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Special Issue: Cultures of knowledge in the history of Chinese medicine

Guest Editors-in-Chief:

余新忠 YU Xinzhong

YU Xinzhong is a doctor of history of Nankai University and a postdoctoral fellow of Kyoto University in Japan. Currently, he is an outstanding professor and Dean of the School of History of Nankai University. He is also the vice president and Secretary General of the Chinese Society of Social History. He has written five works such as *The Epidemics and Society in Jiangnan during Qing Dynasty: A Study on the Social History of Medical Treatment* and *Public Health and Epidemic Prevention Mechanisms in Qing Dynasty and Their Evolution in Modern China*, and published more than one hundred papers in journals such as *Historical Research*. He was selected as a young scholar and distinguished professor of Cheung Kong Scholars Program. He won the National Excellent Doctoral Thesis Award, the first and second prizes of the National Humanities and Social Sciences Outstanding Achievement Award.

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刘小朦 LIU Xiaomeng

LIU Xiaomeng received his PhD from the University of Hong Kong and is currently a Junior Research Fellow at the Department of History, Fudan University. He used to be a visiting scholar at the Center for Science and Society in Columbia University and postdoctoral fellow in the University of Hong Kong. His research focuses on the social and cultural history of medicine in China, with a special focus on medicinal markets and pharmaceutical culture in late imperial and modern period.

The Purpose of the Special Issue

The special issue aims to facilitate interdisciplinary studies and merge the gap between the internal and external approaches in the history of traditional Chinese medicine. By incorporating the history of knowledge in the study of Chinese Medicine, we do not only attempt to uncover historical facts, concepts, or theories, but more importantly seek to explore the socio-cultural processes of knowledge production, transmission, and circulation. We consider knowledge as situated practices, and Chinese medicine as diverse traditions (re)constructed in specific times and places. We believe that the focus on "knowledge" can help to shed new light upon the history of medicine and China and to understand how modern TCM comes into being in historical processes.

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2. Historiographies of Chinese medicine and their meanings
3. Skills, instruments, and the (re-)construction of knowledge in Chinese medicine
4. Global process(es) of knowledge construction in Chinese medicine
5. The modern formation of "TCM" and its knowledge systems

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General Information

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Chinese Medicine and Culture is an interdisciplinary academic journal focusing on the study of Chinese medicine. It aims to promote communication and dialogue between researchers in the natural sciences and humanities of Chinese medicine. The objectives are to build an interactive platform for interdisciplinary research on Chinese medicine and to comprehensively reflect the high-level and latest research results of Chinese medicine in the fields of medical science research, cultural exchange and historical heritage conservation.

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Introduction to the Special Issue for Cultures of Knowledge in the History of Chinese Medicine

YU Xinzhong[1,✉]

The past two decades witnessed the rapid growth of studies on the history of medicine in China. Historians have shown the great diversities of medicine and healing practices in Chinese history as well as their potential to inform aspects of society and everyday life. Now it is widely accepted that there was no single entity known as Chinese medicine but a plethora of knowledge, practice, and healing arts in the premodern period.A discrete and well-defined field of (traditional) Chinese medicine only started to take shape after 1929, when practitioners felt the urgency to defend their profession in face of challenges from both Western medicine and the state.

Recent studies[1] also show that many of the defining features of Chinese medicine, including pattern differentiation and therapy determination, experience-based medicine, and holistic thinking, have more recent origins in the modern period. All these developments in the field urge scholars to reconsider some fundamental categories, concepts, and practices now taken for granted in the realm of traditional Chinese medicine (TCM).[2]

This special issue approaches this problem in Chinese medical history through the lens of knowledge formation and transformation. Continuities and discontinuities were constantly mentioned in historical discourses of Chinese medicine.[3] Though many would agree that institutions, professional identities, and the social status of medicine experienced several dramatic transitions in history, few would assume a parallel change in medical knowledge. Knowledge in Chinese medicine is typically described as accumulative rather than transformative, evolutionary rather than revolutionary. This special issue attempts to show that such an interpretation is inadequate to achieve an overall understanding of Chinese medicine and its history. We intend to demonstrate that knowledge traditions in Chinese medicine were constantly transformed and reconfigured in historical contexts. The term "cultures of knowledge" is deliberately used here to emphasize that we understand knowledge as a social creation constructed in cultural practices rather than a fixed body of words and thoughts.

To achieve this goal, this special issue embraces a long-durée perspective to show that medical transition and transformation is not a distinctively modern phenomenon but intermittently emerged from antiquity to contemporary China. Even though the modern formation of TCM marks a distinctively new system of medicine, it is not the only notable medical transition in Chinese history. From the articles in this issue, one can easily identify the Song dynasty as another key transitional period. Two articles authored respectively by Dolly Yang and Asaf Goldschmidt keenly emphasize the role of the state in facilitating the canonization and institutionalization of medical systems during the Sui, Tang, and Song dynasties. Articles focus on periods after Song, however, manifest a decentering trend in knowledge production in which the role of state becomes obscure. The special issue consists of 12 articles, covering a wide range of topics including materia medica, acupuncture, *Dao Yin*, formula books, disease concept, life nourishment, and medical institutions. Here, I would like to raise a few important categories that organize and synthesize the perspectives and arguments presented in this issue.

Concept. A concept is a typical form of knowledge that distills complex realities into abstract ideas or terms. Once established, a concept tends to be separate from its historical context and further essentialized as a body of timeless knowledge. Several articles in this issue endeavor to recontextualize a few well-known Chinese medical concepts into their historical and practical contexts. Dolly Yang examines the concept of *Dao Yin* and challenges the previous assumption that it was introduced to medical practice from the Daoist

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tradition. Yu Xinzhong discusses the emergence of a new disease concept *Shu Yi* (鼠疫 bubonic plague) in the late Qing period. He argues that the new concept was more likely to be derived from vernacular knowledge rather than Western biomedicine. Lai Lili and Judith Farquhar's article begins with a prominent concept that relates medicine to food. It unravels the rich philosophical implication and practical dimension of flavor in Chinese herbal medicine.

Genre. Gianna Pomata coined the term "epistemic genre" in conceptualizing the function of recipes and cases in medicine. The term denotes the type of genres that are self-consciously used for creating new knowledge. Not all genres examined in this issue are completely new, but authors deliberately used them to form new arguments or to guide new practices in their respective periods.[4] Through a close reading of materia medica works, Chang Che-chia uncovers heterogeneous intentions in composing commentaries for the *Divine Husbandman's Canon of Materia Medica* (神农本草经). Liu Xiaomeng uses practical works on authenticating medicines in late imperial China to reconstruct the sensory technique used in the medicinal markets. Liu Xiyang gathers a wide range of formula books that specifically aimed to disseminate knowledge on epidemic prevention. By investigating medical works for the care of elderlies in modern China, Pi Kuo-li detects the tension between traditional knowledge and new scientific knowledge. Mang Fan's review article provides an overview of cutting-edge scholarships that integrate history of publishing and history of medicine. It shows that the history of books provides a powerful tool in formulating research about medical knowledge.

Material. The "material turn" in the history of medicine redirected the attention of scholars from body concepts and medical theories to the material form of therapeutics, namely technologies and medicines. Three articles in this issue deal with knowledge produced through medicinal materials. Lai Lili and Judith Farquhar present an ethnography of tasting and using herbal remedies in China's southern mountains. Liu Xiaomeng investigates the practical technique of authenticating medicines in the market. Both studies emphasize the role of bodily senses in examining and evaluating herbal remedies. Yao Wuyutong's study, however, explores how the practical knowledge about medicinal ingredients was extracted from folk gatherers and codified in texts produced by the state. Material practices, according to the three articles, are more related to hands-on and down-to-earth expertise rather than highly theoretical abstractions.

Space. New developments in the history of science no longer consider science or any other forms of knowledge as universal claims of truth but as situated practices. Therefore, space stands out to be a significant aspect of knowledge production. Authors of this special issue tackle the spatial questions in Chinese medicine in two ways. Asaf Goldschmidt's article represents the first approach that investigates the establishment of new social spaces for public health by the central government of the Northern Song dynasty. This state-sponsored model of epidemic relief forms a sheer contrast with the strategies of the Qing dynasty (as described in Liu Xiyang's research), in which local officials and gentries played a more prominent part in creating social spaces for the spread of formulas and medical knowledge.

Yao and Lai & Farquhar's articles self-consciously situate their studies in specific locations, one in western Sichuan and the other in China's southern mountains. Liping Bu, however, directs her focus to the United States, probing into the global process in which Chinese medical knowledge is transmitted and transformed.

Nowadays, studies on the history of knowledge have shifted the attention from "knowledge-that" to "knowledge-how." Articles in this issue also focus more on the practical side of knowledge rather than theories and words. We try to avoid the tendency to essentialize any form of knowledge or culture as innate or unchanged core values of Chinese medicine. Our findings suggest that Chinese medicine should be viewed as a fluid system of knowledge and practice being constantly redefined and transformed throughout history. The authors of the special issue include not only historians but also anthropologists and clinicians. We hope that this interdisciplinary effort can demonstrate the potential to integrate history of Chinese medicine with history of knowledge and bring a new perspective to the study of Chinese medicine.

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Ethical approval

This article does not contain any studies with human or animal subjects performed by the author.

Author contributions

YU Xinzhong wrote and reviewed the article.

Conflict of interest

The author declares no financial or other conflicts of interest.

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Research article

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The Establishment of the Concept of *Shu Yi* and its Significance in the History of Knowledge

YU Xinzhong[1,✉], TIAN Yu[1]

Abstract

Plague is one of the severe infectious diseases that has had a huge impact on human society throughout history. Although there is abundant research on the disease, few studies focus on the concept of plague itself. It is generally believed that *Shu Yi* (鼠疫) was first coined by Chinese doctors in the late 19th century, and it was closely related to the introduction of new medicine. This statement is not accurate, because plague was prevalent in Yunnan and Guangdong provinces in the late Qing dynasty. At that time, people had already recognized the relationship between the outbreak of plague and the death of rats, and gradually named the epidemic disease as *Shu Yi*. This name was used by literati and doctors by coincidence. As the epidemic became more and more serious, more related works were widely disseminated, and *Shu Yi* changed from a folk name to a formal name. Later, with the help of the government's active introduction of modern health and epidemic prevention mechanisms and the implementation of rodent control measures, *Shu Yi* became more popular and gradually recognized by all walks of society. The emergence and prevalence of *Shu Yi* created the history of zoonosis in China, and thus formed a new paradigm of naming human epidemics after related animal names.

Key Words: Disease naming; History of knowledge; Plague; Zoonotic disease

1 Introduction

Plague is a severe infectious disease caused by *Yersinia pestis*, which is commonly seen in glires such as rodents and marmots. It is a natural pathogenic disease, and is also a zoonotic disease.[1,2] Plague is one of the two major Class A infectious diseases in the International Law on the Prevention and Control of Infectious Diseases, and it has greatly impaired human life and society throughout history. Plague has been known by many different names in history due to its long history, such as the Black Death, *He Wen* (核瘟), and *Bai Si Du* (百斯笃), etc. Plague is a universal term referring to this disease in the world today. It is generally believed that *Shu Yi* (鼠疫), which literally means the plague, is the traditional Chinese name referring to the plague, while the Black Death is the traditional Western name. Therefore, some contemporary scientists who study infectious diseases believe that these two different names reflect the different origins of understanding of epidemics between China and the West.[3] From the perspective of Chinese disease history, *Shu Yi* seemed not to be a traditional Chinese concept. In the 1930s, Chen Bangxian (陈邦贤) pointed out in the revised version of *History of Chinese Medicine* that "the name *Shu Yi* was coined after the introduction of Western medicine."[4] From this point of view, *Shu Yi* was not a traditional Chinese concept, but a new medical concept. Therefore, the establishment of the concept and the word *Shu Yi* needs further research.

Due to the influential impact of plague on human history, international historians have done much research on the history of plague. The research on the history of plague is also a popular topic in the study of Chinese medical history of diseases. Since the 1950s, no less than 6 monographs on the history of plague have been published,[5-10] not to mention research essays and papers on the same topic. These monographs mainly discussed the situation of the epidemic, its impact and the social response in Chinese history, especially in modern times. A part of this research discussed the relationship between the names of diseases and plague such as *E He* (恶核) and *Ge Da Wen* (疙瘩瘟),[11-14] but only a few of them paid attention to the history of the concept of plague itself. Wu Wenqing (吴 文清) discussed the establishment of the name from the perspective of traditional Chinese medicine in *Research on Major Innovations in Modern Chinese Medicine* edited by Zhu Jianping (朱建平). Cao Shuji (曹树

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基) and Li Yushang (李玉尚) discussed the emergence of the name *Shu Yi* by searching comparative and systematic historical materials. These studies clearly showed that *Shu Yi* first originated in *Zhi Shu Yi Fa* (《治鼠疫法》*Formulas for Treating Plague*) authored by Wu Xuanchong (吴宣崇) published around 1890. Before this concept appeared, there were many folk names such as *Yang-tzu Bing* (痒子病) and *He Wen* referring to the disease. However, *Shu Yi* became popular after that.[15,16] Although these studies have clearly pointed out the origin of the concept of *Shu Yi* and its coexistence with a variety of related concepts at that time, they have not made a systematic research on the process from which the concept was established. They also failed to specifically explore its internal reasons and logic. However, there are exceptions. For example, Carol Benedict (班凯乐) wrote an early monograph on modern plague, but it did not pay much attention to the establishment of *Shu Yi*. She did notice that the concept had been used in Chinese medical history at the end of the 19th century, revealing the historical and cultural implications behind the concept from the perspective of comparing Chinese and Western cultures.[17] Christos Lintris, expert on the history of plague, focused on transmission of plague between humans and animals. He did research on the third plague pandemic on the Sino-Russian borders by sorting out research and interpretations by different disease experts on the basis of ethnography. Lintris' work highlighted the importance of understanding rats as the host animal of *Y. pestis* by the indigenous people where the epidemic occurred.[18] It further showed the tension and even confrontation between indigenous local knowledge and colonial medical knowledge.[19] Although his research did not discuss the concept of "plague" itself in the Chinese context, it revealed the role of the visual medium "rat" in establishing the concept of plague as a disease and its non-negligible position in the local language network.[20] This reminds us that *Shu Yi* is not as simple as a new vocabulary in Chinese, but also contains cognition of disease and complex relationships between different knowledge systems. The name requires further exploration .It is worth noting that names of similar diseases such as *Kuang Quan Bing* (狂犬病 rabies), *Qin Liu Gan* (禽流感 bird flu), *Zhu Liu Gan* (猪流感 swine flu), and *Hou Dou* (猴 痘 monkeypox) are also new names that appeared in modern times after *Shu Yi*. In other words, the naming process of *Shu Yi* might create a new way of naming diseases by referring to human diseases in the name of animals. From the perspective of history of knowledge, *Shu Yi* is not only a new disease name, but also a new way of naming diseases reflecting the evolution of plague cognition. Therefore, what is the significance of the emergence and popularity of this concept?

