Pei CHEN

Digital methods can offer alternative ways to examine existing Chinese local gazetteers, a major proportion of which have been digitized, making quantitative analyses not only possible but essential. Local Gazetteers Research Tools (LoGaRT) is a suite of digital research tools that brings a collective lens to studying the genre and helps scholars to identify patterns in this local knowledge chest across time and space. For example, by analyzing the section headings of 4,410 titles of gazetteers, one can quickly obtain an overview of when fenye 分野 became a dedicated section, when the alternative heading xingye 星野 started to emerge, and when both of them were greatly replaced by new categories that were born out of the collision, negotiation, and creation between the tradition and the western epistemology at the turn of 19th to 20th century.

This paper reports on applying third-party digital analytical tools for identifying similar text passages and visual materials in the fenye / xingye sections. With TextPAIR, we see how classical references of the fenye theory kept being quoted across local gazetteers, and when and where gazetteers compilers started to establish new arguments in response of western astronomical theories to either challenge or rephrase the traditional fenye theory. VIKUS Viewer helps to quickly explore the 1440 pages of star maps that we identified.

Its "Similarity" function displays and clusters images according to their styles. We will analyze a selection of image clusters and provide possible reasons of them being stylistic similar.

Uneven Transformation of the fenye Section of Local Gazetteers in Qing Dynasty

Tan DAN

The field allocation (fenye 分野) theory, as a cosmological, astrological, and geographical system, was profoundly influential in China throughout the imperial period. It most notably gave rise to a huge corpus of the fenye section in local gazetteers. From the 17th century on, however, it was challenged by the newly introduced Western science and gradually replaced by the longitude-latitude system. The evolution of the fenye scheme, as we can observe in the local gazetteers, was an epitome of the broader changes in the history of science, knowledge and thought of the Qing Dynasty. This paper reconstructs the temporal and spatial patterns of these changes. We argue that there was no radical break in the fenye section of local gazetteers in Qing dynasty, but rather various regionally marked processes of transformation at uneven paces. We observe that, until the Tongzhi and Guangxu period (1856-1908) at the end of the Qing dynasty, most gazetteers maintained the fenye section, sometimes alongside with the newly introduced longitude-latitude system. However, some gazetteers of the same period categorically deleted the fenye section, replacing it with the longitude and latitude measurements. This phenomenon is most marked in Guangdong, Hunan, Anhui and Jiangsu, provinces that led the way in introducing new Western science during the Self-Strengthening Movement. We will offer case studies from these regions, to demonstrate how local literati adjusted a traditional knowledge category and found innovative ways to synthesize Chinese and Western knowledge.

Insular versus Continental: A Marginal Early Chinese Spatial Concept Visualised in Late Imperial Popular Field-Allocation Maps

Vera DOROFEEVA-LICHTMANN

The proposed research is concerned with maps of field-allocation (fenye 分野) found across late-Ming popular encyclopedias (first half of the 17th century). The correlative cosmology is a well-studies spatial concept, and one of the instruments of divination characteristic of Chinese culture. Yet the maps are often overlooked as visual sources on the earth-heavens correspondences. For specialists on Early China, these maps are "too late", and for historians of cartography, they are marginal and "primitive" items, lost among a great number of other Ming- and Qing-dynasty cartographic sources. I shall apply an innovative methodology to systematically investigate landmarks listed in early Chinese terrestrial descriptions and their locations in traditional Chinese maps, especially those that were drawn as comments or reflections on the former. In contrast to the majority of the Chinese general maps, the field-allocation maps represent the imperial realm as a cluster of islands. I shall trace the conceptual origins of the field-allocation maps back to the early Chinese cosmography in all their complexity, and in particular, of their insular structure, and try to determine the reasons of the emergence of popular field-allocation maps in the early 17th century. I shall also call attention to the evolution and a long-term after-life of the field-allocation type maps up to the early 20th century equally overlooked in scholarly literature.

Astrological and Geomantic Invocations of the "Western Calendric Method" In Qing Sources

Tristan G BROWN

Following its formulation by Johann Adam Schall von Bell (1591-1666), the "Western Calendric Method" (xiyang lifa) came to be the basis of the last Ming and then Qing calendars (shixianshu). That the "Western Calendric Method" was invoked regularly in official dynastic sources during the Qing is, therefore, unsurprising. More striking is the fact that the Western Calendric Method posed new opportunities for Qing elites and literati in astrology, and by extension, fengshui. Over the course of the Qing dynasty, scholars invoked the Western Calendric Method in offering new astrological readings of provincial histories and even employed it to alter the layout of the geomantic compass. In the broadest sense, the updated calendar and the institutionalization of Jesuit knowledge supported some aspects of imperial ritual and Chinese cosmology over the 18th-19th centuries by providing practical knowledge, and hence new citational options, rooted in various forms of legitimacy for people in Qing society.

P10: Resourceful material practice: 機智, technoscience of living and playing with material

A Considerable Ingenuity of Revitalizing Wastepaper into Reusable yet Valuable Resources: Recycling, Repurposing, and Upcycling Waste Material Culture in Edo-era Japan (1603–1868)

Fumihiko KOBAYASHI

As a member of the high-tech global community, we enjoy using state-of-art lithium battery-operated gadgets, consuming disposable plastic products every day. Unfortunately, this habitual behavior gradually leads to environmental damage as same as industrial air pollution does. Ironically, our industrial ingenuity that raises the living standard eventually causes one of our generation's most complex yet challenging problems—how to manage wastes that rapidly accumulate and gradually deteriorate our environments. Today we cannot ignore this global waste issue anymore.

Looking into our history globally and timelessly, we can observe how our ancestors wisely navigated household, agricultural, and manufacturing wastes, learning practical examples of their ingenuity in managing such wastes. Among many good precedents worldwide, Edo-era Japan (1603–1868) can exhibit an interesting yet valuable example to reconsider our current global waste issue.

Thanks to a thriving economy in Edo-era Japan, waste materials generated by households and commercial industries gradually flooded societies. This social issue led Edo-era artisans to start running twenty-three occupations of new businesses to revitalize such waste materials. They dealt with, for example, broken ceramic wares, old umbrellas, worn-out kimonos, and wastepaper; they bought these waste materials, fashioning them into newly reborn commodities to sell at low price. When these products got worn out again, people usually sold them at recycling shops, buying another recycled yet newly born one there.

Among those occupations, the wastepaper business flourished. Thanks to a considerable number of literates, woodblock-printing books were sold well, widely circulating across Edo-era Japan. Publishers did not always use brand-new paper; instead, they used recycled paper to sell woodblock-printed books reasonably priced. A bunch of wastepaper was also reborn as fusuma and shoji paper, with

which people decorated their homes. Moreover, wastepaper became the essential material of papier-mâché toys, which served as significant implements for practicing the anti-smallpox cult rite at home during Edo-era Japan. Thus, revitalizing wastepaper enacted vital parts of Edo-era Japan's economic and sociocultural backbones.

This revitalizing wastepaper system well operated through Edo-era Japan, forming a significant part of its dynamic economy. In this connection, this study focuses on the revitalizing wastepaper system, illustrating the whole picture of the recycling, repurposing, and upcycling waste material culture in Edo-era Japan. The result of this study will lay the foundations for further research on how our ingenuity can solve current global waste problems to start living sustainably.

Wishful Learning and Western Knowledge in Late Tokugawa Japan

Hansun HSIUNG

Time is the fundamental resource that structures our possibilities for learning. With each moment passing until death, we are asked to organize studies according to priorities, and devise strategies that might make more effective use of our limited time. A pronounced concern with these temporal dilemmas, I argue, characterized the discourses and practices of Japanese scholars who in the late Tokugawa period commenced the study of European-language texts: as early as 1777, we find Maeno Ryōtaku (1723-1803) lamenting that since he "began learning late in life (bangaku)," he would never have the chance to read "all the [Dutch] books" that he would have wished. My presentation explores this fraught relationship between the wish for more time and the acquisition of Western knowledge.

More specifically, I claim that the turn to "Dutch" (rangaku) or "Western Learning" (yōgaku) crystallized debates about how new knowledge might be acquired with greater speed and efficiency in ways that could strike a balance with the time-intensive demands of an existing "Chinese Learning" (kangaku) curriculum. These debates spread over questions of how to read, whether certain languages and genres of writing were better suited for quick communication compared to others, and how social life cycles might be organized. They extended furthermore to an early vocabulary of what might be termed, anachronistically, developmental stages of the mind. In short, solving the problem of how to find, make, and save time relative to the existing temporal orders of the late Tokugawa lifeworld shaped understandings of Western knowledge.

Resourceful creativity with socio-material attachment

Jung LEE

We associate creativity with the human ingenuity, and certain newness. History of papermaking in Chosŏn Korea thus celebrated various experiments attempted by kings in the fifteenth century to find new materials to substitute the unique material used in Korean papermaking, tak, or paper mulberry bark while condemning paper artisan's conservatism that ignored or failed to follow up these successful experimental spirits. However, the closer look at the lengthy list of kings' new materials from pine needles, iris stems, willow leaves to willow wood, etc., may suggest certain material misunderstanding and repeated failures than an explosion of creativity of searching for ever improved new materials. The conservative artisans however came up with resourceful socio-material solutions to secure their old material, tak whose materiality that they thoroughly appreciated

as this tree, like all other materials that we obtain from nature, needed constant efforts to re-source. For their obstinate attachment to tak, the artisans forged certain social relationships with tak cultivating and processing people, living, moving, and sharing techniques with them with the disenfranchised temples as a connecting node. By comparing celebrated experiments with new and the condemned conservatism with old in material standpoint, this presentation reconsiders the immaterial idea of creativity in proposing re-sourcing kichi.

Re-sourcing Fuels for Ceramic Kilns in Socialist China (1950s-1970s)

Kaijun CHEN

The context of this project is the non-linear transformation of energy regimes, from wood fuel to coal (1950-60s), and to heavy oil (1970s), in the manufacture of ceramics in state-owned factories in Jingdezhen, China. While new energy source and technology were adopted, old ones were far from abandoned. This paper uncovers how technicians tried to repurpose wood- or heavy-oil fueled kilns into coal fueled ones at the shortage of wood and heavy oil. In conversation with my co-panelists, I examine the resourceful practice, that is, tweaking of existing equipment and adjustment of productive procedures in response to the constrained supply of materials. Who made the decisions? What factors affected the technological plans and their implement? This paper casts light on the mechanism of technological choices entailed by the negotiation among factories, various level of authoritarian state bureaucracy and the international market.

Techniques, Knowledge and Their Resources in Korean Semiconductor Factory, 1970s-2000s

Sangwoon YOO

This study looks inside a semiconductor manufacturing plant in South Korea(1970s-2000s) where anonymous workers struggled to mass-produce cutting-edge products efficiently and reliably. These underrepresented groups, commonly referred to as operators and maintainers, worked day and night manipulating, repairing and transforming various materials to increase semiconductor production yields. Analyzing their practices, I pose several questions: What kind of technical problems did they solve? How did they record, produce and transfer the complex knowledge? What were the resources that they utilized to build their knowledge and technique in this process? Their detailed recipes, personal diaries, and in-house magazines show that operators and maintainers did not simply ‘operate’ or ‘maintain’ equipment imported from Silicon Valley but developed skills to cope with contingently unfolding situations. Operators not only demonstrated sophisticated techniques for handling the furnaces, but they also produced knowledge of ever-changing physical conditions of the chemical reactions in such furnaces. Maintenance of equipment was simultaneously to develop more efficient and safe equipment for workers. They explored, recombined, and applied the various resources both inside and outside the factory: technical knowledge learned in vocational schools, recipe-writing practices handed down in factories, and electric components obtained from the black market. By revealing the production of knowledge and techniques in factories and its resources in the process, this study will be able to place South Korea’s semiconductor industry in a long-term historical context, consisting of various material practices that cross the boundaries of embodied and recorded knowledge, technology and science, and maintenance and innovation.

Resourceful Use of a Precious Resource: Jade Recycling and Reuse in The Qing Dynasty

Yulian WU

Jade, a hard stone historically imbued with symbolic meaning in Chinese culture, was one of the most desired luxury objects in the Qing dynasty (1644-1911). In the eighteenth and nineteenth centuries, as the Qing court conquered the "New Frontier" of Xinjiang, an Inner Asian territory where jade was richly deposited, an unprecedented amount of nephrite jade was quarried and transported to the imperial capital of Beijing. However, even with this significant increase in the number of jadestones, the Qing court—including the emperor, his officials, and the carvers—strategically utilized and carefully calculated the use of this precious resource. As documents reveal, not only was each raw stone carefully evaluated and ranked for future use, the craftspeople also developed a well-established recycling system to use the material from carved jade objects, leftover stones from other jade projects, and imperfect stones with cracks and unwanted marks. By focusing on the recycle and reuse of jade stones, this research not only uncovers an essential but overlooked procedure in Qing imperial production, but also aims to understand how materials were valued and, more importantly, how resources were measured and deployed in early modern China.

IP4: Ethnomedicine and its transnational practices

Record and Spread of Mongolian Ethnobiological and Ethnomedicinal Knowledge in Scientific Popular Journal SCIENCE in Mongolian Version During Past 40 Years

Qin SI
Khasbagan

Science, was one of the earliest magazines that popularize science in Mongolian language. Founded in 1980, the bimonthly magazine has published 235 issues with more than 6,000 articles. It popularized not only various kinds of natural science knowledge and applied technology but also traditional experiential knowledge of Mongol nationality.

There were 177 Mongolian articles of Science journals, with 119 original articles included, on ethnobiology and ethnomedicine in the past 40 years. The articles were mainly distributed among 47 issues from1980 to 2014, with an average quantity of 3.7 articles per issue. Based on bibliometrics, the article contents were classified into ethnomedicine with 54 articles, traditional zootechny with 41, veterinary sciences with 40, ethnobotany with 30, ethnozoology with 15, folk nomenclature of biology with 7, and ethnoecology with 6. Through literature review and folk interviews, the author preliminarily authenticated the corresponding relationship between the Mongolian names, modern scientific names, and specific usages of 43 species of wild plants and 62 species of wild animals (the names of male and female adults and young animals may be different in Mongolian), and sorting out the Mongolian folk special nominating method and the traditional husbandry method of the Mongolian Five Livestock, including ox, horse, goat, sheep and camel, of different ages and genders. Through interviews with local doctors, veterinarians and experienced herdsmen, 26 kinds of prescriptions for diseases and traditional Mongolian diagnosis treatment methods were sorted out, as well as 28 ancient books on folk therapy manuscripts and Mongolian medicine.

The largest number of articles in the journal are on ethnic medicine and traditional nomadism. This is highly

compatible with the Mongolian way of production and life.These articles recorded valuable experience in production and living of the Mongolian nationality for generations. firstly, when the magazine was founded, science and technology knowledge learning gained extensive attention while relevant Mongolian publications were scarce. Science started disseminating traditional Mongolian knowledge by written records rather than oral means. It has maintained massive publication and distribution for a long period of time. It has given a certain practical guidance for Mongolian farmers and herdsmen who cannot afford expenses of education or medical treatment. Secondly, it makes up for the knowledge that the early batch of Mongolian undergraduates cannot learn in textbooks.

Therefore, this study is the reproduction and collation of this important historical data, which provides the basis for further research in related fields. Through the textual research of the corresponding relationship between the Mongolian folk names and scientific names of animals and plants, research and analysis of prescriptions for diseases and traditional Mongolian diagnosis treatment methods,a bridge has been built between traditional knowledge and scientific knowledge, which is conducive to the protection and inheritance of Mongolian traditional knowledge and culture.

Traditional Indonesian medicine in Taiwan: the suffering of women, the secrets, and the re-enchantment of traditional medicine

Tsung Jen HUNG

Jamu is a traditional Indonesian herbal elixir that has been used for centuries as a health supplement, beauty enhancer, and remedy for various illnesses. It has traditionally been put into bottles, carried by ladies and sold on the street. Since the 1920s, some family jamu businesses have developed into large industries, offering extracted powders and capsules. Nyonya Meneer, established in 1919, is one of the most renowned jamu businesses, known for its products that aid in menstrual problems, breastfeeding, delivery, and sexual intimacy.

In the face of tough competition from other jamu companies, Nyonya Meneer targeted the overseas market with a multi-level marketing strategy, partnering with Taiwan's biotech company, Heaven-Only. As a result, despite Taiwanese consumers having no prior knowledge of jamu or Traditional Indonesia Medicine, Heaven-Only's products derived from Indonesian jamu became popular in Taiwan, particularly among women.

How does jamu circulate in Taiwanese society, given that people there have no idea what it is? Why it becomes popular through specific networks, especially in the women’s community? Why does the biotech company insist on using multi-level marketing to see jamu in Taiwan rather than through pharmacy? This research seeks to understand how this happened.

The paper will first explore the history of jamu industrialization and pharmaceuticalization in Indonesia as a precondition for its sales in overseas markets. Drawing from Star and Griesemer's concept of "boundary objects" and "boundary infrastructure," the paper will then analyze how jamu was alienated from its socio-cultural context and introduced to Taiwanese communities, where it resonated with women's experiences of suffering and pain. Finally, the paper will examine how Heaven-Only mystified jamu and made it more appealing to Taiwanese consumers, leading to its broader circulation in Taiwan.

Overall, this research contributes to our understanding of the history of jamu

circulation and sheds light on the complex cultural exchange and commercialization processes that underpin traditional medicine's globalization.

Small-scale collaborations in transnational Sowa Rigpa practice between South Asia and Europe

Patricia MUNDELIUS

While Sowa Rigpa has been practised for centuries in the Tibetan Autonomous Region, in parts of China and in the Himalayan regions of Nepal and India, attempts to facilitate the practice in European countries are fairly recent and mostly happen under precarious circumstances. Nonetheless, even in these contexts, a growing number of resident doctors of European, Russian or Asian origin, as well as travelling doctors from India and Nepal, offer their services both locally and intermittently to European patients. The restrictive legal environment and the simultaneous dependence of a majority of these doctors on herbal compounds or other medicinal products produced in South Asia, however, lead to a state of constant uncertainty about how to ensure treatments in various European countries. Increasingly severe constraints on 'grey zone' practices are even causing some practitioners to question whether Sowa Rigpa in its current form has a future in Europe at all, thus contributing to a kind of existential crisis. Because of these insecurities and the sheer impossibility of treatments with pharmaceutical preparations in some contexts, more and more innovative ways of producing medicine and making it easily accessible emerge.