In response to the research question above, this article aims to discuss the emergence and popularity of the concept *Shu Yi* and its significance on the basis of existing research, from the dual perspectives of history of concepts and knowledge.

2. The establishment of the concept *Shu Yi*

Plague, as a severe zoonotic infectious disease, has had a long history of harming the human world, especially in the European Middle Ages. Called the Black Death, plague had a profound impact on the demographic and historical evolution of Europe. In China, though plague was deeply related with many major epidemics in ancient history and other diseases such as *E He* and *Ge Da Wen* in historical records, there existed great controversies in the academic circles as to whether some of the great pandemics recorded in history before the 18th century could be plague. However, there was little objection to the existence of plague epidemic in Yunnan province in the late 18th century.[21] It is an indisputable fact that plague did not attract attention from the Chinese medical community until the late 19th century. Plague is a dangerous disease with obvious symptoms and strong contagiousness. It is often accompanied by special phenomena such as the death of rats. Despite this, medical records describing symptoms and characteristics of plague were hard to find in traditional Chinese medical classics, not to mention a dedicated focus on plague. Existing studies believe that Wu Xuanchong's *Zhi Shu Yi Fa* published in the 17th year of Guangxu (1891) was the first monograph on the treatment of plague in China. After that, a large number of books were published on the same topic.[22-31]

Plague is an infectious disease caused by *Y. pestis*. Its most notable feature in Chinese language is that the name *Shu Yi* indicates the relationship between the disease and rats. Almost all existing research believes that the emergence of the concept of *Shu Yi* began with Wu Xuanchong's *Zhi Shu Yi Fa* published in the 17th year of Guangxu (1891).[4] The original edition of this book is no longer in existence. In the 20th year of Guangxu (1894), plague spread out in Guangzhou. To deal with the disease, Chen Zhaoxiang (陈兆祥), a doctor from Panyu reprinted the book and titled it as *Ji Jiu Shu Yi Chuan Ran Liang Fang* (《急救鼠疫传染良方》*Fine Formulas for Emergency Plague Infection*).[32,33] At that time, Luo Rulan (罗汝兰), a Confucian doctor from Shicheng, was also looking for a cure for the plague. In the winter of 1894, Luo got the book. Based on his own experience and thinking on the epidemic, Luo made additions, deletions and revisions to Wu's work and compiled *Shu Yi Hui Bian* (《鼠疫汇编》A Compilation of the Plague). The book was influential and was republished more than five times in seven years.[34] Physicians in the Republic of China regarded the establishment of *Shu Yi* as a manifestation of the development of Chinese medicine. For example, Li Jianyi (李健颐) believed that "the origin of the epidemic was India and the former Asia,

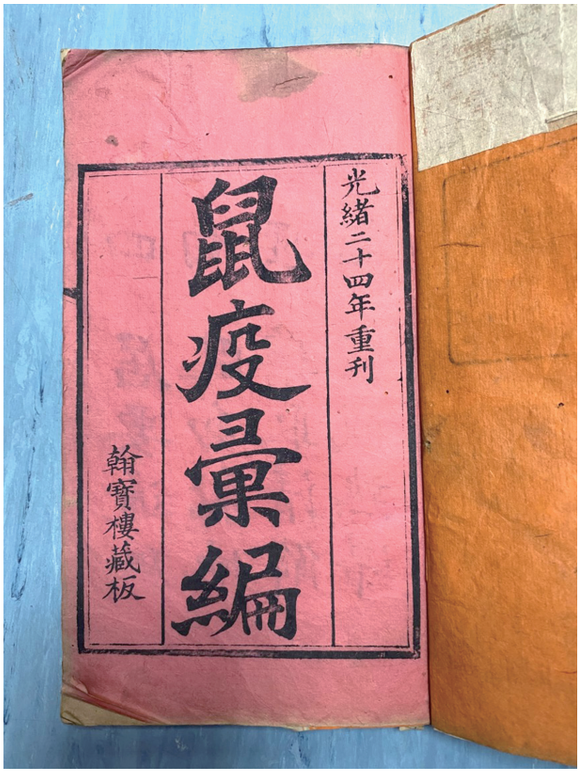

Figure 1 Front cover of *Shu Yi Hui Bian* (*A Compilation of the Plague*) edited and published by Luo Rulan, 1898 version, collected in Guangzhou University of Chinese Medicine (source from: http://m.stdaily.com/index/kejixinwen/2020-06/13/content_956016.shtml).

and it was passed on to various European states. It spread to China during the Qianlong period of the Qing dynasty. The famous Chinese doctors knew that the epidemic was caused by rats, so it was named *Shu Yi*."[35] However, Chen Bangxian believed that "after the introduction of new medicine, the name *Shu Yi* came into existence."[4] Contemporary researchers believe that the books mentioned above were the earliest naming of plague by Chinese doctors,[36] because these literatures were the earliest ones recording plague in Chinese history. However, it was only an assumption if the naming of *Shu Yi* was regarded as a conscious new means of naming a new disease by Chinese doctors. An article titled *Shu Yi Yuan Qi* (《鼠疫原起》*The Beginning of the Plague*) in Wu Xuanchong's book *Zhi Shu Yi Fa* recorded the situation as follows:

> "In the winter of the 16th year of Guangxu (1890), *Shu Yi* broke out. Rats died before *Shu Yi* broke out. People were invaded by epidemic qi and caught the disease, and they would suffer rat sores and scrofula. Those who were mildly ill would die in three to five days, and those who were severely ill would die in an instant. The doctors could find no cure. Only one or two in ten people could survive the epidemic by removing the buboes, being treated by acupuncture, and taking cold and bitter decoction to clear heat. The disease first broke out in Annan in the Tongzhi period, then it extended to Guangxi, and finally to the coastal city of Leilian area and cities attached to Wuchuan. ... The cities in the Leilian area and Guangxi had suffered the disease for the past 20 years. The epidemic usually started in November and ceased in May. It was more severe in the cities than in the countryside. As the epidemic developed, it was feared that Gaozhou could inevitably suffer from future epidemics. I don't know medicine, so I have no way to analyze the formulas. However, I heard some experiences on the avoidance and treatments of the plague from my friends, so I will describe them later."[37]

According to the quotation above, the plague broke out in Wuchuan in the 16th year of Guangxu (1890), and it had been prevalent in the Leilian area of western

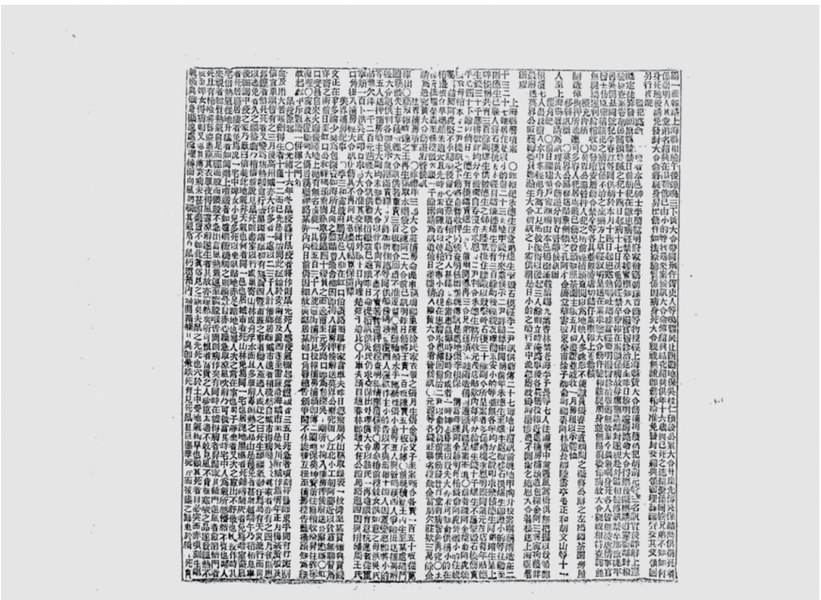

Figure 2 *Shu Yi Yuan Qi* (*The Beginning of the Plague*) from *Shen Bao*, on June 16 1898, 3rd section (source from: Shen Bao Database).

Guangdong for 20 years. Wu Xuanchong did not know medicine himself because he was a local gentry and not a doctor. Therefore he could only record the experience and treatments he heard from his friends. According to current research, Wu Xuanchong, courtesy name Cunfu (存甫), was born in Wuchuan. He became a student of the imperial academy in the eighth year of Guangxu in the Qing dynasty (1882), and was the grandson of Wu Maoqing (吴懋清), a successful candidate in the imperial examinations at the provincial level and a local gentleman in Wuchuan.[38] If he had coined the name *Shu Yi*, it was hard to imagine that a literati who did not know medicine would directly call a local pandemic in a new name without any explanations. It is also difficult to understand that Luo Rulan, who was a student of the imperial academy and a medical practitioner in Shicheng, would pose no objection to the name *Shu Yi* after he "met Wu Xuanchong, a friend of his in Wuchuan county" and read his book *Zhi Shu Yi Fa*.[22] Furthermore, Luo directly used the term by titling his book *Shu Yi Hui Bian*. According to common sense, *Shu Yi*, though it had not been seen in the records, should be a relatively common name used by the local people. This could be well confirmed from a note written by Jin Wuxiang (金武祥) in the late Qing dynasty:

> "In the spring of Jiawu year (1894), I returned to eastern Guangdong once again. The epidemic prevailed in a timely manner, and it lasted for several months. Tens of thousands of people died. Before the epidemic outbreak, local families witnessed the death of rats, and people fell ill once they touched the pathogenic qi. The local people called the epidemic *Shu Yi*."[39]

According to the note, *Shu Yi* was not yet a formal written name. However, it has been a commonly used term by local people in both western and eastern Guangdong. In the two earliest monographs on plague written by Wu Xuanchong and Luo Rulan, both of them regarded plague as *Shu Yi*. For example, Wu wrote, "Rats died before the outbreak of plague. People were intruded by epidemic qi and caught the disease, and they would suffer rat sores and scrofula."[40] Luo mentioned that "rats died and the plague broke out, therefore it got the name *Shu Yi*".[41] The notes showed the relationship between "death of rats" and "outbreak of plague". Although this way of naming did not conform to the general rules of Chinese traditional disease naming,[42,43] it was very possible that ordinary people noticed the obvious connection between rats and the plague, and further named the disease as *Shu Yi*, a concise word describing the characteristics of the disease (疫) in Chinese.

Many names for plague existed in Yunnan and Guangdong at that time, and *Shu Yi* might not have been the common name. The relationship between the death of rats and the outbreak of plague had already been noticed as early as the late Qianlong period. Some literati had noticed the strange epidemics related to the plague in Yunnan at the time.[36] For instance, a famous poet Shi Daonan (师道南) finished his work *Death of Rats*(《鼠死行》) in the first year of Jiaqing(1796), describing rats appearing in houses at daytime and died spitting blood. The poem was later included in *Dian Nan Shi Lue* (《滇南诗略》*Poems of Southern Yunnan*) complied by Yuan Wendian (袁文典) and Yuan Wenkui (袁文揆), and *Bei Jiang Shi Hua* (《北江诗话》*Poems and Sayings of Beijiang*) written by a famous scholar Hong Liangji (洪亮吉).[44] This showed that the connection between the epidemic and death of rats had attracted more attention from literati and scholars. Despite this, people seem to be more used to calling the plague by the symptoms of the disease according to historical records and research by the later generations. The plague in the 19th century was mostly bubonic plague, which not only was followed by the death of rats, but also showed symptoms of swollen lymph nodes. Therefore, it was more frequently called as Yang-tzu Bing or *Li-tzu Bing* (疬子病).[45] References could be found in an report on the plague in Yunnan written in English in 1878. It started by "The sickness known in Yunnan under the name of *Yang-tzu*..."[46] However, that few records of plague or rat plague could be found in previous literature did not mean that the local people do not use *Shu Yi* or *Shu Wen* (鼠瘟). Although ancient classics used *Niu Wen* (牛瘟 cattle plague), *Ma Yi* (马疫 horse plague), *Zhu Wen* (猪瘟 Swine fever) and other terms, these were names for livestock plagues different from human plagues and using such terms could cause ambiguity. The way of naming diseases based on their symptoms was more common, and relatively easier to accept and adopt. Furthermore, such naming might cause less misunderstanding. However, with the repeated outbreak of plague, people were more accustomed to referring to the plague by *Shu Yi*. Thus, the term *Shu Yi* naturally became more and more popular among the people. It proves Lintris' viewpoint that recognizing the plague contributed to knowing the disease, and it also shows the difference between folk and mainstream medical knowledge systems.[18,19] But, both Wu Xuanchong and Luo Rulan naturally adopted the folk name *Shu Yi*. From this point of view, there is no strong confrontation between folk and mainstream medical knowledge systems.

In summary, *Shu Yi* had appeared in formal texts since the early 1890s. It had nothing to do with the introduction of Western medicine, and was not a theoretical innovation of Chinese doctors. It was but a coincidence of scholars and doctors such as Wu Xuanchong and Luo Rulan, who chose the same folk name referring to plague. With the increasing prevalence of plague at the end of the 19th century, their works gained increasing attention. Therefore, *Shu Yi* gradually changed from a folk name to a formal name.