Based on 16 months of ethnographic research, this paper addresses the question to what extent such innovative attempts between Europe, India, and Nepal can be seen as genuine efforts to pave new ways to establish the medical tradition under precarious conditions. Looking at transnational small- scale collaborations between practitioners, laboratories, and companies as complex multi-sited entanglements that seek to explore novel paths of sustainably engaging the practice and its medicines in European contexts, I argue that these efforts are perceived as interesting but mainly commercial ventures by a majority of practitioners, and as yet provide little in the way of viable solutions to the problem. Still, they help to raise awareness and visibility and spread knowledge about the practice as such.

IP15: Historiography of Chinese Science

Explore the Answers to the Needham Question Basing on Zhu Kezhen’s Articles

Xiao LIU

This article explores how Zhu Kezhen answered the Needham Question by examining the articles he wrote in different periods. The Needham Question sought to investigate the reasons why China had been overtaken by the West in science and technology in modern times, despite their earlier successes. As one of the most influential historians of science in China, Zhu Kezhen had been studying ancient Chinese science closely since late 1910s, decades before Joseph Needham raised his question in 1944. Numerous studies have considered how to answer the Needham Question as well as how Zhu answered it. What these papers fail to consider, however, is that Zhu’s view on the question varies considerably, and this article argues that the reasons for this change arise from two aspects, namely the external political environment and the interaction between Chinese and foreign scholars. For ease of

analysis, this paper divides Zhu's articles into three groups, according to the different periods in which they were written. It argues that the answers to the Needham Question in Zhu's articles were gradually developed. The first period came before 1937, during which Zhu studied ancient Chinese science without the influence of foreign scholars. His articles on science laid emphasis on political factors, which was in accordance with his aspiration of using his expertise to influence Chinese politics. The second period dates from 1937 to 1949, where Zhu became acquainted with Joseph Needham and paid more attention to social and economic factors. This was also the period when Chinese scientists became increasingly disillusioned with Chinese politicians, turning almost exclusively to science to promote change in the social environment. The third period spans from 1949 to 1960. After the establishment of the new regime in China, ideological conflict began to strain the relationship between China and Western countries, despite both British and Soviet scholars feeling that ancient Chinese science should receive more attention. Under these circumstances, Zhu's opinions became more absolute. He thought it was not appropriate to evaluate ancient Chinese science according to Western standards, and he encouraged Chinese scholars to affirm the value of ancient Chinese science. Drawing on Zhu's articles, this paper argues that Zhu's answers to the Needham Question were compatible with the requirements of China's scientific development. Adopting a broader outlook, it attempts to investigate the factors that influenced the research of Chinese historians of science before the 1960s.

The History of Science and the Shift in Zhu Kezhen's Political Thought

Fanqi XU

Zhu Kezhen (1890-1974), as a pioneer of modern meteorology and geography in China, played a vital role in twentieth-century Chinese academia. Widely regarded in the People's Republic of China (PRC) as a patriotic scientist who rejected the Kuomintang's invitation to relocate to Taiwan in 1949, Zhu's public image is one of staunch support for the Chinese Communist Party (CCP) and a key figure in the Chinese Academy of Sciences. However, his close ties to high-ranking officials in the Kuomintang do not fit into this simplified image. Furthermore, what caused Zhu's shift in political standpoint remains unclear. As a graduate student at Harvard, he was steeped in academic liberalism and the ideals of "science for its own sake"; existing biographies do not explain how Zhu then became a supporter of socialism, with its far more explicitly political approach to science. This article seeks to uncover the intellectual foundations of Zhu Kezhen's reception of socialism by examining his long-standing interest in the history of science, which not only transformed his understanding of science, society, and the state but also reshaped his political thought.

Like many of his contemporaries, Zhu Kezhen viewed science as crucial to the strength and prosperity of the Chinese nation, as well as its independence from foreign domination. The question of why China failed to develop modern science in the same way as Europe was therefore of great interest to Zhu, who believed that the absence of scientific progress was a major factor contributing to China's "backwardness." In his quest to solve this puzzle, Zhu delved deeply into the works of British scientific socialists such as J. D. Bernal, Hyman Levy, and Joseph Needham, and began to appreciate the principles of socialism in the 1940s. Through a Marxist lens, he analyzed the social and economic factors that had prevented the development

of science in China. This paper argues that Zhu's historical and scientific research ultimately led him to accept socialism—at least enough to convince him to stay in the PRC and work with the CCP. Zhu's case provides a striking example of how and to what extent the history of science can shape a scientist's political beliefs; moreover, it demonstrates that, while politics may influence the research choices of scientists, their research may also make a difference to their politics.

A preliminary study on Alexander Wylie's annotated catalogue of the astronomy and mathematics division in the Notes on Chinese Literature

Changfei WEN

Alexander Wylie (1815—1887）is one of the most famous British sinologists in the 19th century. His Notes on Chinese Literature (NCL)（1867), an annotated catalogue written in English for thousands of Chinese books, earned a great reputation in the field of the Western sinology. The astronomy and mathematics in ancient China was one of the subjects on which he payed the most attention, and he introduced lots of corresponding books in the NCL. There are 104 books with annotations in the NCL, which can be summarized as: (1)books on astronomy and mathematics in the tradition of ancient Chinese; (2) translation works in Chinese by the Jesuits since the late Ming dynasty; (3) works by Chinese native scholars and translation works of Western learning contemporaneously. His annotated catalogue for the Chinese books on the astronomy and mathematics division was influenced by the Annotated General Catalogue for the Four Branches (Siku quanshu zongmu tiyao 四库全书总目提要), and also contained Wylie's research achievements in the history of astronomy and mathematics in China. Nearly half of works in the catalogue of the astronomy and mathematics division of the NCL were compiled by Wylie's contemporary scholars, which corresponded with his idea of spreading the Gospel by using sciences and (or) the history of sciences.

IP38: Technologies in Circulation

Gifts and Technology in West-East diplomacy: Harpsichords in periods of crisis and disruption

Constantin CANAVAS

European travellers towards Southeast and East Asia since the late 16th century carried not only political ambitions, trade commodities, and missionary visions, but also presents for the intended hosts. The paper focuses on a category of music instruments used as presents, the harpsichord, in a comparative study of two destinations: the royal residence of Siam in Ayutthaya and the Chinese imperial court. Harpsichords as presents were characterised by both advanced technology and aesthetical value. The latter resulted from the lavishly painted and carved decoration, as well as from the musical/acoustic experience. Besides, the specific instrument presented a major knowhow challenge regarding operation (playing) and maintenance. The paper focuses on the perception of harpsichords as carriers of technological, aesthetical, and political values during periods of crisis and historical disruption – the 1688 revolt against the king Phra Narai in Ayutthaya, and the violent end of the Ming rule through the Manchu/Qing leaderd in imperial China in 1644.

The question on the reception of the considered presents by the old and the new rulers leads to diverging answers in the cases considered. In China, the interest of the new ruling dynasty regarding the objects, their operation, and the scientific

background is documented not only before but also short after the political disruption – the latter through the Kangxi emperor and his relations to the Jesuits, the carriers of the know-how, who remained on site during the turbulent years. The Siamese case can be regarded as a negative film in developing the Chinese picture. Although the Siamese king Phra Narai (r. 1656-1688) recognised the potential of the Jesuits as carriers of precious technological presents and scientific knowledge, the transfer was eventually compromised by the diplomatic tactic of the French ambassadors sent by Louis XIV in 1685 and 1687-1688, and the 1688 revolt, whose leader and new ruler, Petracha, was hostile towards Westerners – whether French or Jesuits. The earliest repercussion of the precious music presents (harpsichords) in the royal Siamese perception after the revolt is documented in 1748. The claim of the paper is that in the case of Imperial China the harpsichord retained its intriguing role in the cultural transfer that continued taking place inside the broader and sustainable techno-scientific frame provided by the Jesuits. In Siam, the plan of culturally dressed mission undertaken by the same institution perished through a revolt against the increasing influence of Europeans in the Siamese political scene.

An Elementary Study of Mughal Porcelain Hookah Base

Jia ZHAN
Haochun TANG

With the spread of species and cultural exchanges around the world in the Age of Exploration, tobacco and its smoking were introduced from Latina America into Europe and Asia and became a fashionable lifestyle for people. However, its sweeping impact contrasts markedly with its inadequate research. Therefore, focusing on the Mughal Empire, this paper explores the transformation of tobacco into hookahs and its social impact through documents, photographs and physical objects. It is found that tobacco originated in Latina America, while hookah bases were derived from Chinese kendis, which was originally a special utensil for holding liquids. Based on the impact of Chinese porcelain export to the Mughal Empire and Safavid Empire in the 16th to 18th centuries, the author systematically contrasts kendis with hookah bases in materials, structures, types and decorations, believing that kendis predate hookah bases in that they bear long necks, globular bodies, short spouts, with a smoking bowl attached to the neck, and a stopper to hold the hose at the bottom of the spout. By pouring clear water into the body, lighting the tobacco in the bowl and inhaling through the hose, the smoke is purified by the water, which not only satisfies the functional use and aesthetic taste of hookah smoking, but is also very scientific and artistic. Furthermore, based on historical records, the author argues that most Mughal porcelain hookah bases were export porcelain in Qing dynasty, stimulating local artisans either elaborately decorate or imitate their production. Its shape and decoration combined Chinese and Mughal cultural elements and it became a treasure of the Mughal royal nobility, highlighting their special social status, thus revealing the influence of Chinese porcelain on Indian culture.

The mystery of new archaeological discoveries at the site of Subashi Buddhist temple

Ce GAO
Yang YANG

The site of Subashi Buddhist Temple is an internationally renowned world cultural heritage. In recent years, site staff have discovered the strange phenomenon of "ground dragon absorbing water" in the

ancient city of Xisi, that is, no matter how much rain it rains, a certain area in the ancient city of Xisi will never produce stagnant water, as if it was sucked dry by a "dragon" hidden underground. In 2021, Shanxi University, in conjunction with the Institute of Air and Space Information Innovation of the Chinese Academy of Sciences and the Kuqa Municipal Bureau of Culture and Tourism, organized researchers to inspect the site. Finally, two large holes were found in the black wolfberry bushes in the middle of the ancient city lecture hall and near the southwest corner of the wall, and there was really no silt deposited after the rain around the bushes, so it can be seen that these two holes are the mouths of the so-called water-absorbing "earth dragons." The question is, how big are the bottom of these two holes? What is the structure? Why can there be such a large "water absorption"? On the premise of adhering to the first protection and not violating the measures for the Protection and Management of the World Cultural Heritage, the research team used modern geophysical instruments to measure the underground structure of the Xisi ancient city site without damage, in order to solve the above mystery, strengthen the excavation and interpretation of heritage value, promote the protection and utilization of heritage, and give full play to the advantageous role of heritage in educating people with history and culture.

P69: Conflict and Complexity of Scientific and Cultural Communication between Modern China and the West in the Ming and Qing Dynasties

The Absorption and Expression of Western Optical Knowledge in Encyclopedia of the Late Qing Dynasty

Zhaojun DING

In the late Qing Dynasty, a series of new type of compilation ——the encyclopedias, reflects the reconstruction of imported knowledge from the West by the Chinese intellectuals. This paper discusses the compilers' systematic absorption and expression of optical knowledge by combing the distribution of optical knowledge in the encyclopedias and the acceptance of western optical knowledge by the intellectuals in the late Qing period.

The Use of Translation Strategies in Translating Electricity into Dianqi（电气）in The Philosophical Almanac

Fuling NIE

"Qi" （气）is a very important ontology and concept of nature in Chinese traditional knowledge. Correspondingly, the knowledge of "Qi", "Yin and Yang"(阴阳) and "Five Elements"（五行） were used to explain natural phenomena such as “sky lightning” and "amber picking" in ancient China. However, this knowledge system was challenged by Western scientific knowledge that was systematically conveyed to China in the mid-19th century. The Philosophical Almanac（《博物通书》）by American Baptist missionary Daniel Macgowan saw the first-ever dissemination in China in 1851 of the knowledge of electromagnetism and telegraph and the translation of “electricity” into Chinese as a concept of science, as is evidenced by Macgowan’s innovative invention of the Chinese character 电气 (dianqi) due to the void of corresponding concept in the target language, thereby giving new meanings to the Chinese characters "Dian" (電) and "气"（Qi）.

This presentation will explore how The Philosophical Almanac applied the traditional Chinese concept of "Qi" to interpret the Western concept of "electricity", thereby deconstructing the

traditional concept of "Qi", including the concepts of "Yin Yang" and "Five Elements" deeply rooted in the thoughts of Chinese intellectuals.

Reconstruction of Western Physics by Encyclopedias in the Late Qing Dynasty

Shimin YANG

The dissemination of western scientific knowledge in the late Qing Dynasty witnessed the editing and compilation of a large amount of encyclopedic works, demonstrating not only a development of or improvement to the traditional category books, but also different characteristics and ideas by weaving the introduced “novel” or western knowledge into China’s traditional knowledge systems in the form of encyclopedic works for the sake of popularizing western knowledge. On the surface, the works were arranged in the framework of western knowledge, but in reality, the compilers had their own logical ideas for sorting out knowledge by reconstructing the knowledge system of the western knowledge through their own content selection, concept elaboration, value judgment, reclassification, and logical reconstruction. These encyclopedic works, as a whole, reflected the Chinese people’s understanding of western knowledge and the process of trying to connect them with traditional knowledge at that time. Their compilations is a processes of understanding and interpreting western knowledge, so we can clearly see the role of traditional knowledge structure and expression habits.

By examining the collation, adjustment and effect of western physics knowledge in the encyclopedic works of the late Qing Dynasty, we have come to the following conclusions. Firstly, the encyclopedias placed more emphasis on the effectiveness and practicality of physics in solving problems by putting western physics within a practical framework. Secondly, in terms of the cognition of physical knowledge, the traditional cognition of physical knowledge as a technique or “skill” attempt to construct a "integration of skill knowledge" in physics so as to have transformed into the cognition of a set of knowledge. Thirdly, the branches of mechanics, thermodynamics, acoustics, optics, and electricity are classified under the name of “gewu” as unified physics.

IP3: Medicine, war and revolution

Negotiating Toxicities with herbs for the Nation-state in Taiwan in Cold War

Po-Hsun CHEN

In this article, apart from focusing on the political and diplomatic issues of international relationships in the Cold War studies, I probe Taiwan’s international situation and political anxiety by herbs and toxicities in the 1980s. I argue that Chinese medicine was not only a medical method to treat poisonings but also a political tool to tackle societal crises in the Cold War era. In the early 1980s, two poisoning crises, Polychlorinated biphenyls (PCBs, a group of environmental toxicants) and Huang-Lian (Rhizoma Coptidis) in Taiwan demonstrated how negotiating toxicities by/about herbs could assist the Taiwanese government in building cultural identity and the nationhood.

In the Cold War, the Kuomintang (KMT) government retreated to Taiwan and was keen to build a nation-state and modernity. However, during the 1970s and the 1980s, the U.S. and the United Nations’ recognition of the People’s Republic of China posed political anxieties to the KMT government. Thus, KMT implemented the Chinese Cultural Renaissance Movement (CCRM, 1966—1991) to build Chinese cultural identity and reinforce KMT’s

governance. Chinese medicine and herbs were considered parts of this propagation.

Although PCBs poisoning is non-curable, Senior KMT member Li-Fu Chen, one of the deputies of CCRM, promoted the integration of Chinese medicine into PCBs therapy in the early 1980s. Interdisciplinary teams also conducted animal experiments and clinical trials to prove the efficacy of Chinese medicine in domestic. In the same period in Taiwan, this integrated infrastructure also played a critical role in negotiating Singapore's medical study: whether the herb Huang-Lian could induce neonatal jaundice and brain damage. In the end, by mobilising multiple kinds of medical resources and actors, the KMT government evidenced the safety of Chinese herbs. Meanwhile, the KMT proved itself as the orthodox of Chinese culture, domestically and internationally.

How 'Lujian' Became a Remedy

Changyu CHEN
Weimin XIONG

As an endemic cardiomyopathy, Keshan disease（克山病） has seriously endangered the health of the people in northeast and southwest China，in the first 60 years of the 20th century. 'Lujian'（'卤碱'） extracted from 'brine'（'卤水'） was once considered a remedy for Keshan disease, and was gradually upgraded to a panacea during the promotion process. By reviewing archives and interviewing people involved, this article restores the process of how 'Lujian' was invented by the "mass" at the grassroots level, discovered by scientific and technological personnel, and established by the administrative leaders as a 'new thing' （'新生事物'）under the 'Chairman Mao's Revolutionary Health Line'（'毛主席革命卫生路线'）. And put forward a generation model of 'new things' in the field of science and technology as well as medical and health in Mao Zedong's era.From 1935 to 1967, numerous medical experts attempted to identify the cause and treatment of Keshan disease, but without success. In 1967, a blacksmith from Inner Mongolia with only a primary school diploma claimed to have discovered a treatment for the disease using 'Lujian' extracted from 'brine'. This invention was discovered by scientific and technological personnel during a rural investigation and reported to higher authorities such as the 'Central Committee for the Prevention and Control of Endemic Diseases in Northern China'('中共中央北方防治地方病领导小组办公室')，the Chinese Academy of Sciences(中国科学院), and the State Council of the PRC（国务院）. The researchers intended to conduct further studies on the 'Lujian', but the higher authorities misunderstood their intentions and instead codenamed 'Lujian' '681'，and promoted it as a miraculous cure for Keshan disease, without conducting sufficient pharmacological, toxicological, clinical, and formulation studies. During the promotion, the efficacy of 'Lujian' was exaggerated, claiming to cure over thirty diseases and eventually becoming a panacea. It was not until around 1972 that 'Lujian' was replaced by more effective remedies. This article reveals that the main reason for the emergence of this absurd phenomenon is that Liu Shaoxian（刘绍显）, the inventor of 'Lujian', came from the grassroots and had not received professional training, which conforms to the characteristics of 'new things' born under the 'Chairman Mao's revolutionary health line'. Therefore, he received the support from the administrative leaders and was set up as a model for propaganda and promotion, which eventually led to a Mass Medical Campaign（群众医疗运动）.