3. The popularity of *Shu Yi* and its reasons

After the name *Shu Yi* appeared in various medicinal books and classics, it did not receive immediate attention and wide acceptance. The term "was not widely accepted during the Guangxu period...it was until very late that *Shu Yi* was widely accepted".[47] From a national perspective, whether the concept was widely accepted or not was not should give way to another question, that the local names of the epidemic had not received enough attention from the domestic cultural circle. A notable example was that a plague of widespread influence broke out in Guangdong and Hong Kong during the Guangxu Jiawu year (1894). At that time, *Shu Yi Hui Bian* by Luo Rulan had been republished many times. Chen Zhaoxiang republished the book under the title *Ji Jiu Shu Yi Chuan Ran Liang Fang*. Jin Wuxiang, an imperial messenger who traveled to Guangdong, also used *Shu Yi* to record the situation of the epidemic. Although *Shu Yi* was already used frequently to refer to plague at the time, the dominant media of China did not turn to it. One of the most influential media sources in China, *Shen Bao* (《申报》) had a series of detailed report on the epidemic, and reporters employed words such as *Yi* (疫 epidemic)、*Shi Yi* (时疫 seasonal epidemic)、*Yi Li* (疫疠 epidemic disease) to refer to the plague.[48] A small proportion of reports mentioned that local people called the plague as *Yang-tzu* (痒子) and *Li-tzu* (疬子).[49-53] But, none of the reports used *Shu Yi* or related words. The following year, however, when reporting the epidemic in Fuzhou, *Shen Bao* used the term *Shu Wen* in the reports twice in a row, namely, "*Shu Wen* is prevalent in Fuzhou, and the epidemic is spreading",[54] "According to the people in Fujian, *Shu Wen* came before the epidemic qi, which is the same to last year's Guangdong."[55] Although in terms of content, *Shu Wen* in these reports referred undoubtedly to the plague, the meaning of *Shu Wen* was not the plague, but the disease prevalent among rats. Two years later, *Shu Wen* was also used in reports and commentaries referring to this epidemic, but its meaning had changed from the disease prevalent among rats to the plague. A comment wrote that, "People believed that this epidemic was similar to the outbreak of *Shu Wen* in Fuzhou the year before. The death rate approached over 80%. Within a few months, as many as 20,000 to 30,000 people died."[56] Later, *Shu Yi* was also used directly to refer to the epidemic. Another report wrote that, "There was a strange epidemic outbreak in Guangdong the year before last. Local people called it *Shu Yi*, which killed countless people."[57] In the next year, *Shen Bao* published the full text of *Shu Yi Yuan Qi* by Wu Xuanchong.[58]

The publication of this article contributed conductively to people's attention to the concept of *Shu Yi*. Since then, the term began to appear more and more in the newspapers and magazines, such as *Shen Bao*. The author's search results of the terms used for plague in the newspapers and magazines from late Qing dynasty to the Republic of China (see Table 1-3 for details) showed that before the 20th century, in addition to the general terms such as epidemic and severe epidemic, the usage of *Shu Yi* was roughly equal to concepts such as *He Wen* and *Yang-tzu*. However, after entering the 20th century, *Shu Yi* gradually took

Table 1 Search results of *Shu Yi* in Shen Bao database

Year/usage of terms	*Shu Yi*	*Shu He*	*Shu Wen*	*He Wen*	*Yang-tzu*	*Bai Si Du*	*Hei Si Bing*
1884–1899	11	1	3	0	7	0	7
1900–1909	19	1	5	2	1	1	2
1910–1919	1971	35	32	64	2	85	89
1920–1929	472	10	0	1	0	45	18
1930–1939	567	0	5	9	0	19	23
1940–1949	365	0	0	0	0	1	33

Data description: Shen Bao database is used as the retrieval tool. *Shu Yi*, *Shu He*, *He Wen*, *He-tzu Wen* (核子瘟), *Yang-tzu*, *Bai Si Du*, *Pei Si Tuo* (配斯脱) and other keywords are used, and the search period is limited from 1872 to 1949. The results above remove one entry under *Shu Yi*, eight entries under *Yang-tzu* and 18 entries under *Pei Si Tuo* which are irrelevant to the plague. *Shu Yi* appeared in the Shen Bao in 1897. It is put in the 1884 to 1899 column, which does not mean that the concept of "plague" appeared in the *Shen Bao* since 1884. It indicates that words referring to infectious diseases caused by *Yersinia pestis* had existed, such as *Yang-tzu* and so on.

Table 2 Search results of *Shu Yi* in Index of National News Papers and Journals

Year/usage of terms	*Shu Yi*	*Shu He*	*Shu Wen*	*He Wen*	*Yang-tzu*	*Bai Si Du*	*Hei Si Bing*
1897–1899	2	0	0	0	0	0	1
1900–1909	33	0	4	2	0	4	9
1910–1919	1023	2	6	7	0	55	8
1920–1929	486	0	0	0	1	29	11
1930–1939	1293	0	0	0	0	98	30
1940–1949	1199	0	0	0	0	3	60

Data description: Index of National News Papers and Journals is used as the retrieval tool, and data in English is excluded. *Shu Yi*, *Shu He*, *He Wen*, *He-tzu Wen*, *Yang-tzu*, *Bai Si Du*, *Pei Si Tuo* and other keywords are used, and the search period is limited from 1833 to 1949 for precise results. The results above remove four entries under *Pei Si Tuo* which are irrelevant to the plague.

Table 3 Search results of *Shu Yi* in Ta Kung Pao database

Year/usage of terms	*Shu Yi*	*Shu He*	*Shu Wen*	*He Wen*	*Yang-tzu*	*Bai Si Du*	*Hei Si Bing*
1902–1909	11	3	5	2	0	0	5
1910–1919	372	0	5	5	1	65	18
1920–1929	156	0	1	0	0	28	9
1930–1939	309	0	1	0	1	19	21
1940–1949	651	1	0	0	0	2	41

Data description: Ta Kung Pao database is used as the retrieval tool. *Shu Yi*, *Shu He*, *He Wen*, *He-tzu Wen*, *Yang-tzu*, *Bai Si Du*, *Pei Si Tuo* (配斯脱) and other keywords are used, and the search period is limited from 1902 to 1949. The results above remove 1 entry under *Shu Yi* and 1entry under *Pei Si Tuo* that are irrelevant to the plague.

the advantage, and after 1910, the usage of *Shu Yi* had an overwhelming advantage.

The results obtained from the big data search indicated that, by the 1910s, *Shu Yi* had been fully established as a common and formal word referring to the plague. More references could be retrieved from the dictionaries of the time. After Robert Morrison compiled *A Dictionary of the Chinese Language* in the early 19th century, foreign missionaries and scholars had compiled and published a series of English-Chinese and Chinese-English dictionaries from that time to the early 20th century. These dictionaries regarded the Chinese equivalents of pest and plague as *Wen Yi* (瘟疫), *Shi Yi* or *Yi Zheng* (疫症). It was not until the publishing of *Deutsch-Englisch-Chinesisches Fachwörterbuch* (*German-English-Chinese Dictionary of Technical Terms*) complied by Richard Wilhelm in 1911 that pest was translated into Chinese as *Shu Yi*.[59] And the *English-Chinese Dictionary of the Standard Chinese Spoken Language and Handbook for Translators* published in 1916 complied by German Sinologist He Meiling (赫美玲) translated pest into Chinese as *Shu Yi*.[60] However, there were still no entries for *Shu Yi*, *He Wen*, *Hei Si Bing*, etc. in the Chinese-English dictionaries. The first entries for these names came from *Ci Yuan* (《辞源》*The Source of Words*), the first major Chinese dictionary linguistically structured around words. The Commercial Press began compiling the dictionary in 1908 and published the first edition in 1915. Entries and explanations related to plague were as follows:

> "*Shu Yi*, or *Hei Si Bing*, is infected by rodents parasitized by fleas. The patient has a strong fever and the body develops buboes, so it is also known as *He Wen*. Black spots appear on the surface of the human body after death, so it is also known as *Hei Si Bing*. Also see *Hei Si Bing* entry.
> *Hei Si Bing*, or the pest, is the most contagious. It is also called *Shu Yi* because rats are the vector of this disease. The Japanese translation of the disease is ペスト, which is triggered by the *Bai Si Du* bacteria. The bacteria invades the blood and spreads throughout the body. Those suffering swollen and painful lymph glands are diagnosed as Gland *Bai Si Du*; those with red phlegm and pneumonia are diagnosed as Lung *Bai Si Du*; those with sores and boils are diagnosed as Skin *Bai Si Du*. The epidemic could trigger severe fever, and very few people could be completely cured. The patient's excrement is highly contagious, so it should be avoided.
> *He-tzu Wen* is the plague. Also see *Shu Yi* entry.
> *Bai Si Du*, or the pest, is also known as *Shu Yi*. Also see *Hei Si Bing* entry."[61]

Ci Yuan was the first large-scale dictionary compiled by the Chinese, and enjoyed a high authority. It took *Shu Yi* and *Hei Si Bing* as entries. Therefore, from a linguistic point of view, these names were obviously regarded as the most common and formal words at that time. But, *Shu Yi* is a native word. So it could be predicted that its usage should be much higher than that of *Hei Si Bing*. *Shu Yi* quickly became the most popular and standard term among the many related words. Apart from the fact that it is a local word, what are the reasons and opportunities behind its popularity?

As mentioned earlier, Wu Xuanchong and Luo Rulan highlighted two characteristics of the plague in the name of *Shu Yi*, namely, rats died and the plague broke out, and patients would suffer "red and swollen glands, and develop buboes".[41] These two characteristics had been recognized by local people in Yunnan since the end of the 18th century. Before the concept of *Shu Yi* appeared, people in Yunnan called it by names such as *Yang-tzu Wen* or *Yang-tzu Bing*. *Yang-tzu* was not a commonly used word in ancient Chinese, and its meaning was confusing. According to the investigation by doctors in Yunnan during the period of the Republic of China, *Yang-tzu* referred to the testicles of a sheep in the local language. Patients of plague would develop swollen lymph nodes in their groin, armpit or neck, etc., which resembled the testicles of a sheep.[62] *Yang-tzu* was a disease name that expressed the characteristics of the disease, and it had the same meaning with *He Wen* commonly used later. In the works on the plague that had appeared since the 1890s, in addition to the concept of *Shu Yi*, terms such as *He Wen*, *Shu He* (鼠核), *He Zheng* (核症) and so on appeared from time to time. For example, Huang Zhongxian (黄仲贤) stated at the beginning of his work *Shu Yi Fei Yi Liu Jing Tiao Bian* (《鼠疫非疫六经条辩》*Systematic Differentiation of the Six Classics of Plague Being Non-Pandemic*) published in 1909 that, "*Shu Yi*, or *He Zheng*, began in Guangzhou in the Jiawu year (1894), and later spread to villages and counties nearby."[63] *Shu Yi Jue Wei* (《鼠疫抉微》*Elaborations on Plague*) published by Yu Botao (余伯陶) also mentioned that "*Shu Yi* was called *He Yi* at first", and listed the death of rats or the

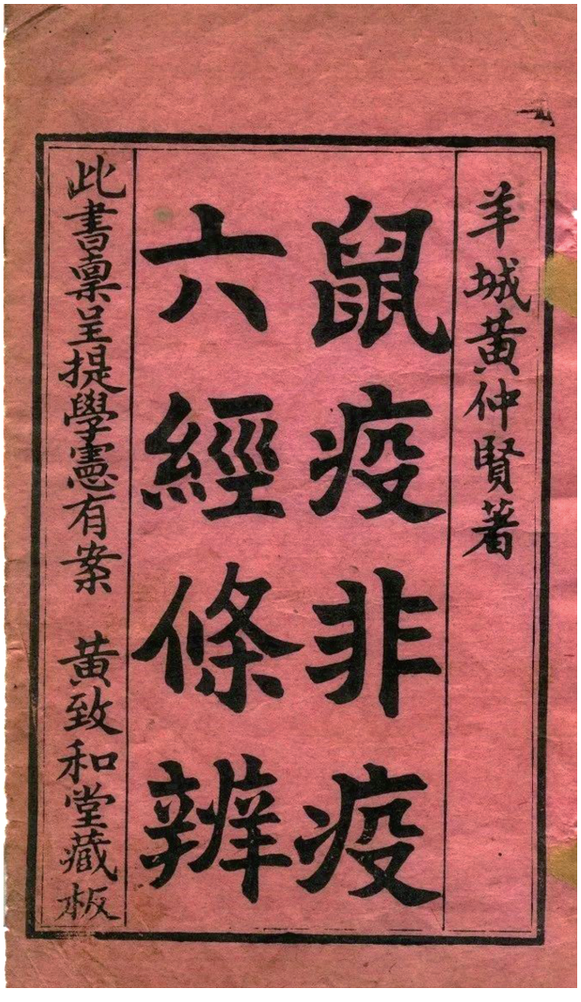

Figure 3 Front cover of *Shu Yi Fei Yi Liu Jing Tiao Bian* (*Systematic Differentiation of the Six Classics of Plague Being Non-Pandemic*) complied by Huang Zhongxian, 1909 version, collected in Beijing University of Chinese Medicine (source from: http://szyyj.gd.gov.cn/zwgk/xxgkml/5/content/post_3088044.html).

presence of buboes as the two necessary conditions for the diagnosis of plague.[64] *Yang-tzu* was a local dialect. It was difficult to understand, and the diction was not elegant and tame. So with the rise of concepts such as *Shu Yi* and *He Wen*, *Yang-tzu* was quickly ignored. After the 20th century, *Yang-tzu* nearly disappeared from newspapers and magazines, except that local chronicles in Yunnan still used this concept from time to time.

Shu Yi took the place of other terms such as *He Wen*, *He Zheng*, etc., and became the most popular standard term referring to plague at that time. The reasons behind this phenomenon lay in three aspects. First, the concept of *Shu Yi* was frequently used in influential medicinal works and classics by famous scholars, namely Wu Xuanchong, Luo Rulan, etc. by coincidence. Second, *Shu Yi* could be closely related to the characteristics of the epidemic prevention and treatment. Finally, the acceptance of *Shu Yi* was deeply rooted in the background of the era when China was

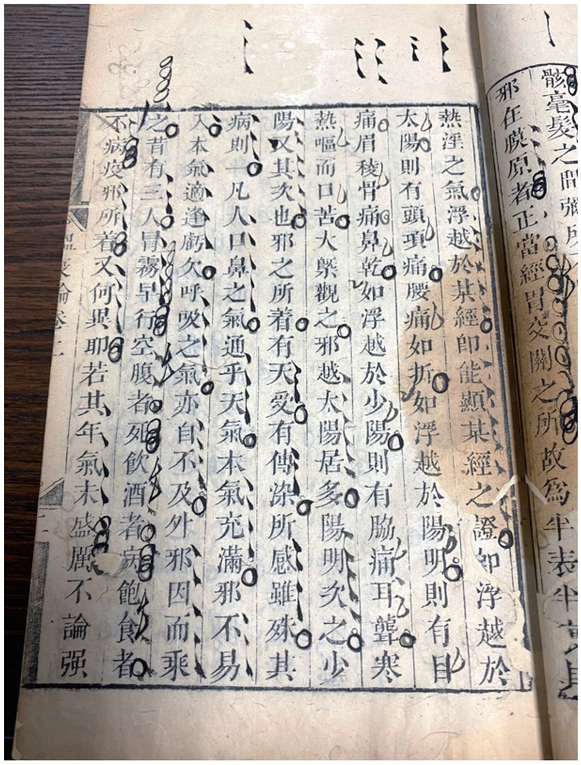

Figure 4 *Wen Yi Lun* (*Treatise on Warm-Heat Pestilence*) compiled by Wu Youxing, 1715 version, collected in Guangzhou University of Chinese Medicine (source from: http://m.stdaily.com/index/kejixinwen/2020-06/13/content_956016.shtml).

actively introducing a modern health and epidemic prevention mechanism. These aspects promoted the acceptance of *Shu Yi*. Plague was a severe infectious disease, and was very dangerous. Before the invention of antibiotics, it not only had a high fatality rate, but also had no treatments both at home and abroad. Therefore, in the face of the epidemic, the colonial institutions such as the British Hong Kong authorities and Shanghai Municipal Council focused on public health measures, including cleaning, disinfection, quarantine, isolation, etc. They encouraged catching and killing rats to control the epidemic.[65,66] These methods revealed the deepening influence casted by the West and Japan on China at the end of the 19th century and the beginning of the 20th century. At the same time, Chinese society began to pay attention to the concept and system of modern health and epidemic prevention, and commenced to introduce this mechanism gradually. There existed objections, particularly from TCM practitioners who believed that the plague could be cured.[67,68] Nevertheless, the strategies and measures employed by the colonial institutions were generally recognized by the official and mainstream society. For example, in 1903, an instruction from the Tianjin Municipal Health Bureau pointed out:

> "The Bureau found that plagues had broken out in the Shanhaiguan area of Yingkou. The epidemic came from

Figure 5 One Health: balance between healthy humans, healthy animals and safer environment (source from: https://www.sohu.com/a/417993993_696850).

> rats. When the rat died, the fleas and worms on the rat's body turned to bite people. As soon as the patient was bitten, his skin was swollen and developed buboes, and the pathogenic qi intruded the human body. In no time, the patient would suffer severe fever, and would die without proper treatment in time. The epidemic was called *Shu He Wen*....It should be noted that the way to prevent the epidemic is nothing more than catching rats and cleaning. Catch rats to clear the source of the epidemic, and clean the environment to prevent the outspread of the epidemic."[69]

At the same time, newspapers and magazines used colloquial language and pictures to vigorously publicize preventing and controlling the plague by catching and killing rats. For example, in 1908, a report in the *An Hui Bai Hua Bao* (《安徽白话报》Anhui Vernacular News) stated that:

> "There are many kinds of diseases, but the plague is the most dangerous....So foreigners regard the plague as the strongest enemy, and the only way to control it is to get rid of rats. Compared to the westerners, Japanese are no less cautious about it. When the people caught a mouse and sent it to the police, the police would award him fifty cents of money and a certificate.... So the Japanese people did their best to catch rats, because they can make money for themselves and make contributions to the society at the same time.... Now the Tianjin Patrol Bureau knows that the plague is a serious problem and must be prevented. So it also awards ten cents to people who catch a mouse, in order to bury it at any time."[70]

Since catching and killing rats were important strategies for the prevention and control of plague, *Shu Yi* was undoubtedly the most favorable choice to directly associate the name of the disease with rats. In addition, the word was concise and clear in Chinese language, and it also conformed to the Chinese word-formation habits. For these reasons, it was not surprising that *Shu Yi* stood out among many words and became a commonly used word.

Shu Yi had also been recognized by the scientific community with its increasing usage. After the plague outbreak in northeast China in 1910, Ding Fubao (丁福保), a famous literati and an influential medical scientist at the time, published a series of long scientific article *Shu Yi Bing Yin Liao Fa Lun* (《鼠疫病因疗法论》*On the Etiology and Therapy of Shu Yi*) in *Eastern Times* (《时报》), *Sin Wan Pao* (《新闻报》), and *Ta Kung Pao* (《大公报》). The article started by explaining the name of the epidemic:

> "The etiology of pest is caused by the infection of the rodents, hence it is named *Shu Yi*. It is also well known as the Black Death, because the human body turns black after death. It is also named as *He Yi* or *Yi-tzu Wen* by ordinary people. Anyone who suffers from this disease will develop swollen lymph nodes or buboes all over the body. Buboes used to be translated as *He* (核), meaning kernel, pit, or nutlet in the fruits. The shape of buboes is similar to these and thus gets the name....The cause of *Shu Yi* is due to the pest bacteria, which the lice and fleas on the rat's body contain it, and it is transmitted to humans by sucking and biting humans."[71-73]

On the basis of Ding Fubao, Li Xianglin (李祥麟), a medical doctor who studied in Japan, further discussed the history and diagnosis differentiation of the plague. He wrote that "*Shu Yi* is called Plague or Pest in the West. There are other names such as *Li-tzu*, *Yang-tzu*, *He-tzu Wen*, *Hei Si Bing*, etc. in our country."[74] After that, Wu Lien-The (伍连德), the plague fighter who enjoyed a wide reputation in the international medical community, also mentioned in his academic essay that "*Shu Yi* is more appropriate" compared to other names.[75] These quotations showed that *Shu Yi* had been recognized by the scientific community. Academic endorsement by famous scholars undoubtedly contributed to establish this term as a common standard term.

4. The importance of the concept of *Shu Yi* from the perspective of history of knowledge

Shu Yi has appeared in literature as early as the 1890s as mentioned above. However, this term should have existed in the folk society of Guangdong and Guangxi for many years. The local literati chose this term as an unintentional respect for local customs. Therefore, *Shu Yi* was neither an invention of Chinese doctors, nor a deliberate choice with theoretical consciousness, and it had nothing to do with the introduction of new medicine. The concise and clear term that showed the characteristics of the disease should appear in folk society. However, from the perspective of traditional Chinese disease naming, this disease name was very unusual. There were no definite rules for naming diseases in ancient China. So the names of the diseases were highly arbitrary, and experienced accumulation and changes in the long-term historical evolution, thus resulting in various and messy disease names. In fact, there were generally rules to follow, such as naming

the disease by its symptoms, conditions, etiology, disease location, disease nature and mechanism of the diseases.[83] Calling the disease by the names of animals suffering the same ones with human beings was not included in the rules. Of course, there were disease names for animals, especially livestock diseases in ancient times, such as *Niu Yi* (牛 疫 cattle plague), *Ji Wen* (鸡瘟 chicken plague), *Ma Yi* and so on. However, these names referred to the diseases of animals themselves, and they were mostly concerned with livestock and poultry closely related to human life. By the Ming and Qing dynasties, the medical community had realized that whether it was a human or an animal, the disease was caused by the epidemic qi, pathogenic qi, and miscellaneous qi. Wu Youxing (吴 有 性), a famous medical scientist in the late Ming dynasty, mentioned in his work *Wen Yi Lun* (《温疫论》*Treatise on Warm-Heat Pestilence*) that:

> "The invisible qi which is biased towards animals, such as cows, sheep, chickens and ducks, could cause pestilences. Therefore, not just human beings suffer pestilences. However, in some cases, cows are sick but sheep is not sick, chickens are sick but ducks are not sick, people are sick but animals are not sick. The reasons behind them lie in different pathogens of different qi. Knowing that different qi could cause different diseases, this qi is thus called miscellaneous qi."[76]

Guo Huaixi (郭 怀 西), a veterinary scientist in the Qing dynasty, also said: "The epidemics were triggered by pathogens from the four seasons.... Because the diseases were much alike and contagious, they were named as epidemics. Epidemics to human beings were similar to warm diseases to animals."[77] And people at that time were also aware of the contagious nature of the epidemic, and even mentioned the possibility of humans infecting livestock. For example, Zhang Zongfa (张 宗 法) of the early Qing dynasty said: "Human epidemics infect people, and animal epidemics infect animals. This is to say that epidemics would infect their likely beings. But, hog plague can infect cattle, and cattle plague can infect hogs. Therefore the epidemics need to be avoided."[78] Li Nanhui (李南晖) later also mentioned that, "The epidemic comes from the unhealthy miscellaneous qi in the four seasons of heaven and earth....If the cattle suffer, the horse will inevitably be infected." He further said that, "The epidemic spreads to villages and towns, and infects both humans and animals. All lives should avoid that. If the cattle and horses are infected, hogs must avoid them."[79] These discussions showed that the medical community had already had detailed and reasonable observations and discussions on the epidemic infection across humans and animals. But it should also be noted that, scientists who discussed this issue were veterinary scholars except Wu Youxing. General medical literature paid little attention to this issue, and did not further point out the transmission of animal diseases to humans or explore the relationship between human and animal diseases. Therefore, ordinary people not only paid seldom attention to animal diseases, especially those that were loosely connected to people's livelihood, but also felt that animal diseases were not directly related to human diseases. It was natural that names of animal diseases were not used to refer to the name of human disease.

Differentiating diseases of animals and those of human beings also occurred in the West. Modern medicine regards the comorbid disease between humans and animals as Zoonosis. It is generally believed that this concept was first coined by Rudolf Virchow, a famous German pathologist in the 19th century. When he was studying pig Trichinella, he recognized the connection between animal diseases and human health, and proposed this concept to refer to the animal diseases transmitted to human beings.[80,81] However, zoonosis aroused the attention and systematic research of the medical community after the 20th century. It was not until 1930 that the first monograph discussing zoonotic diseases in details appeared, which was *Diseases Transmitted from Animals to Man* compiled by Professor William T. Hubbert and others.[82] In 1959, zoonosis was clearly defined by the World Health Organization as "any disease or infection that is naturally transmissible from vertebrate animals to humans".[83] Furthermore, the American epidemiologist Calvin Schwabe integrated human and animal health into one in 1964 and proposed the term "One Medicine". The term was based on the common knowledge of science of anatomy, physiology epidemiology and etiology. It emphasized the similarities between veterinary medicine and human medicine, and believed that there was no paradigm difference between the two disciplines of human medicine and veterinary medicine.[81,84] With the deepening research into epidemiology and public health, the importance of research on zoonotic diseases was recognized. Existing research showed that zoonotic diseases accounted for 60% of all known infectious diseases. Furthermore, in recent years, 75% of new human infectious diseases come from animals, which has become a major driver of emerging and re-emerging infectious diseases.[85]

In the context of knowledge evolution, it could be concluded that *Shu Yi*, which was a disease name established by various coincidences, inadvertently created the history of zoonosis in China. With the widespread acceptance of this traditional while peculiar disease name, it not only promoted physicians to pay more attention to and think about the relationship between human and animal diseases either consciously or unconsciously, but also led to continuous appearance of similar disease names which are popular today. As a result, many medical works and newspaper reports discussed the relationship between *Shu Yi* and rats from time to time. In spite of this, some people still had doubts about the transmission of the disease

between humans and rats, and posed objections. Huang Zhongxian argued in his work *Shu Yi Fei Yi Liu Jing Tiao Bian* that, "The title of the book argues that *Shu Yi* is not an epidemic. *Shu Yi* is a disease among rats, however, an epidemic refers to the disease of people, not the disease among animals."[86] Du Ziliang (杜子良) argued that rats was wronged for. He wrote that,

> "Westerners take *Shu Yi* too seriously. They believe that if there were no rats in the world, the epidemic would not break out. This shows their eagerness and confidence to destroy the epidemic, but it is only self-disturbing, which does not make up the fact. Rats are only one animal species that is infected by the epidemic. Among the six animals, which are horses, cattle, sheep, chickens, dogs, and hogs, they are all susceptible to the disease. But Western medicine does not care about them. They only do research on rats, so I feel that rats are treated unfairly."[87]

These statements might seem unreasonable. However, they promoted the scholars to pay more attention to the correlation and relationship between humans and animals in the epidemic system. More discussions believed that *Shu Yi* was a zoonotic disease which infected both humans and rats. Scholars began to think about the impact of animal diseases on humans, thus promoting the development of zoonosis in China. For example, a commentary in 1915 pointed out that:

> "The epidemic is triggered by pathogenic qi of heaven and earth, which is what Westerners call bacteria. There are different types of bacteria, and each of them contains a poisonous substance floating in the wind. The wind blows around a certain county or a village. The epidemic qi prevailed, and both people and animals will fall ill when they are invaded, though their symptoms would be different. There are diseases in which mules and horses fall ill when the cattle and sheep do not, or chickens and dogs will be sick while fish and shrimp are not. There exist diseases which make people ill, but not the animals. So do the opposite ones, and the diseases which make both people and the animals ill. Such is *Shu Yi*, an epidemic that transmits across humans and rats. The source of the epidemic could either be infected humans or infected rats. This epidemic is called the plague in other countries. But what is the reason that both humans and rats are infected? Rats appear in the families of patients, and they steal the patient's food and eat it, so the rats are infected. The infected rats are thirsty and anxious, and they run around without fear. They drink water whenever they find it, and if they drink too much, their abdomens will become bloated and the rats die. The bodies of dead rats are in the dark places, and people could not find them. After a period of time, maggots gather on the dead bodies, and unleash an unbearable smell as well as poisonous bacteria. The rats like to stay with their kind, so they infect each other and run into families. This is why the rats become the medium for the infection of the epidemic. The healthy people could suffer the pathogenic qi."[88]

At the same time, with the popularization of *Shu Yi*, the name of *Kuang Quan Bing* also appeared. By 1911 at the latest, *Kuang Quan Bing* began to appear in the newspapers.[89] Nowadays, *Feng Niu Bing* (疯牛病 mad cow disease), *Qin Liu Gan*, *Zhu Liu Gan*, and *Hou Dou*, etc., have long become common names.