Scientific History Research of Bethune's Medical Practice during the War of Resistance against Japan in the East

Huan LIU

Henry Norman Bethune is a man of great creativity, improving and inventing a number of medical and surgical instruments, as well as field medical treatment strategies. At the very beginning of 1938, Bethune came to China and organized medical services for the front and the region. In this study, by consulting traditional material databases such as the full-text periodicals database of Chinese Periodical Full-text Database, and the relevant historical materials of the Chinese Bethune Spirit Research Association, we will obtain a wealth of important materials such as traditional writings, newspapers, and periodicals related to Bethune, as well as the fieldworks at the Shanxi Provincial Archives, Site of Bethune Special Surgery Hospital, Former Site of Bethune Operating Room, and the Norman Bethune Health Science Center of Jilin University will be conducted. By studying historical documents of Bethune and conducting interviews at archives and historical sites with relevant information, we will have new sources of reference. How did Bethune carry out his medical work under the hard conditions, even developing new methods of blood transfusion and mobile casualty care systems? What was the impact of this new technology on medicine, warfare and society at the time? What were the subsequent developments and improvements? During in China, Bethune gave lectures about blood transfusion techniques at the military rear hospital and firstly gave details on blood collection operations, standard blood group products, blood group identification, and educated his colleagues on blood matching tests, blood storage, transport and preservation, which improved the methods of battle rescue.

P51: Chinese Scientific Research Institutions and International Exchanges during the Wartime

International Technical Assistance to China during the Wartime: A look from the Archives of the league of Nations

Maohua WANG

In the 1930s, there was extensive technical cooperation between the League of Nations and China, and the newly opened archives of the League of Nations show us richer historical details of this process. Through a systematic review of these archives, this report finds that technical cooperation between the League of Nations and China officially began in 1931 and entered a more extensive phase of cooperation in 1933. By examining the selection of experts in China, their basic living guarantee, the work carried out, and the final report, etc., this report attempts to summarize the characteristics of the technical cooperation between the League of Nations and China. In further, the important value of the League of Nations' archives for the study of the history of science and technology in the first half of the 20th century is emphasized.

Discussion on the school-running concept of National Southwest Associated University during the Anti-Japanese War

Huakai HU

After the outbreak of the Anti-Japanese War, the National Southwest Associated University, jointly established by Peking University, Tsinghua University and Nankai University, settled in Kunming, the southwest border. Under the environment of simple conditions and hard life, the University had cultivated a large number of pillar talents represented by Yang Zhenning and Li Zhengdao in eight years. The

academic research of Southwest Associated University has also made outstanding achievements, creating a miracle in the history of Chinese education, and its school-running experience is still instructive. This paper argues that the school-running philosophy of Southwest Associated University is mainly reflected in several aspects: First, the school-running principle is based on the principle of "treating wartime as usual, and don't lose the basics because of emergencies"战时须做平时看，勿为应急丢基本, so that all kinds of teaching activities must meet the needs of wartime , but also based on the needs of long-term development, followed the law of educational activities; second, to inspire the sense of responsibility and initiative of teachers and students with the spirit of fortitude and determination to save the nation and surviving. They were working hard together when the world was in the dust of war.相期俱努力，天地正烽尘. In order to save the country, the teachers teach earnestly and the students study hard for the purpose of survival, so that the teaching work has received very good results; the third is to manage academic activities based on the principle of academic independence and professors running the school. Teachers and students are free in thinking and inclusive. Not only has a good academic atmosphere been created, but also a number of important achievements have been produced; Fourthly, it cultivates talents with a wide range of calibers based on the concept of "general knowledge is the foundation, and expertise is the end"通识为本，专识为末. The students cultivated have a wide range of knowledge and a high success rate. There are many things worth discovering in the experience of running a school in Southwest Associated University, and these four points alone have shown its value.

Foreign Academic Exchanges of Academia Sinica During the Wartime

Banghong FU

The Academia Sinica was established in 1928. Before the permanent site was completed, China fell into the quagmire of the Anti-Japanese War. Since then, the Academia Sinica has been relocated to the southwest frontier, and continued to carry out research, organize and coordinate the work of scientific undertakings across the country, which lasted eight years. After 1945, the Academia Sinica still faced various war situations many difficulties, but it never gave up its efforts to conduct research and contribute to the cause of the country and the nation, including its persistence in foreign exchanges.

Through extensive research on archives and historical materials, from the perspectives of institution, practice, and influence etc., this report examines Academia Sinica’s efforts in importing books and equipment, cultivating talents with an international perspective, attracting and leveraging foreign scientists, and disseminating research results of the Academia Sinica to the world. It reveals how Academia Sinica tried its best to carry out foreign exchanges in an environment of raging wars, lack of foreign currency, and numerous crises. These foreign exchanges have become the sunshine that Chinese academic circles presented to the world, and also opened a window for the opening of the post-war scientific era in China.

Foreign Exchange Activities of Science Societies during the Anti-Japanese War

Degang YI

China's participation in international cultural and academic exchanges as an academic group began in the 1930s, with the International Cultural Cooperation Organization of the League of Nations as the main promoter. China's modern

scientific groups started in the early years of the Republic of China, and had a preliminary development in the 1920s and 1930s. During the Anti Japanese War, the scientific groups entered a difficult stage of development. During the eight years of the War of Resistance against Japan, most scientific groups concentrated from the eastern coast to the rear area. The orientation of scientific groups changed to the interaction of scientific undertakings and social undertakings. In terms of academic exchanges, the scientific groups and the scientists of the newly-built society also differentiated due to different political appeals. In order to communicate with the government and the international scientific community, a number of new scientific groups have been established. For example, the International Science Cooperation Agency established by the Central Academy of Sciences in 1943, headed by Xu Ji, played an important role as an intermediary and bridge in the wartime scientific exchanges between China and foreign countries. The China UK Science Cooperation Museum, an official science and technology aid institution, was established in Chongqing, with Dr. Joseph Needham as the curator. The China France Science Cooperation Association held its inaugural meeting at the Central Library of Liangfu Branch Road in Chongqing. In the same year, six academic groups, including the Chinese Science Society, the Chinese Mathematical Society, the Chinese Zoological Society, the Chinese Botanical Society, the Chinese Geographical Society, and the Chinese Meteorological Society, held an annual meeting in Bei'an, requesting to strengthen scientific research institutions, train young people, and encourage scholars to communicate with foreign countries. The scientific groups established before the war also actively carried out work conducive to scientific and technological communication between China and foreign countries. Based on a large number of historical data verification, the article mainly investigated the external academic exchange activities of dozens of scientific and technological groups during this period and the important impact of these activities.

The National research institute of engineering and its scientific research during the wartime

Anyi WANG
Jizhang LIU

In 1928, as one of the first four research institutes established by the National Academia Sinica, the National research institute of engineering was established in Shanghai, with mechanical engineer Zhou Ren as the first director. At the beginning of its establishment, the National research institute of engineering took the aim of "studying all kinds of problems within the scope of engineering, especially focusing on scientific issues, in order to improve old domestic industries and create new ones", and sought the combination of science and engineering. Based on this aim, during the first ten years of development, the National research institute of engineering has been trying to analyze industrial raw materials, test engineering materials, improve production machinery and try to formulate industrial standards around the theoretical problems within the scope of engineering research, and has set up three experimental fields of ceramics, steel and glass, and industrial laboratories such as cotton textile dyeing laboratory. After nearly ten years of development, the National research institute of engineering, as an industrial laboratory, has made good achievements in materials research in several major industries, such as ceramics, steel, glass and textile. However, after the full-scale outbreak of the Sino-Japanese War in 1937, the Engineering Research Institute was forced to move to

Kunming, thus its purpose and objectives changed. The National research institute of engineering has shifted from basic research to applied research, and has participated in the production of industrial raw materials urgently needed in wartime, including special steel, experimental glass, building wood, etc., in combination with the needs of the nation during the wartime. As an early attempt of the National Industrial Laboratory, the National research institute of engineering, as the only engineering research institution of the National Academia Sinica, has a representative development. Its establishment and development reflect the nation's attempt to explore a mode of guiding industry with science, and the institutionalization process of modern engineering development in China. The tension between its ideal purpose and practical efforts also reflects the special form of engineering science development in the special period of China.