5. Conclusion

Various diseases and pandemics have accompanied the development of human society, and zoonotic diseases such as the plague have a very long history. Nevertheless, human beings who look down on the world with the mentality of the superior spirit of all things always tend to regard their own diseases as a relatively closed system, at least before modern times. Human beings do not realize that their species are just a member of nature after all. Like animals, they are exposed to extremely complicated pathogenic microorganisms, and human beings and animals may also infect each other. As is mentioned above, existing research has shown that zoonotic diseases are not only diverse, but also very harmful to humans. In recent years, at least 2.5 billion people are infected and 2.7 million people die annually due to zoonotic diseases.[90] Therefore, from the perspective of natural ecosystems, paying more attention to such diseases and gaining a more comprehensive understanding of the relationship between humans and animals are indeed issues that humans must face now. Just as Barbara Natterson-Horowitz and Kathryn Bowers mentioned at the last of their work *Zoobiquity*:

> "Our essential connection with animals is ancient, and it runs deep. It extends from body to behavior, from psychology to society—forming the basis of our daily journey of survival. This calls for physicians and patients to think beyond the human bedside to barnyards, jungles, oceans, and skies. Because the fate of our world's health doesn't depend solely on how we humans fare. Rather, it will be determined by how all the patients on the planet live, grow, get sick, and heal."[91]

Therefore, on the basis of One Medicine, the international academics further put forward the concept of One Health, which involves human, animal, food, environment, urban planning and many other aspects. One Health is a global expansion strategy aiming to promote interdisciplinary and cross-regional collaboration and communication. It is dedicated to combining human medicine, veterinary medicine and environmental science to promote human and animal health, as well as maintaining and improving the ecological environment. Global public health departments and academia promote this concept by establishing relevant institutions and promoting academic research, further implementing the ideal in specific practices such as public health construction and epidemic prevention.[92]

In this context, from the perspective of the evolution of knowledge about zoonotic diseases in China, the

establishment of *Shu Yi*, which may be a creation by coincidence, opened up a new field of disease cognition inadvertently. Its significance in the history of knowledge deserves more attention and elucidation. Furthermore, compared with the international academic community, there is still a considerable gap in domestic attention and research on zoonotic diseases and One Health, both in terms of quantity and depth.[93] Human beings have already stepped into an era of comorbidity, yet most of the species lack general awareness. Therefore, a refocus on the concept of *Shu Yi*, and excavating its intellectual historical significance have more academic value and practical significance.

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Ethical Approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

Author Contributions

YU Xinzhong and TIAN Yu did the research wrote and wrote the article.

Conflicts of Interest

The author declares no financial or other conflicts of interest.

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Looking up Prescriptions to Treat Infectious Disease: Anti-epidemic Books of Medical Formularies and Epidemic Prevention and Control in the Qing Dynasty

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Abstract

Copying, compiling, publishing, disseminating, and referencing anti-epidemic books of medical formularies were common activities during the outbreak of epidemics in the Qing dynasty. Its emergence, motivated by epidemic disease again and again, was important component parts of epidemic prevention and control. They played a unique role as media on affairs such as treating patients suffering from infectious diseases, mobilizing peoples to make contributions to anti-epidemic activities, integrating and popularizing knowledge of epidemic prevention. Anti-epidemic books of medical formularies were important to link peoples, things, and substances related with epidemic prevention and control, and were a kind of motivation to actively deal with the infectious disease, control the epidemic, and maintain health. Compared to other common measures, anti-epidemic books of medical formularies participated in many prevention and control practices deeply, which actually built a low cost, spontaneous, dispersed and non-institutional system to respond to epidemic, and the system had characteristics of stronger conductibility, bigger coverage area, and better external benefits.

Keywords: Anti-epidemic books of medical formularies; Epidemic prevention and control; Knowledge diffusion; Medical practice; Qing dynasty

1 Introduction

The Qing dynasty was one of the dynasties with the most serious epidemic disasters in the Chinese history. It had witnessed various types of major epidemic diseases, which featured wide ranges of distribution and high outbreak frequency.[1,2] In the face of the epidemics, there existed a medical activity in addition to the general measures such as placing patients, administering medicines, isolation, and quarantine. It was taken part in by many participants with high frequency and unique characteristics, which was popular among professionals and non-professionals. The activity was collecting and arranging epidemic prevention medical formulas, and compiling, publishing, disseminating, and referencing anti-epidemic books of medical formularies (防疫方书), and it contributed to construct and spread medical knowledge. Anti-epidemic books of medical formularies were books containing medical formulas for certain epidemic disease and related medical knowledge. As a collection of medical formulas, books of medical formularies (方书) provided people with diagnosis and treatment methods or successful experiences for various diseases. They were concise, popular, practical, and highly operable, and suited readers of different levels, especially for the middle and lower classes.

The books began to emerge continuously from the Song dynasty, and became an important medium to disseminate and popularize medical knowledge. From the beginning of the 18th century to the end of the 19th century, anti-epidemic books of medical formularies increased dramatically, reaching a peak in the late Qing dynasty. They were usually named after *Formulas*, *Wonderful Formulas*, *Fine Formulas*, *Statements on Formulas*, etc. They focused on conditions such as cold damage, warm diseases, prescriptions and formulas, clinical treatments (especially pox and throat disorder), and fell into different categories. Scholars have paid attention to the research field. Yu Xinzhong (余新忠) pointed out that during the epidemic, officials and social groups would aim to aid more infected people by publishing medical books and delivering medical formulas when discussing the response to the Plague broken out in Jiangnan area in

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the Qing dynasty.[3] Li Yushang (李玉尚) noticed that collecting, arranging, and testing various formulas and prescriptions, or compiling and distributing relevant books of medical formularies were common measures for the medical community and local governments when he explored the epidemic response mechanism in modern China.[4] Zheng Hong (郑洪) mentioned that officials, gentry, Confucian doctors, and herbalists were engaged in creating, disseminating, and developing various medical formulas or books of medical formularies for preventing and treating the plague in his research of how traditional Chinese medicine knowledge fought against the epidemic was established during the outbreak of the Lingnan plague in the late Qing dynasty.[5]

Current research involved fragmented relevant historical facts, and most of them regarded compiling and publishing books of medical formularies as a temporary assistant measure, which was not systematic and did not look into the fact that a great number of books of medical formularies were published and distributed during the epidemics in the Qing dynasty. Furthermore, it did not fully reveal the interactional relationships between epidemic prevention texts, anti-epidemic knowledge as well as epidemic prevention and control practices. This study would take compiling, circulating, and applying anti-epidemic books of medical formularies as basic clues, to explore how such activities were carried out, as well as the interactional relationship between medical texts, epidemic prevention, and control practices.[6–9] The study aims further to enrich the understanding of the history of epidemic prevention in the Qing dynasty, and lay a foundation for studying the construction, dissemination, and evolution of anti-epidemic knowledge in the Qing dynasty from the perspective of social culture.

2 Turning knowledge into curative efficacy: anti-epidemic books of medical formularies and treatment of infected patients

Once the epidemic broke out, treatment of infected patients became top priority of epidemic prevention and control. Anti-epidemic books of medical formularies were collections of anti-epidemic medical formulas. Each formula would conduct a brief analysis of pathology, symptoms and treatment of the disease, and list the name of the formula, drug composition, functions, indications, usage and dosage, addition and subtraction according to the symptoms, etc. Each formula could serve as a treatment plan. Therefore, the direct application of books of medical formularies in epidemic prevention and control was to serve the treatment of infected patients.

2.1 Checking the anti-epidemic books of medical formularies was the basic choice for patients when the doctor's treatment was invalid

After the outbreak of the epidemic, seeking help from professional doctors to treat the infected patients was the most common choice. However, the doctor's diagnosis and treatment might not always be effective. In this case, anti-epidemic books of medical formularies which integrated treatments of different epidemics and diseases had become the basic choice, or the last hope for people to treat patients.

In the 44th year of Qianlong (1779), Shi Cheng (施诚), the prefect of Henan, printed and published the book *Xuan Yuan Yi Dian* (《轩辕逸典》 *Scattered Classics of Xuan Yuan*), whose author remained unknown. The book mainly collected treatments of smallpox. Uncle of Liu Yaokui (刘耀奎), a native of Yangzhou, bought a copy of the book from the bookstore and adored it very much. Soon after that, two infants of a servant in Liu's family were infected with smallpox, and "for the time being, doctors and famous professionals could find no cure." At the time, Uncle of Liu Yaokui "sought a formula from the book to treat the epidemic," and finally the two babies were saved.[10] In the 9th year of Jiaqing (1804), Li Shoushan (李寿山), a friend of Pei Fengchen (裴奉辰) who was an official in Shanxi, fell ill. According to the related literature, "the doctors were helpless, and they thought that the disease could find no cure. They suggested that the patient be sent to cities with better hospitals, and the rest agreed with it." But one of the relatives of Li Shoushan, Xu Defu (徐德夫) strongly opposed the doctors' opinion. He reminded that "Yu Lin (余霖) had published a book titled *Yi Zhen Yi De* (《疫疹一得》 *Achievements in the Treatment of Epidemic Rashes*), and "checked the formulas in the book to get *Qing Wen Bai Du Yin* (清瘟败毒饮 Epidemic-Clearing Toxin-Resolving Beverage) which boiled a large dose of gypsum." The patient "took the beverage continuously for days and nights," and finally, "seventeen catties of gypsum were used, and Shoushan's disease was cured." In the second year, Pei Fengchen copied *Yi Zhen Yi De* and made it a collection. Around the 15th year of Jiaqing (1810), Pei took a post in Kaifeng. At that time, "seasonal epidemic prevailed," and Pei's family members were unfortunately infected. He made his family members to "follow the formula from the book," and "all were cured"[11] (Fig. 1).

Some doctors also referred to specific books of medical formularies to treat patients in critical moments. For example, during the Daoguang period, Zhu Chufen (朱楚芬), who gave up Confucianism to study medicine, often diagnosed and treated diseases by reviewing books of medical formularies in his family's collection, and gradually accumulated experiences in medical treatment. One day, his cousin Zhu Peizhi (朱佩之) suddenly came by and told him that three of his five grandchildren had been infected with smallpox. The epidemic "was so severe that

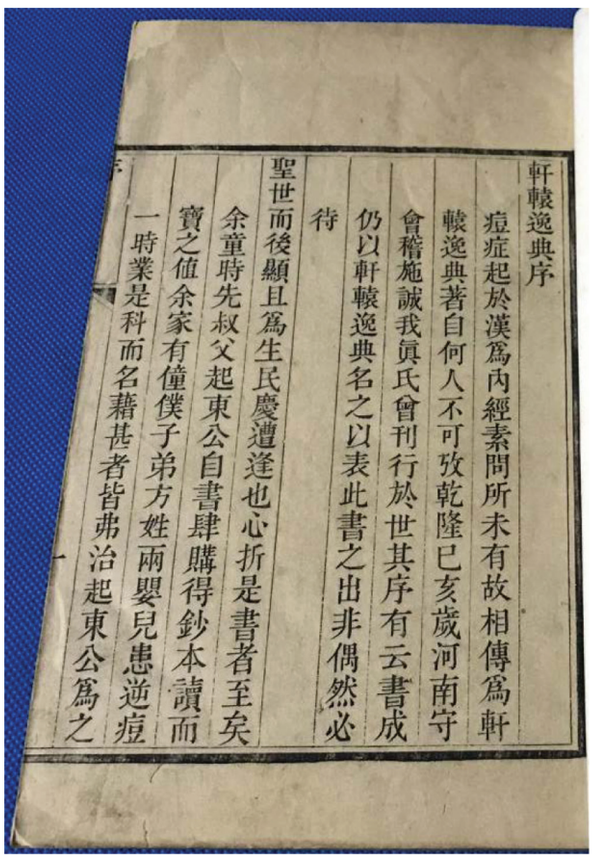
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Figure 1 Preface of *Xuan Yuan Yi Dian* (*Scattered Classics of Xuan Yuan*), published in 1826. (source from: https://book.kongfz.com/17560/5027840573/).

the doctors panicked," so he came to ask for a diagnosis and treatment. Zhu Chufen "hid a book on treatments of smallpox which he copied in his childhood into his sleeves, and went to diagnose the patients," and "after being treated for more than half a month, all the patients went well." Zhu Peizhi was so happy that he asked his son to transcribe the book of medical formularies that Zhu Chufen carried with him, and put it on his desk.[12]

Similar cases were very common, indicating that officials, gentry, or professional physicians found the corresponding treatment by referring to anti-epidemic books of medical formularies to cure the patient when encountering ineffective treatment. Transcribing, collecting, and referencing books of medical formularies had become a part of the daily activities of the people in the Qing dynasty. Therefore, the existence and circulation of anti-epidemic books of medical formularies actually granted people an extra option when facing the epidemic, and an extra means to treat patients and save their lives.

2.2 Obtaining the corresponding treatment directly from the anti-epidemic books of medical formularies was a common medical practice during the epidemic

In addition, directly reviewing and copying anti-epidemic books of medical formularies to treat patients after an epidemic outbreak was important to deal with the epidemic. This practice was mainly due to two reasons: First, the number of infected patients was large, while the number of doctors was too small to meet the needs of treatment. It was not easy to invite doctors in time, especially in the vast countryside. In contrast, books of medical formularies could be copied, distributed, and reviewed in a relatively short time. Second, some epidemics occurred frequently, and people already had relevant knowledge and experience in dealing with them. They could complete the treatment of infected patients according to the formulas in the books without the help of doctors. In many cases, the two conditions happened simultaneously, making books of medical formularies the first choice for people to treat infected patients.

For example, during the Qianlong period, people in central Chongqing fell ill due to "a strange disease, killing the patient as soon as the symptoms arose." In the 2nd year of Daoguang (1822), a similar epidemic occurred in eastern Guangdong. A Taoist named Jueyin (觉因道人) "found a formula by chance, and it proved effective immediately." In the first year of Xianfeng (1851), another similar epidemic broke out in central Zhejiang. Jueyin reprinted this book for reference at once and proved effective.[13] An official named Pan Wei (潘霨) liked to collect fine formulas and applied treatments according to them. In the early years of Tongzhi, he served as the prefect of Tianjin. At that time, there was a big epidemic, so he "copied an effective formula and spread it by printing books," and finally "all lives were saved."[14] In the 4th year of Guangxu (1878), Zhou Zhaozhang (周兆璋), a native of Shunde and an official in Jiuquan, obtained a book *Shi Yi Bai Hou Zheng Lun* (《时疫白喉证论》 *Treaties on the Seasonal Disease Diphtheria*). In the 6th year of Guangxu (1780), he accompanied the army to Hami, Xinjiang, and there occurred a diphtheria epidemic in the army. Zhou "treated the patients according the formulas in the book," and "proved effective in every case."[15]

Books of medical formularies were equivalents to a collection of existing experience, which could provide people with targeted treatments and formulas for common epidemics or local outbreaks. They could be replicated timely and massively in the entire epidemic area, and were important reliance for people to carry out prevention and control in an orderly manner.

The successful experience from individual regions could be quickly copied and promoted after it was compiled into books of medical formularies in the face of new epidemic diseases. Therefore, referencing books of medical formularies became the most convenient, direct, and effective method to treat patients. From the Daoguang period, an infectious disease commonly known as *Diao Jiao Sha* (吊脚痧 calf cramps) continued to appear. At first, a great number of people died because the doctors did not know how to treat it. In the 10th year of Xianfeng (1860), Xu Zimo (徐子默), a native of Jiaxing, wrote and published the book *Diao Jiao Sha*

Fang Lun (《吊脚痧方论》 *Discussions on Calf Cramps*). He believed that *Diao Jiao Sha* was different from cholera, and should be treated differently. Xu's formulas proved effective by practice. During the Tongzhi period, *Diao Jiao Sha* occurred in different regions. The disease "could be treated by Xu's formula, and all patients were cured."[16] For another example, in the late Qing dynasty, diphtheria prevailed in different regions. Zhang Shaoxiu (张绍修), a doctor in Liuyang, Hunan, had a lot of experience in the treatment of diphtheria, and had compiled *Zhi Hou Zheng Shen Xiao Fang* (《治喉症神效方》 *Wonderful Formulas on Treating Diphtheria*). In the 10th year of Tongzhi (1871), Wang Songchen (王崧辰), a native of Min County, Fujian, came across this book on the desk of Gong Ziwen (龚子闻), an official of the ministry of justice. Gong said to Zhang that: "the book was published to deal with the disease of diphtheria which occurred in the capital city annually. Treat the patients with the formulas in this book, and most of them would be cured." Later on, Wang Songchen returned to Fuzhou with this book, and showed it to Ye Wenlan (叶文澜), the director of Fuzhou Shipping Bureau. Ye was a kind and generous person, and decided to "wide spread the book by republishing and reprinting it"[17] (Fig. 2).

In summary, books of medical formularies were collections of works describing death on the surface. However, the anti-epidemic knowledge in them was the essence of people's experience in dealing with epidemic diseases, which was relatively independent, identifiable, and replicable. Therefore, the books became equivalents to doctor's diagnosis and treatment to a certain extent, and could even replace the doctors when people were familiar with the disease or the situation was urgent, bringing practical curative effect. In this perspective, books of medical formularies were essentially living medical resources. People reviewed and treated patients according to the anti-epidemic books of medical formularies, which embodied the process of transforming anti-epidemic knowledge into curative effects and acting on practice.

3 Turning text into practice: anti-epidemic books of medical formularies and mobilization of epidemic prevention forces

Many epidemics were acute and strongly contagious, and they spread rapidly. Therefore, shortages of medical staff and medical resources often occurred. Under this circumstance, people who could read and write other than professional doctors could devote themselves to epidemic prevention and control under the guidance of anti-epidemic books of medical formularies. They could treat patients, carry out effective self-protection and treatment, or disseminate anti-epidemic knowledge, etc. In this process, potential epidemic prevention forces had been stimulated and mobilized, which could undoubtedly enhance epidemic prevention forces, expand the scope of prevention and control, and ease the overall prevention and control pressure. In the practice of epidemic prevention and control in the Qing dynasty, anti-epidemic books of medical formularies had the function of social mobilization, and the mobilized epidemic prevention forces were mainly officials, gentry, students and other intellectual groups.

3.1 Anti-epidemic books of medical formularies formed an important basis for people who knew medicine to carry out epidemic prevention

Officials, gentry, students, etc., in traditional Chinese society would learn medicine, read medical books, collect medical prescriptions, or even occasionally treat diseases and provide medical advice. In the face of emergencies, they could become medical and health service providers or assistants of professionals, and directly participated in epidemic prevention and control. The tasks could not be finished without the help of their accumulated medical knowledge or medical experience and the guidance of anti-epidemic books of medical formularies.

In the late Ming and early Qing dynasties, father of Fan Xiang (范祥), a Xuzhou native, browsed his medical books during his rests while studying for the imperial examinations. One day, he found a copy of *Dou Zhen Fa Wei* (《痘疹发微》 *Elaborations on the Subtleties of the Smallpox Disease*) in his bookcase. According to Fan, his father "tested the formulas from the first volume of the book on me and my second brother, and they proved effective." And after that, "a decade later, I tested the formulas on my two sons, and the younger boy was cured."[18] The Fan family cured smallpox of two generations according to the formulas in the book, which was an example to treat own family members according to anti-epidemic books of medical formularies. Formulas from books of medical formularies were used to treat other people's diseases. During the Kangxi and Yongzheng period, Yu Tianchi (俞天池), a knowledgeable and brave imperial student was not only charitable and generous, but also "loved to read books of medical formularies." He heard that the children of other families were infected with smallpox, so he used formulas from the books he read to treat the patients. As a result, "most patients treated by Yu were completely cured"[19] (Fig. 3).

Local gentry with awareness of disease prevention would record the relevant knowledge, experience, especially effective treatments for highly frequent infectious diseases such as smallpox, and formed brief text materials for emergency in their daily lives. When the smallpox epidemic occurred, people could quickly carry out epidemic prevention and control with the help of such texts. During the Jiaqing period,

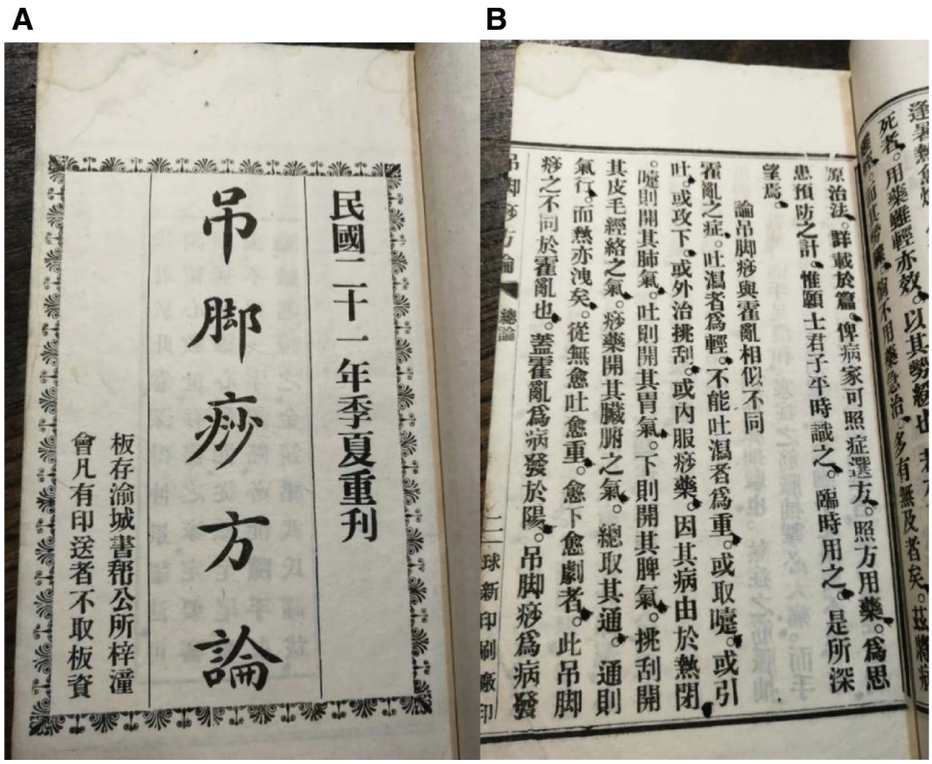


Figure 2 (A) Title page of *Diao Jiao Sha Fang Lun* (*Discussions on Calf Cramps*) published in 1932; (B) Similarities and Differences between *Diao Jiao Sha* and cholera. (source from: https://book.kongfz.com/19622/905983870/).

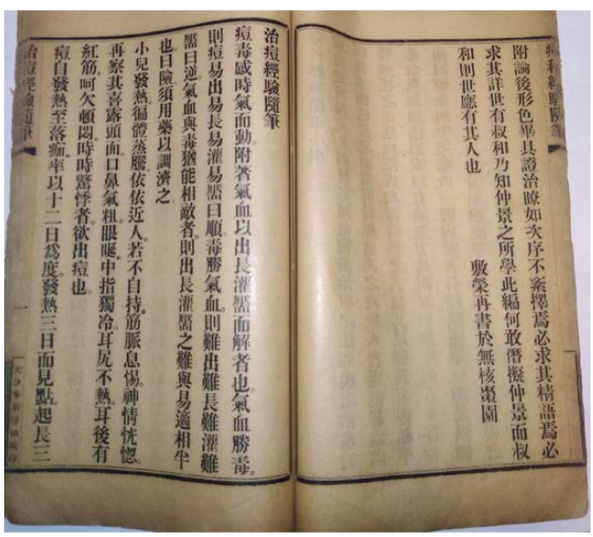


Figure 3 *Dou Ke Jiu Jie Lun* (*Discussion on Treating and Curing Pox*) re-published in 1846. (source from: https://book.kongfz.com/30657/1681864896/).

Li Furong (李敷荣), a native of Jinan who served as a Confucian instructor in Haifeng County, had several children who died of smallpox infection. Every time a child passed away, Li reflected and studied the epidemic. As time flew, Li not only understood the prevention and treatment of smallpox, but also could provide effective diagnosis and treatment advice to his relatives and friends. "Whenever a family member of Li was infected with smallpox, Li would treat the patient and cure him or her." In his late years, Li compiled his insights, ideas, and experiences into a book called *Dou Ke Jiu Jie Lun* (《痘科救劫论》 *Discussion on Treating and Curing Pox*), which recorded more than 50 internal and external formulas for the treatment of smallpox. During the Daoguang period, Zhang Shigu (张式谷), son of a local official who got this book, "browsed the book from front to cover again and again to treat smallpox of his sons and daughters." Zhang's efforts proved useful, that "people from nearby villages and counties seek treatment for smallpox from Zhang, and the curative effects were good." Over the years, Zhang treated a great number of patients, and "most patients were cured."[20] Later on, copies of the book were widely spread because the formulas in it were very effective. However, the copies were broken or shattered as time flew, and it was inconvenient for everyone to copy it, so Zhang Shigu paid to reprint the book.

3.2 Anti-epidemic books of medical formularies provided a variety of possibilities for people who did not know medicine to participate in epidemic prevention and control

After the outbreak of the epidemic, the treatment of doctors might not be completely effective. In some cases, misdiagnosis and mistreatment occurred. In contrast,

number of doctors was relatively limited, and doctors with high medical skills were even fewer. As a result, many patients could not get medical treatment in time. Anti-epidemic books of medical formularies collected formulas for different diseases, which enabled those who had no basic knowledge of medicine and no experience in diagnosing and treating diseases to contribute to the prevention and control of epidemic diseases. The books also provided another way to look for, test, and spread prevention and treatment methods.

During the Daoguang period, an official named Dan Minglun (但明伦) was ordered to serve as a military guard in Lixian County in Hunan. Due to the long-term drought, "an epidemic disease broke out after the spring, and many infected people were sick abed." Dan searched his book case and found two books of medical formularies, *Xin Yan Fang* (《信验方》 *Trusted Proven Formulas*) and *Ji Yan Fang* (《集验方》 *A Collection of Proven Formulas*). Dan "checked the books and found *Shen Xian Huo Zhong Dan* (神仙活众丹 Fairy Reviving People Elixir). He made and distributed the medicine," and the patients "were cured after taking the elixir." After that, Dan was believed to know medicine, and was asked for medical treatment.[21] In the 2nd year of Guangxu (1876), Huang Bingqian (黄炳乾), a native of Liuyang, Hunan, who became a guest in Huang County in Gansu, encountered an epidemic, "diphtheria prevailed everywhere in Huang County." Huang presented the secret formulas and acupuncture methods he obtained in his hometown, and dictated them to other people in oral. People in Huang County "treated the patients according to the formulas and proved effective. All patients were cured."[22] Huang Bingqian collected the formulas and acupuncture methods from the book *Shi Yi Bai Hou Jie Yao* (《时疫白喉捷要》 *Brief Essentials of the Seasonal Epidemic Diphtheria*) compiled by his fellow countryman Zhang Shaoxiu (张绍修). The book spread widely in Hunan and had a great influence since its publication in 1864.[23] At the beginning of Guangxu period, an epidemic broke out in northern Anhui. "The epidemic spread everywhere, and it came very quickly. Those who cannot be treated to the point or in time would be sick abed in day or two, or even died suddenly." Liu Yueting (刘月汀), a doctor from Hunan "sent apprentices to treat patients. However, he was deeply worried that the numbers of his apprentices could not meet the needs of all patients, so he published a book of medical formularies to teach people how to treat the epidemic, so that they would not be misled by quack doctors." Seven years later, a similar epidemic occurred again in Tongcheng, Anhui. A local gentry Fang Chuanli (方传理) taught Liu's treatment method and saved many people. In order to further disseminate the treatment, Fang revised Liu's original book into *Yang Mao Sha Yan Fang* (《羊毛痧验方》 *Proven Formulas of Wool-like Sha Disease*), hoping that "everyone in the remote areas who does not know a doctor, can follow the book, so that he will not be helpless and misunderstood."[24] There existed many similar cases (Fig. 4).