IV. 16:10 – 17:50

P55: Colonial Medicine as a Site of Proxy War: New Perspective on Japan's Imperial Medicine

Double Imperialism in the Bacteriology of Shibasaburo Kitasato: A Japanese Representative of German New Science and its Conquering Power

Yuriko TANAKA

Shibasaburo Kitasato (1853-1931) was a Japanese bacteriologist, trained by Robert Koch (1843-1910) in Berlin. Born in the very year when the Tokugawa-Japan was forced to abandon its isolation policy, Kitasato followed a scientific career almost in perfect step with Japanese society's quest for 'modernization.' He participated in the on-going nation building works of the Meiji-Japan by joining the Ministry of Home Affairs in 1883 and afterwards his knowledge of bacteriological science served him a weapon to wield against his compatriot rival elites or political opponents, as well as against hostile scientific schools or social barriers that he had to face either in Japan, Germany or elsewhere.

This paper focus on Kitasato's scientific itinerary around 1889-1894 and the struggles he waged in both Europe and East Asia. He managed a position in the European medical community by being a loyal disciple of Koch. His power in Japan was gained by identifying with Koch's/German/Western science's superiority. His 'discovery' of the plague bacillus in 1894 Hong Kong served as an anecdote of miracle to the eyes of the Japanese public, and he made the best out of it to promote the excellence of the Modern/Western science, of which he appointed himself as a representative. With this 'superior' science Kitasato was to vow, in 1914, to make Japan "flourish as a nation amongst those competing Great Powers."

Parasitic Worms and Scattered Knowledge Production in Southern ChinaExperimental Systems in the Context of New Imperialism

Dominik MERDES

The discourses on tropical medicine and helminthology owe much to Patrick Manson's (1844-1922) groundbreaking research on filarial worms; and he carried it out in southern China in the 1870s and 1880s. The role of the mosquito in the transmission of filariasis, which manifested itself in the form of elephantiasis among others, was the blueprint for the malaria cycle. In the following decades, further knowledge about parasitic worms, their life histories, and their treatment was produced in southern China.

What distinguished parasitology in southern China was the scatteredness of knowledge production. There was no supervisory body which controlled research. The scatteredness of parasitology in southern China was partly due to the diverse origins and characteristics of the authors the produced knowledge about parasitic helminths was attributed to. Besides officers of the Chinese Imperial Maritime Customs Service like the famous Patrick Manson, there were medical missionaries who were the main agents of Western medicine or allopathy in many parts of the country. Furthermore, Japanese parasitologists was able to conduct research in the Japanese colony of Formosa from 1895 onwards. Also, Western-educated Chinese physicians began to play a role.

In my contribution I focus on medical missionaries like James Laidlaw Maxwell jr. (1876-1951), who saw southern China as a 'happy hunting ground for almost all varieties of intestinal parasites', and colonial doctors like Koan Nakagawa (1874-1959), who had better research facilities at their disposal. How were the different agents interconnected during the imperial penetration of China? And how were they related to helminthological research in other parts of the world? To answer these questions, I examine the research arrangements they employed. In his book 'Toward a History of Epistemic Things' Hans-Jörg Rheinberger has described how knowledge of protein biosynthesis and in vitro acellular systems emerged through the differential reproduction of experimental systems in Western laboratories of the 1950s and 1960s. Starting from there, I explore experimental arrangements that produced helminthic knowledge while transgressing the walls of the laboratory. On the basis of fragments of knowledge about the classification, the epidemiology, the transmission, and the treatment of worms, I reflect on the underlying experimental arrangements and structures from a postcolonial perspective.

Japanese Colonial Racial Medicine and Related Societies: Kobayashi Haruijrō, an ex-Keijo Imperial University professor as its hub

Sumire SAITO

Race was a concerning topic for Japanese colonial medicine. In this presentation, I would like to explore its institutional aspect, formation of academic societies related to this concept.

We see establishments of different societies related to racial medicine before and after 1945. For instance, Furuhata Tanemoto, a forensic scientist, studied blood type of Japanese and tried to show serological homogeneity of Japanese race. He was the first president of The Japan Society of Human Genetics in 1956. Even before that, Japanese Society of Race Hygiene was established by a Eugenics scholar Nagai Sen the first president. Nagai openly claimed to improve the quality of Japanese race.

Among others, the Japanese Society of Medical Entomology and Zoology(JSMEZ) was established in the wartime of Japan. This society clearly demonstrated colonial characteristics. In the founding members, we see Kobayashi Harujirō (1886-1969) as the central figure, famous colonial characters like Sessa Manabu, Kitano Seiji, Miyajima Mikinosuke were present.

A parasitologist Kobayashi started his career at the Institute for Study of Infection Disease, founded by Kitasato. Later, Kobayashi was appointed as a professor of Keijō Imperial University, and worked on parasitic warms in Korea. Sassa studied mosquitoes and tropical diseases in Southeast Asia as a naval surgeon. Kitano was a captain of the Unit 731 (Epidemic

Prevention and Water Purification Department of the Kwantung Army). Miyajima was also a member of the National Institute for Study of Infection Disease and studied endemic diseases in Taiwan and other foreign areas. Coverage of areas is overlapping with Japan's expansion territories. This JSMEZ was officially established after the war has ended, in 1950 with the president, Kobayashi.

These societies have their origins in wartime and they are connected to Japanese colonial racial medicine. Most importantly, those colonial medical legacies continued after the war.

Colonial Development of Medical Controversy: Focusing on Neurophysiological Research in Colonial Korea

Chang-Geon SHIN

This presentation will discuss how a physiological controversy in Japan were brought to colonial Korea and what kind of research was conducted there. In Japan, from 1923 to 1932, there was a fierce debate on neurophysiology between the "theory of decremental conduction" of Kyoto Imperial University and the "theory of non-decremental conduction" of Keio University. The controversy was so heated that it had a profound effect on the entire physiological community of Imperial Japan. I will elucidate the complex development of this controversy in colonial Korea.

From the 1920's to the 1930's, there were two professors in the Department of Physiology at Keijo Imperial University. The First Laboratory was controlled by Prof. Masakazu Nakanishi（中西政周） who was graduated from Kyoto Imperial University, and the Second by Prof. Tokichi Otsuka（大塚藤吉） from Keio University. Although colleagues, they engaged in a heated academic debate in 1930's. At first glance, it appears that a proxy war was waged in colonial Korea, but the facts were not so simple. Although Otsuka supported "the theory of non-decremental conduction" advocated by Prof. Genichi Kato（加藤元一）, the relationship between "homeland" Keio University and "colonial" Keijo Imperial University was not one-way. At times, Keijo research team criticized Keio's research. Professor Otsuka and Keijo team not only criticized the experimental basis of Kato's theory, but also questioned the existence of "all-or-none law", which was the premise of both the decremental and the non-decremental theory. The research team at "colonial" Keijo Imperial University was not a subcontract factory of "homeland" Keio University, but rather a rivalry that developed into a powerful laboratory that critically examined "the theory of non-decremental conduction".

IP5: Gynaecology, Obstetrics and Female Health

From Determinism to Diagnosis: Gynaecological Discourse in Early Chinese Medical Texts

Anna Lisa BECK

The origins of life have been at the centre of medical discourse throughout history. In the case of China, specific instructions on gynaecological care can be traced back to at least the 2nd century BCE and are preserved to this day in the "Writings on the Generation of the Foetus", or Taichan shu, recovered from Mawangdui archaeological site in 1972. This presentation employs a close reading of the early Chinese gynaecological texts Huangdi neijing (3rd/2nd cent. BCE, 1st cent. BCE-1st cent. CE), Taichan shu (2nd cent. BCE), Nanjing (1st/2nd cent. CE), Shanghan lun (2nd/3rd cent. CE), Jinkui yaolüe (2nd/3rd cent. CE), and Maijing (3rd/4th cent. CE), and thus

offers insights into approximately 600 years of intellectual history.

Investigating these six texts with a focus on fertility and gynaecology offers great insights into fundamental changes in early Chinese conceptualisations of human (and cosmological) life. Huangdi neijing and Nanjing mostly describe "humans as a mirror of the cosmos". Life and death result from the workings of the cosmos – most notably the forces of Yin and Yang – and lie therefore beyond human influence. While I argue that humankind may harness these forces for its benefit by timing intercourse, their flourishing (sheng 盛) and succumbing (shuai 衰) are otherwise predetermined. On the other hand, we find that Shanghan lun, Jinkui yaolüe, and Maijing frame humans as "beings of themselves" and give them diagnostic and therapeutic capabilities. Finally, Taichan shu combines the reflective-cosmological and medical-therapeutical roles of humankind in its fertility, representing both the former (i.e., the powers of Yin-Yang and harnessing them) and the latter (i.e., recipes and medical processes) tendencies.

In the future, contextualising these findings within greater intellectual developments of early China will greatly benefit the scientific value of this presentation. For the time being, I hope to inspire further research into medical discourse beyond the boundaries of individual texts or dynasties.

Selected Bibliography

Hua Shou (comp.) (1923): Nanjing benyi. Beijing: Zhongyi she.

Mawangdui Hanmu boshu zhengli xiaozu (1983): Mawangdui Hanmu boshu. 3 Volumes. Beijing: Wenwu chubanshe.

Yang Weijie (ed.) (1984a): Huangdi neijing lingshu yijie. Taipei: Tai lian guofeng chubanshe.

Yang Weijie (ed.) (1984b): Huangdi neijing suwen yijie. Taipei: Tai lian guofeng chubanshe.

Zhang Ji (comp.) (1923): Jinkui yaolüe fanglun. Beijing: Zhongyi she.

Zhang Ji (comp.); Wang Shuhe (ed.) (1923): Zhujie shanghan lun. With the assistance of Cheng Wuji. Beijing: Zhongyi she.

Institutionalizing Ultrasonography, Transforming Pregnancy: Dissemination of Prenatal Ultrasonography in Korean Obstetrics, 1960s-1990s

Heesoo CHO

How has prenatal ultrasonography become routine for pregnant women in Korea? How does it change women's maternal experiences? Following the institutionalization of ultrasonography in Korea, this study argues that sonography transformed pregnancy into a practice requiring women's active participation and decision-making. Previous research in feminist studies was generally critical of the routinization of prenatal ultrasonography, emphasizing medical technologies' oppressive power over women. However, this paper does not assume an antagonistic relationship between medical technology and women; instead; it considers women and doctors equally as consumers of ultrasound technology capable of deciding on whether to use it to meet their individual needs. Based on interviews, newspapers, and obstetric research papers, this paper shows why women chose to use sonography and how doctors responded to the requirements. From the mid-1980s, inexpensive and compact ultrasonic devices appeared even at small clinics, responding mainly to women's need to predict their baby's sex and decide whether they would give birth. The cultural preference for a son to a daughter in Korea at that time was the powerful driving force that made women

undergo sonography. Doctors who wanted to attract those women needed to prepare the equipment and techniques. Although the use of sonograms for identifying the sex of a fetus was legally banned in 1987, and the social criticism of it became prevalent, the usage didn't stop. From the 1990s, sonography was part of the ordinary prenatal care regimen, and nearly every pregnant woman in Korea underwent a sonograph. As the practice enabled scrutinization of fetal anomalies in advance, not only could an expectant mother check the baby's sex and defects in advance, but she also had to decide whether she delivered the baby.

Christianity and Elite Women: Margaret Sanger's Birth Control and Republican China (1920s)

Wenhao CHEN

In the 1920s, Margaret Sanger visited Japan and China and enlightened audiences by sharing knowledge and information about birth control. Elite women were not only passive recipients in the process but also acts as supporters or opponents of Sanger's discourse.

Ishimoto Shizue, who met Sanger in the United States, utilized the concept of birth control as a means to bring about women's liberation in Japan. In Republican China, birth control has been dominated by elite men in the 1920s. Some elite womens' reactions also provide an insight into Sanger's influence on birth control in Republican China. Yu Qingtang[俞庆棠], a well-known educationist in Republican China, was shocked by Sanger's speech when interpreting. LiuWang Liming [刘王立明], by contrast, recognized Sanger's contribution to China. Thesethree women, who similarly received well education and training and ever lived in the United States, show different attitudes towards Sanger's birth control approaches.

This article argues that Margaret Sanger represents a "second-generation missionary", who promoted womens' liberation and social reform. Through an analysis of Yu's and LiuWang's writings and Republican China periodicals like the Quarterly Journal of the Christian Birth Control Society in Republican China (中华基督教节制会季刊) and Annual Journal of the Women's Birth Control Society in Republican China (中华妇女节制协会年刊). By comparison of Yu and LiuWang, this article highlights how Christianity critically affected elite women's attitudes toward birth control in 1920s China.

IP16: The history of epidemics and infectious disease

"The Scourge of Clams": the Epidemic of Hepatitis A and the Controversy over the Culling of Clams (1982-1990)

Yiqian LAN

Hepatitis A exploded in Shanghai in 1988. The main cause, according to medical research, is the consumption of blood clams, which were enriched with hepatitis A virus. Both in historical scholarship and popular science propaganda, the logic of narrative is controlling the source of infection and cutting off the transmission route. This interpretation simplifies the ecological forces at work in epidemics of contagious diseases. Based on the analysis of research reports, news reports, oral history, and local gazetteers, as well as the perspective of "One Health", this article examines how blood clams are linked to hepatitis A and have become the major target of scientific investigation and public health intervention. The study of epidemiology and pathogenesis provide the scientific image evidence, and mainstream media fueles public opinion. All of theses framed blood clams as "sinful clams" and the ban on

blood clams became one of the primary interventions to crush hepatitis A. Public health officials believe that the ban was effective in controlling epidemics, but aquatic operators and hygienists realize that the ban couldn't explain and suppress recurring outbreaks of hepatitis A-like intestinal diseases. Besides, exaggerating the "clams pathogenicity theory" to endanger other aquatic organisms and ignoring environmental health issues. Humans, animal, and ecology share a persistent threat. Considering the various roles of clams from the perspective of clam researchers is helpful. On the one hand, it aids in understanding the ecological and recurring nature of contagious diseases, as well as breaking free from the formulaic anthropocentric narrative model of contagious diseases outbreaks; on the other hand, it engages in a conversation with current preparedness for ecologically episodic contagious diseases.

The Mutant People: "Experimental Typhoid" and Vaccine Development by Keio Bacteriologists, 1930-1960

Kyoryen HWANG

Around 1930, Japanese bacteriologist Wataru Murase isolated the pink lustrous E. coli colony from an incubator with "bouillon" media. The mutant bacteria what he called the "Mutabile strain" of E. coli soon constituted the dominant research program of the Department of Bacteriology at Keio Medical School, which was then one of the most prestigious laboratories of bacterial genetics and immunology in Japan. This paper analyses Keio's experimental system and research network to show the material construction of bacteriological knowledge within its military context in the trans-war period. Keio bacteriologists tried to churn the interspecific assemblages - such as E. coli, Salmonella, mice, rabbits, phages, and humans - to carry on their "experimental typhoid" research for the development of the effective live typhoid vaccine. This was accepted by some laboratory members as the few ways that could make some "real contribution" through "something that was known only in Japan."

To reconstruct Keio's bacteriological research, the presentation will be organized into three parts. First, I show the co-establishment of the experimental settings and research questions, along with the cultivation of the most valuable cornucopia, mutant strains. In search of scientific achievements after its founding by the renowned Shibasaburo Kitasato, the Keio Laboratory stumbled upon epistemic things such as "Mutabile" and "mouse typhoid" around 1930. I here illuminate how this surprise emerged and soon became a routine technique in their immunological studies. Second, I focus on the economy in the laboratory to connect its scientific practices to the broader wartime context. As the imperial expansion intensified, many lab members, including Murase, were sent to the colonies while their instruments and techniques have been claimed as useful public health innovations. However, support for "experimental typhoid" research often conflicted with more pressing projects, such as encephalitis or tuberculosis. Finally, I analyze how the Keio group's work is negotiated with somewhat 'universalized' postwar microbiology. Under the Japan-U.S. Encounters, a Keio member named Hiroshi Nikaido, who later earned a professorship at UC Berkeley, made their old mutants into new biochemical findings on galactose metabolism. This paper will contribute to the scholarship interested in the multiplicity of experimental organisms as well as de-centering the Euro-Americentric history of microbiology and biotechnological practices.

From Wartime to Peacetime : The Historical Rise and Fall of Chinese Infectious Disease Hospitals (1945-2003)——Taking Beijing Ditan Hospital as an Example

Qiman LIU

With the changes in the type and scale of infectious diseases in China, the types and numbers of specialties in China's infectious disease hospitals have also undergone dramatic changes. As a special social system and medical space, there is a tension between fairness and public welfare and economic efficiency in the rise and fall of Chinese infectious disease hospitals, which is also closely related to the reform policy of Chinese public hospitals. It should be pointed out that the main reason for the particularity of infectious disease hospitals is the changes in the spectrum of infectious diseases, while the changes in the source and transmission conditions of epidemic diseases require more attention to the interaction between the natural environment and human technological activities. In the case study of Beijing Ditan Hospital as an example, the article finds that under the background of socialist society in New China, political orders and economic development related to the development of infectious disease hospitals are both top-down movements. Under the double impact of the epidemic and the implementation of the system formulated by policy makers, as indicated by Bourdieu's theory, the introduction of scientific and technical personnel and equipment in infectious disease hospitals was mainly regulated by political capital before the reform and opening up, and mainly by economic capital after the reform and opening up. Under the impact of the current COVID-19 epidemic, infectious disease hospitals with fixed locations, personnel, and systems failed during the transition from peacetime to wartime, so that a large number of temporary isolation places such as shelter hospitals and isolation points were established, and the treatment of patients had to be weakened. In response to the inevitable next wave of epidemics in the future, how should infectious disease hospitals and medical and health policy operators learn from the experience of past economic and political movements, and improve the campaign mechanism with infectious disease hospitals as the core, so as to help the Chinese people and the world deal with infectious diseases disease threat, to which the article wishes to contribute.