Books of medical formularies contained treatment methods for different epidemics, so they were a kind of medical resources in a broad sense. The wide spread of the books distributed and redistributed medical resources. After effective methods for diagnosis and treatment of epidemic diseases had been developed, the books were transported to different regions, and could

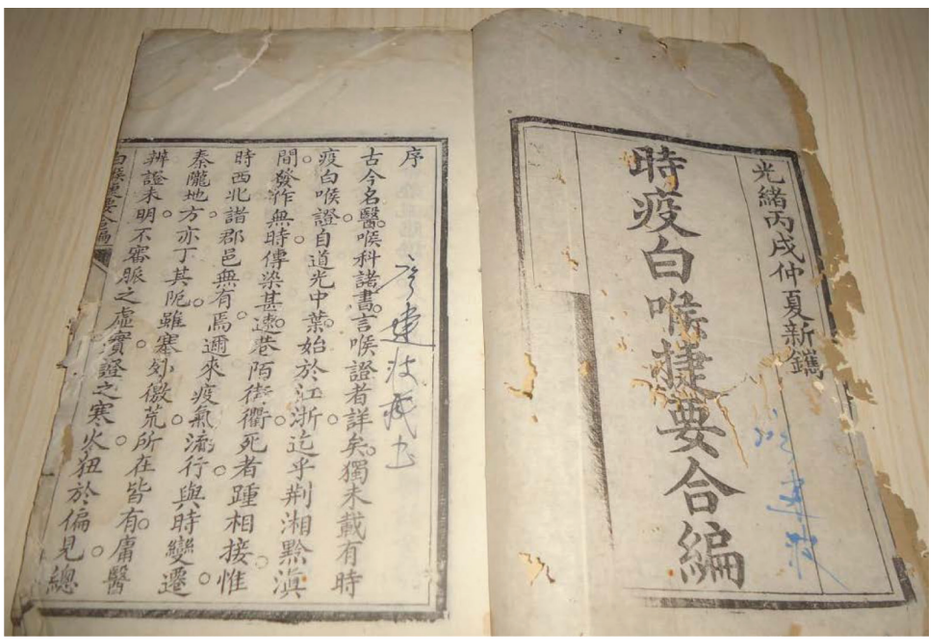


Figure 4 *Shi Zheng Bai Hou Jie Yao He Bian* (*Combined Compilation of Brief Essentials of the Seasonal Epidemic Diphtheria*) complied by Huang Bingqian published in 1886. (source from: https://book.kongfz.com/9464/1789815273/).

make a difference to treat patients, control the spread of the epidemic, and reduce losses. However, the distribution of such books was uneven, and they were difficult for ordinary people to collect or read, because they needed to be spread, shared, and explained by their owners. It was in this context that people who owned the books but did not understand medicine could contribute effectively in prevention and control of epidemics in practice.

Compiling and spreading books of medical formularies required little professional knowledge. Therefore, in addition to mobilizing people to directly treat patients, books of medical formularies became knowledge carriers. They provided an extra way for people who did not know medicine to contribute their powers to disseminate relevant anti-epidemic knowledge or treatments by editing, publishing, and distributing books of medical formularies. For example, in the 1st year of Daoguang (1821), Sun Qi (孙玘), a student from Taicang, Jiangsu, witnessed "a great number of patients infected with acute filthy disease." However, medical books dealing with the disease, such as *Sha Zhang Yu Heng* (《痧胀玉衡》 *Comprehensive Treatise on Acute Filthy Disease*) and *Sha Zheng Quan Shu* (《痧症全书》 *Encyclopedia on Acute Filthy Disease*) were not widely spread. In view of the situation, Sun quoted main contents from the books and compiled it into a concise book *Sha Zheng Hui Yao* (《痧症汇要》 *Summary of Essentials of Acute Filthy Disease*) to prepare for emergencies.[25] For another example, in the 5th year of Xianfeng (1855), "Throat Granular Disorder spread widely in Liangzhou, Gansu. Patients would infect ordinary people rapidly, and those who were seriously ill would die in days." One son and two daughters of the local official Zhao Bida (赵必达) died one after another, and the youngest daughter's condition was also critical. At this time, one of his fellow countrymen gave him a copy of *Hou Ke Zhi Zhang* (《喉科指掌》 *A Handbook on Laryngology*). Zhao "treated his little daughter according to the formulas in the book," and saved her life. After that, Zhao republished the book, hoping that it could widely spread and help more people. Song Xinru (宋炘如), who worked in Kaifeng, Henan Province, often gave good books to help those in need. In the 10th year of Tongzhi (1871), he saw *Hou Ke Zhi Zhang* in a friend's house. Song "did not know medicine. But he would record every formula he saw, and send it with the ingredients to those in need." Song decided to publish and distribute this book, because he thought that "many people were infected with the epidemic, and patients would die without proper treatment in time. This book could prevent people from regretting that there were no fine formulas for the epidemic."[26]

The mobilization of medical resources could only play an indirect role in treating patients and controlling the spread of the epidemic at the time. Nevertheless, it was an effective strategy in the face of severe epidemics, shortage of medical resources and limited medical service capacity. Professional doctors would often use books of medical formularies to enlarge the scope of treatment, and reduce the impact and loss of the epidemic. For example, in the 25th year of Jiaqing (1820), an epidemic prevailed in the Liling area of Hunan. Dr. Li Binmen (李宾门) was frequently invited to treat infected patients. Unfortunately, Dr. Li "couldn't save all lives, and he felt sad and upset." Therefore, he "chose the essential formulas and methods for pulse diagnoses, deleted unnecessary contents from various books, and compiled them into three volumes to benefit the doctors." The volumes were titled *Wen Yi Ji Lue* (《瘟疫辑略》 *Edited Essentials of Warm Pestilences*), and aimed to be referred to for treating diseases by ordinary people.[27] During the Guangxu period, Xu Ruji (许汝楫), a famous doctor in Putian, practiced medicine in Beijing. He worried that after the epidemic outbreak, "he could not fulfill all the needs of the patients due to shortage of time." Therefore, Xu "chose formulas with its ingredients, dosage and explanations, and complied them without unnecessary rhetoric," and published *Wen Zheng Bian Zhen Bian Zheng* (《温症瘴疹辨证》 *Pattern Differentiations of Warm Diseases and Macula*), so that people can "choose the formulas according to the symptoms and take medicine referring to the formulas."[28]

In summary, anti-epidemic books of medical formularies or medical formulas circulated and shared epidemic prevention resources, information, knowledge, etc. Through this process, ordinary people could also take actions to contribute to epidemic prevention. Therefore, the books played a role of social mobilization, which was of positive significance for enriching the epidemic prevention force and alleviating the pressure of epidemic prevention and control.

4 Turning the special into the general: the integration and popularization of epidemic prevention prescriptions and anti-epidemic knowledge

Whether people could overcome the epidemic and whether it could be effectively controlled depended fundamentally on the accumulation, innovation, and application of anti-epidemic knowledge. During epidemic prevention and control, anti-epidemic books of medical formularies integrated old and new important anti-epidemic knowledge in addition to treating patients and mobilizing social forces. It helped various epidemic prevention medical formulas to specialize, systematize, and popularize, thus promoting application of anti-epidemic knowledge. It not only laid the foundation for the development of epidemic prevention practices, but also subtly improved the overall epidemic prevention awareness and ability of the entire society.

4.1 Anti-epidemic books of medical formularies formed an important genre of anti-epidemic knowledge collection and integration

The continuous specialization and systematization of epidemic prevention medical formulas were important parts of anti-epidemic knowledge, which was an inherent requirement for epidemic prevention and control. Treating infected patients, preventing the epidemic from further outspread, etc., required anti-epidemic knowledge with strong timeliness, pertinence, and high circulation speed. Books of medical formularies were the most important medical literature with these three characteristics. In epidemic prevention and control in the Qing dynasty, publishing and disseminating new anti-epidemic books of medical formularies was one of the most important social and cultural practices, including collecting, sorting, reexamining, compiling, merging, selecting old, and new epidemic knowledge, etc.

Although there were mature methods to deal with common epidemics in the society, some people had no access to relevant books. Even if they did, the books might not be well preserved or circulated, and there might be multiple treatment methods for the same epidemic. Therefore, when the epidemic broke out, collecting and sorting out relevant knowledge, especially specific and effective treatment methods, so that they could be integrated and promoted in various ways became a strategy favored by many professionals and non-professionals.

For example, smallpox, a highly frequent infectious disease, had been recorded in Chinese history since the Han dynasty. Despite that there was a vaccination method in the middle and late Ming dynasty to prevent smallpox, treatment for this epidemic varied. This was due to the differences in the condition and physique of each patient, and different understandings on the identification of symptoms and usages of medicine. There existed countless formulas in the history of China. How to choose the effective treatment methods and formulas for smallpox was important. In the late Ming and early Qing dynasties, "a variety of treatment methods for smallpox proved ineffective, resulting in the death of the living and the old." In the 15th year of Kangxi (1676), Wu Xuesun (吴学损), a native of Xiuning, Anhui, combined the book *Dou Zhen Jin Jing Lu* (《痘疹金镜录》 *Golden Mirror Records for Pox*) written by Weng Zhongren (翁仲仁) in the Ming Dynasty, as well as the books *Dou Zhen Bai Wen* (《痘疹百问》 *One Hundred Questions on Pox*), *Dou Zhen Xin Fa* (《痘疹心法》 *Teachings of Pox*) and related pictures which he collected into one book, titled *Dou Zhen Si He Quan Shu* (《痘疹四合全书》 *Complete Treatise on Pox*). Wu intended that people could adopt correct and appropriate treatment to reduce misdiagnosis and mistreatment of smallpox by referring to the book.[29] During the Daoguang period, Hou Gongzhen (侯功震), a local gentry from Jinan, Shandong, liked to browse different medical books, and gained much experiences in treating pox. He thought that formulas and explanations by famous doctors on pox in the past dynasties had their advantages and disadvantages. Therefore, Hou "collected medical books, selected essential teachings, sorted fine formulas, and compiled them into one book," which was *Dou Zhen Da Cheng* (《痘疹大成》 *The Great Compendium of Pox*), to achieve "no bias on one treatment method."[30]

In order to treat patients and control the epidemic, sorting, trying and improving effective methods from existing experience and knowledge to apply them to infected patients, as well as spreading various new treatment for new diseases as soon as possible, so as to provide references for doctors and patients in the face of new epidemics were necessary measures. Compiling and disseminating relevant books of medical formularies was the easiest way to achieve these goals in the absence of advanced communication technology.

In the middle and late Qing dynasty, new epidemic diseases such as scarlet fever, diphtheria, cholera, and plague posed a huge threat to social and economic development and people's lives. Officials, gentry, doctors and ordinary people paid more attention to the diagnosis and treatment of these diseases. A large number of books of medical formularies specifying on these diseases became the basic way for people to understand, master, and apply relevant knowledge. For example, acute respiratory infectious diseases such as throat granular disorder and diphtheria were severe infectious diseases in the Qing dynasty. These diseases frequently triggered major epidemics in the middle and late Qing dynasty.[31,32] When the doctors, officials, and gentry encountered such epidemics, they chose to collect, sort, screen, and concluded knowledge and treatments in ancient and current medical classics, and compiled them into simple books of medical formularies. Since the Jiangqin and Daoguang periods, scarlet fever had prevailed in the Jiangnan area. Jin Dejian (金德鉴), a doctor in Suzhou, was infected. After he was cured, he laid emphasize on classics and books focusing on throat granular disorder. Later, Dr. Jin obtained a valuable book titled *Jing Yan Chan Jie* (《经验阐解》 *Experience in Explanation and Analyses*) whose origin was unknown. Dr. Jin mentioned that "the book had only a few pages, but its essentials and teachings were brief. The book paved a different way to treat scarlet fever, which made up for the unpreparedness of laryngology." He "searched through ancient classics and modern literature, made deletions and additions to the original text, and paid attention to collect the essentials, teachings and formulas." Jin compiled them into *Lan Hou Dan Sha Ji Yao* (《烂喉丹痧辑要》 *A Summary of Throat Disorder and Scarlet Fever*) to help people prevent and treat scarlet fever.[33] During the Tongzhi period, Zhou Xingnan (周兴南), a gentry from Ju County, Shandong, claimed to "never learn or know medicine." However, in response to the helpless situation of local doctors during the prevalence of diphtheria, Zhou collected "descriptions of 36 symptoms of throat disorders,

as well as records of decoctions, elixirs, and methods of acupuncture and moxibustion on diphtheria," and compiled key contents of popular books in the Qing dynasty into *Zhi Fei Zhai Yan Hou Ji Fang* (《知非斋咽喉集方》 *Collected Formulas of Throat Disorders by Zhi Fei Zhai*) for local people.[34] Similar works include *Hou Ke Zhi Nan* (《喉症指南》 *Guide to Throat Disease*), *Hou Ke Ji Ye* (《喉科集腋》 *Collected Teachings on Laryngology*), and so on.[35]

The integration of anti-epidemic knowledge and epidemic prevention formulas was an indispensable part of epidemic prevention and control in the face of common diseases and new epidemic diseases. It spread and popularized relevant knowledge to the public, so that people could apply treatments as soon as possible. In this context, books of medical formularies for the general public became a popular choice. The continuous editing and publication of anti-epidemic books of medical formularies integrated relevant anti-epidemic knowledge, making it more specialized and systematic, thus provided great convenience for people to deal with epidemic diseases in a more timely and targeted manner.

4.2 Anti-epidemic books of medical formularies were important mediums for the spread of anti-epidemic knowledge from point to surface and combination of individual and the mass

Anti-epidemic knowledge could be transformed into public medical resources, but it could not be recognized and applied without the help of mediums. In the Qing dynasty, a great deal of anti-epidemic knowledge was spread out in one place or among few people. Therefore, compiling and disseminating books of medical formularies was an important way to overcome these limitations, so that the knowledge could be shared.