IP29: Engineering and Technology in Modern China

The Knowledge Flow of Armament Science and Technology in China from the Perspective of Academic Genealogy

Mo WANG

The discipline of armament science and technology in China was established in the 1950s, with early assistance from the Soviet Union, and later developed independently to form the academic genealogy. Academic genealogy is a group composed of scientists of different generations connected by academic inheritance relations, which can reflect the academic origin, mentoring relationship, and academic tradition of related scientists. It can also reflect the paths of knowledge flow and its ability to reproduce. Using social network analysis and science diplomacy as a framework, this paper explores the formation and evolution of the academic genealogy of armament science and technology in China since the Cold War, identifying the academic cooperation and topic networks of different generations. The knowledge elements inherent in the textual content of the genealogy members are analysed and it is concluded that the key to the establishment

of the discipline in China was not only the effective knowledge flow between China and other countries but also the process of knowledge localisation.

Vanishing Technological Revolution: Technological Practice in the Great Leap Forward Movement

Yuanzhi LIAO

The Great Leap Forward Movement (1958-1961) was a mass revolution and technological revolution launched by the Chinese Communist Party in order to achieve socialist modernization. Chairman Mao emphasized the role of intellectuals in this movement, aiming to achieve industrial mechanization and electrification through their contributions to technological revolution. Initially, foreign technologies and experts who mastered these technologies were not excluded from the Great Leap Forward. On the contrary, the CCP implemented a series of institutional measures to support technological revolution in the early stage of the movement. However, the concept of "integration of Chinese and foreign technologies" shifted to the reality of "advocating indigenous technologies and opposing foreign technologies" during the course of the Great Leap Forward. In practice, the mass revolution converted the technological revolution, resulting in a state that was completely different from the original concept of the campaign. This paper reflects on the Great Leap Forward from the perspective of technological practice, arguing that it was not only filled with fanatical irrationality, but also influenced by considerations based on material productivity and technological politics.

The Art of Engineering Modern China: Technology and Late Qing Educational Reforms Revisited

Hailian CHEN

Seeking solutions out of the late Qing crisis had been deeply intertwined with China's modernization process, for which imitating Western-style scientific and technological systems occupied a central position in debates and reforms. "Technology" seemed to refer to the acquisition, replication, production, and industrial manufacture of machines of diverse types, such as steamboats, firearms, looms, and like—machines found primarily in the West. This study examines the hitherto ignored concept of technology in the late nineteenth century. The concept of technology is shown to be key to our understanding of the emergence of modern education and cultural and social transformations in China. Unlike popular narratives that tend to downplay the technical or engineering educational reform (especially before 1895), this study argues that the jiqiju [bureau for manufacturing machinery] and the previously overlooked yiju [bureau for arts] were two pioneering institutional models founded by the late Qing reformers for developing manufacturing and educational enterprises in the 1860s; and that they stimulated the Confucian scholarly learning of arts and triggered a conceptual shift in institutionalizing the learning of arts, thereby changing the educational system. That last step permitted the establishment of schools for mass education, open for scholars and other social groups.

IP25: Pharmacology and Drugs in Republican and Wartime China

The Movement of "Western Medicine Practitioners Using National Drugs" and Its Meanings, 1929-1949

Rui FAN

In 2015, Chinese scientist Tu youyou received a Nobel Prize for the discovery of

artemisinin, an anti-malarial drug made from a Chinese herb. This is the biggest success of PRC in implementing scientific research on Chinese herbs. In China, scientific research on herbs in the national level began in 1930s. Contrary to general understanding, it was Western medicine practitioners, not Chinese medicine practitioners, who had prompted the scientific research on herbs into the national level. At that moment,the development of Chinese herbs industry was considered to be an important means to improve Sino-foreign trade and China's national economy. Thus Western medicine practitioners was required to use Chinese herbs to cure. In 1931, the Third National Congress of the China (Western)Medicine Practitioners Federation was held in Shanghai, which focused on how to Scientificize Chinese herbs and use them. At the same time, Many Western medicine practitioners embarked on the research and development of Scientific Chinese herbs. The most representative were Yu Yunxiu and Wang Qizhang. Both strongly advocated abolition traditional Chinese medicine (TMC). Yu Yunxiu developed a drug called “Yu’s Analgesic Anti-inflammatory Cream”, which was made from several Chinese herbs. Wang Qizhang developed a drug called “Tonier Lung Sutra”, which was made from garlic, a herb in TMC. Both recipes of the two drugs came from TMC books. Due to the lack of professional knowledge, especially pharmaceutical chemistry, Yu Yunxiu and Wang Qizhang even didn’t understand the chemical ingredients of the Chinese herbs contained in the drugs they developed, and the so-called Scientificization was just to “translate” the content of the TMC books with Western medicine knowledge. Other Western medicine practitioners, such as Liang Xin changed the physical structure of herbs in order to Scientificize them, which was closer to traditional Chinese pharmacy and far from modern pharmacy. At first, Western medicine practitioners hoped to abolish TMC while conducting scientific research on herbs, but at the result, the Scientifizing conducted by them still relied on TMC. This was one of the reasons why TCM hadn’t been abolished. However, Western medicine practitioners’ devote in Scientifizing Chinese herbs had successfully attracted the attention of Western medicine merchants and the government. Before and after the outbreak of the Anti-Japanese War, with the funding of Western medicine merchants and the government, several institutions specializing in scientific research on Chinese herbs led by pharmacists were established. This laid the foundation for the large-scale implementation of scientific development of herbs after the CCP came to power.

Making Modern Pharmaceuticals in Wartime China: E.N. Meuser, West China Pharmacy School and Pharmaceutical Sciences, 1928-1945

Wuyutong YAO

This paper examines the critical period of modern pharmacy development in China from the 1920s to the end of the Second Sino-Japanese War in 1945. The focus is on the wartime period between 1937 and 1945, during which China faced national crises. The paper explores how the war shaped pharmaceutical research and manufacturing, not only for national survival but also for the development of modern pharmacy in China. Specifically, this paper investigates the understudied but significant region of western China where scientists relocated to "the Great Rear" and coped with the wartime shortage of pharmaceutical products by experimenting with local natural medicinal materials.

Previous studies have highlighted the confrontation between traditional Chinese medicine and modern western medicine in the 1920s and 1930s, as well as the efforts of doctors and physicians to modernize and "scientize" Chinese drugs. This paper contributes to this discussion by shedding light on a group of missionaries, pharmacologists, pharmacists, botanists, and chemists who were affiliated with the West China Pharmacy School at West China Union University. It shows that the scientists involved in the project generally did not take part in the debate between Chinese and Western medicine. Instead, they used the ambiguity of the term "guoyao" (domestically-produced national drugs, which originally referred to sourcing materials for the drugs rather than traditional Chinese pharmacy in general) to assert their connection with China and claim nationalism, while also emphasizing the scientific nature of their work based on Western scientific principles. This story highlights the dynamic interplay between China's drive for self-reliance, nationalism, and the adoption of western scientific methods. These parallels in the first half of twentieth-century China had a long-lasting impact on the development of pharmacy in China.

Fighting for Survival in Crises: The Chinese Pharmacopeia Exhibition, Shanghai, 1942

Xiaojing HAN

Between 1850 and 1950, China faced an unparalleled civilizational crisis rooted in its decline and the impact of Western powers and also of Japan. This all-out upheaval triggered a wave of modernization, which in turn set off a major crisis of all matters traditional: a trend that denied the value of traditional culture, of which Chinese medicine and pharmacology were important parts.

This contribution focuses on the Chinese Pharmacopeia Exhibition set up by Chinese and foreign intellectuals and institutions at the Heude Museum in Shanghai in 1942. The idea grew out of concerns about the situation in China at the time: because of natural and man-made disasters, people suffered, and even died, due to the lack of medicines. The organizers, Father Jacques Roi (1902-1986), a French Jesuit trained as a botanist, and Wu Yunrui 吳雲瑞 (1905-1970), a professor of medicine at the Aurora University, conjectured that mass-production of Chinese medicines using modern technology could be a solution to make cheaper cures available to the public.

By describing the theme, presenting the actors and networks, the paper sheds new light on the ways in which medical and pharmacal communities cooperated to survive in a time of multi-scale crises, as well as on their reflections and contributions. With questions like: How could the Exhibition be held in such a situation? Why was this subject chosen? How could it be against the mainstream thought before the war? The study shows that in a context of tension between Conservationists and Abolitionists of Chinese medicine, the Exhibition gave voice to a novel viewpoint around this issue: it valued the history of Chinese pharmacopoeia, and the recent pharmacodynamic achievements based on Chinese pharmacology, with a view to develop modern pharmacy through the integration of Chinese traditional practices.

The exhibition was hoped to pave a way out of the survival crises through which the country tried to navigate at the time, which threatened the lives of the Chinese people of course, but also the country’s traditions and civilization. To this day, the debate on the abolition of Chinese traditional medicine and pharmacology has

never ceased. By presenting how the actors I study established the value of the Chinese pharmaceutical tradition in a modern context, I aim to highlight some of the ways out of survival crises that have been proposed in the past, which may be of some relevance in the context of the present crisis.

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