First, editing and publishing simple anti-epidemic books of medical formularies were the basic ways to promote effective anti-epidemic knowledge with limited spread. In the early Qing dynasty, Ouyang Tiaolyu (欧阳调律), a native of Chongqing, sorted *Sha Zhang Yu Heng*, the first monograph on filthy diseases in the Qing dynasty, and compiled *Zhi Sha Yao Lue* (《治痧要略》 *Essentials to Treat Acute Filthy Diseases*). During the DaoGuang period, Zhang Weiyi (张惟仪), a native of Fengxiang, Shanxi, "tried and tested the formulas from the books on the patients, and proved very effective." However, "few people knew the book, and the engraved block of the original copy was no longer in existence." Zhang "remade the engraved block and republished the book. He did his best to send out as many as one thousand copies."[36] In the 14th year of Guangxu (1888), an infectious disease broke out in Guangdong, Fujian, Jiangsu, Zhejiang, Hubei, and other provinces one after another. People "did not recognize the disease, and many infected patients died." Some doctors believed that the epidemic was cholera, so they treated patients accordingly, which "received no effect," and resulting in the deaths of patients. Tian Zonghan (田宗汉), an imperial student from Hanchuan, Hubei, who once served in the Ministry of War and learned medicine in his elder years, tried to save people with his own treatment method, which "was a great success." Many local gentry and businessmen donated money, hoping that he would compile the treatment into a book and spread it widely. Tian finally published the book *Yi Ji Fu Yin Lun* (《医寄伏阴论》 *Discussions on Fu Yin Warm Disease*).[37]

Second, reprinting existing books of medical formularies or compiling new ones effectively spread secretly circulated remedies in a family, school, or region. In the 6th year of Xianfeng (1856), Yu Zhangxin (俞彰信), a famous doctor in Cixi, Zhejiang, wrote a book titled *Shi Zheng Fang Lun* (《时症方论》 *Discussions on Seasonal Diseases*) for "the prevalence of cholera." The book was only available in his family. Later on, younger brother of Yu's wife funded to publish the book, and "send them elsewhere." In the 12th year of Guangxu (1886), Feng Yunkui (冯允骙), a native of Cixi, who "witnessed countless people cured by referring to the formulas in the book," republished it for fear that "this disease has already broken out in recent years, and it is difficult to cure one or two patients out of ten." Feng hoped that people use Yu's method to treat patients.[38] From 1901 to 1902, throat disorders were prevalent in the Changshu area. Yu Yanghao (俞养浩), who had been an assistant to the prefect, used the formulas from *Nang Mi Hou Shu* (《囊秘喉书》 *Secret Book on Laryngology*) to treat patients, and the formulas were effective. However, after its publication during the Daoguang period, it was circulated within the Chen family in Changshu, and few people knew about it. Therefore, Yu Yanghao republished the book and printed it as gifts to ordinary people.[39]

Finally, carrying and publishing books of medical formularies, collecting effective treatments for the same disease shared knowledge and treatment in different regions. In the 6th year of Jiaqing (1801), Chen Gengdao (陈耕道), a doctor from Changshu, complied a book *Yi Sha Cao* (《疫痧草》 *Draft of Acute Filthy Disease*) to effectively cure scarlet fever and throat disorder. However, the engraving of the book was in Suzhou, thus the book was rarely seen in Anhui. In the 18th year of Daoguang (1838), Wan Yong (万镛), a doctor from Anhui, decided to "republish the book and distributed it to the public" to cope with scarlet fever.[40] During the Tongzhi period, epidemics occurred frequently in Henan. A magistrate surnamed Hong (洪) brought a copy of *Wen Yi Tiao Bian Zhai Yao* (《瘟疫条辨摘要》 *Supplemental Critical Annotations on Epidemic Diseases*) from Shanxi compiled by Lyu Tian (吕田), a doctor from Xin'an County, Henan. According to Hong, the book was popular in Anhui, but it was rarely seen after the war. Song Guangzuo (宋光祚), a local official referred to the book

and "cured every patient after using the formulas from the book." Song republished the book in Henan, and people rushed to copy the book. Thus, "the book was widely spread in the province, and many patients were cured by referencing it." Song thought that other provinces might not know about this book, so he decided to print it again, and planned to send it to various prefectures and counties by military officials. He asked that "please ask the military officials to send the books to capital counties of the provinces, reprint the book, and spread it widely." In the 11th year of Guangxu (1885), a similar epidemic broke out in Wenzhou. Li Shibin (李士彬), the prefect of Wenzhou, immediately published this book locally[41] (Fig. 5).

Since the mid-to-late 19th century, the plague had appeared from time to time. It was prevalent in Guangdong and Guangxi at first, and spread throughout the whole country. During the epidemic, the knowledge for preventing and controlling plague was gradually applied in many regions along with the editing and publication of relevant books of medical formularies. In the 2nd year of Xuantong (1910), the plague broke out in Shanghai. "The governors of Shanghai implemented measures such as inspecting and checking the epidemic, so that the people in Shanghai were worried and restless, which could result in uprisings and protests by chance." Shen Dunhe (沈敦和), a well-known social activist and philanthropist, convened both traditional Chinese medicine practitioners as well as Western doctors and physicians to conduct research, diagnosis, and treatment on the plague. They spread and published prevention and treatment, and "inquired about anti-epidemic experience of famous doctors in Fujian and Hong Kong, collected books of medical formularies, and compiled them into a volume." The team also invited doctors to choose essential teachings from two books, *Bian Zheng Qiu Zhen* (《辨症求真》 *Seeking Accuracy in Pattern Differentiations*) written by Liang Daqiao (梁达樵), a doctor in Guangdong, and *Shu Yi Yue Bian* (《鼠疫约编》 *Simple Compilation on the Plague*), a book mailed to Shen by friends from Fujian. The doctors "deleted complicated contents and simplified essential teachings into one volume," and named it as *Shu Yi Liang Fang Hui Bian* (《鼠疫良方汇编》 *A Compilation of Fine Formulas for the Plague*) for Chinese people to refer to.[42] In the same year, the pneumonic plague broke out in the northeast regions of China. The epidemic spread rapidly. Liu Bingjun (刘秉钧), director of the Jilin Official Book Printing Bureau, sought the book *Shu Yi Yue Bian* from Hebei after many hands. Liu "printed and donated all 10,000 copies, re-titled it as *Jing Yan Shu Yi Yue Bian* (《经验鼠疫约编》 *Experiences on Simple Compilation on the Plague*), and attached a famous article *Zhong Xi Fang Yi Xin Lun Shuo* (《中西防疫新论说》 *New Sayings and Statements on Epidemic Prevention at Home and Abroad*) to the appendix of the book. At that time, Cao Tingjie (曹廷杰), a frontier defense official in Jilin Province, "knew that practicing acupuncture at acupoints such as *Qu Chi* (LI11), *Wei Zhong* (BL40), or *Shao Shang* (LU11) could treat the epidemic."

Figure 5 (A) Title page of *Yi Sha Cao* (*Draft of Acute Filthy Disease*) published in 1904; (B) Preface of *Yi Sha Cao*. (source from: https://book.kongfz.com/230405/5420583790/).

Therefore, he appended quick-acting methods, songs and verses to *Jing Yan Shu Yi Yue Bian*, and compiled them into another book *Fang Yi Chu Yan* (《防疫刍言》 *Exercising Caution when Preventing the Epidemic*). Cao "published 2000 copies and distributed them to all places affected by the epidemic"[43] (Fig. 6).

In summary, the contradiction between the uneven distribution of anti-epidemic knowledge and the indiscriminate transmission of epidemic diseases fundamentally promoted anti-epidemic knowledge from secret to public, and from local areas to all epidemic areas. Anti-epidemic books of medical formularies acted as bridges. People who could read and write without understanding medicine could dispense medicines, make medicines and carry out treatment according to the instructions of such books to treat patients and control the epidemic. Thus, the numbers of both practitioners and beneficiaries had increased accordingly, providing important support for the integration of epidemic prevention and control from point to surface and combination of individual and the mass.

4.3 Anti-epidemic books of medical formularies were important bases for anti-epidemic knowledge to become popularized

Anti-epidemic knowledge was transmitted from professional to popular, from elite to public, which was a social response to the many types of epidemic diseases and numbers of major epidemics in the Qing dynasty. The Qing dynasty did not achieve much in the fields of anti-epidemic systems and mechanism, therefore, pressure of epidemic prevention at the social and individual levels was great. People had to rely on means of understanding, reserving, and paying more attention to epidemic diseases and relevant anti-epidemic and control knowledge in order to better maintain life and health. In this context, many highly professional medical books as well as medical formulas had become popularized by means of a popular medium, books of medical formularies. After the books entered people's daily life, they would consciously popularize contents and teachings in them, so as to effectively transmit professional knowledge of epidemics to the public. Three major ways were used in this process.

First, to present anti-epidemic knowledge in simple and clear poems or rhymes is important to popularize language and to facilitate people to learn and memorize. In the periods of Xianfeng and Tongzhi, after warfare stormed regions in Sichuan, epidemic diseases prevailed. Zhang Ruzhen (张汝珍), a doctor in Chengdu, feared that warm diseases would be treated as cold diseases in view of the variety of warm diseases and the confusion of diagnosis methods. So, he wrote the book *Chun Wen San Zi Jue* (《春温三字诀》 *Three Character Verses on Warm Diseases in Spring*), which discussed conditions and proper ingredients of formulas for warm diseases in 56 sentences of three characters. Since its publication in the 11th year of Xianfeng (1861), the book had become very popular. Jinzhang Bookstore in Shanghai, the Commercial Press, Yishengtang in Chengdu, etc., had successively published this book. It had been included into various versions of *Chen Xiu Yuan Yi Shu* (《陈修园医书》 *Medical Classics of Chen Xiuyuan*), which further promoted its influence.[44] Almost at the same time, Wang Guangdian (王光甸), a doctor from Shifang, Sichuan, who had cured many patients during the epidemic, reviewed and

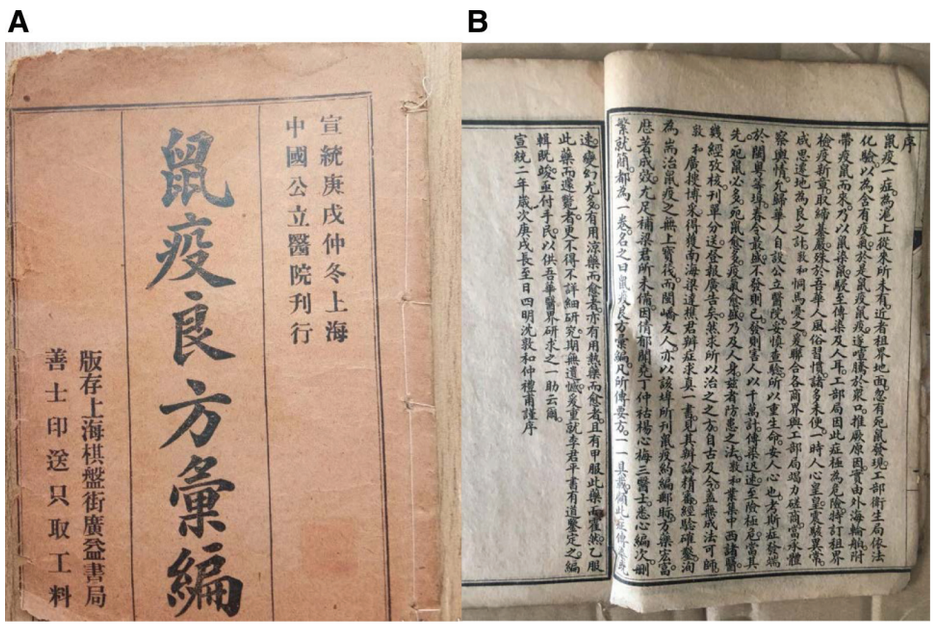


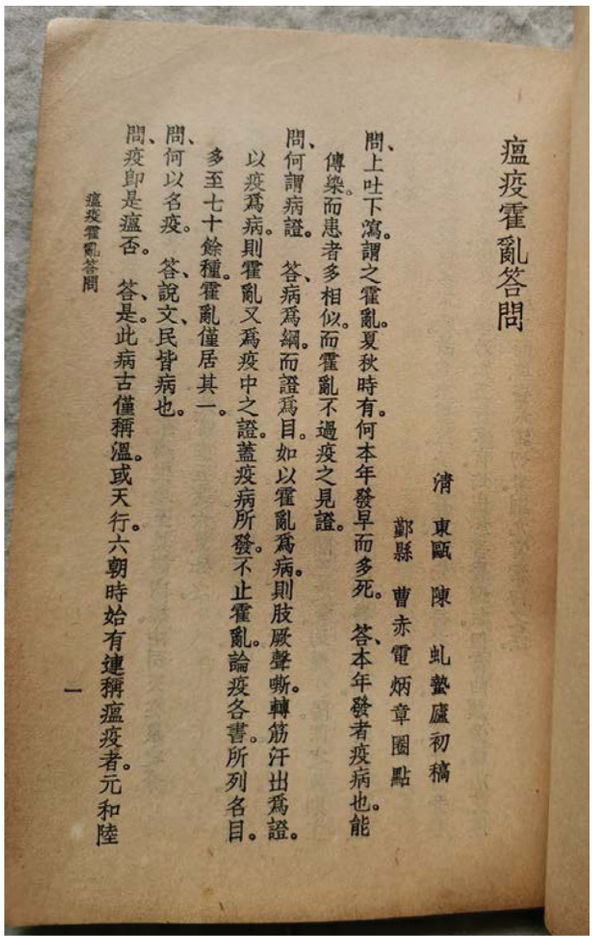
Figure 6 (A) Title page of *Shu Yi Liang Fang Hui Bian* (*A Compilation of Fine Formulas for the Plague*) published in 1910; (B) Preface of *Shu Yi Liang Fang Hui Bian*. (source from: https://book.kongfz.com/46522/5127408218/).

rewrote *Shang Han Cuo Yao* (《伤寒撮要》 *Essentials on Cold Damage*) in order to let more people understand the epidemic and learn how to deal with it. The original book was "very long and difficult to memorize." Wang "included its essentials… made verses of songs… compiled them into rhymes, and combined into *Han Yi He Bian Ge Kuo* (《寒疫合编歌括》 *Summary Verses of a Compilation of Cold Epidemics*)," so as to make "readers easy to memorize, and make no confusions between rights and wrongs." In the year following the completion of this book, Leshan Charity Hall in Xujiachang, Shifang published it. In the 22nd year of Guangxu (1896), Chongshantang in Chengdu reprinted the book.[45] Such verse books continued to emerge in the middle and late Qing dynasty, such as *Shang Han Zheng Fang Ge Kuo* (《伤寒证方歌括》 *Summary Verses of Proven Formulas for Cold Damage*), *Du Shang Han Lun Ge* (《读伤寒论歌》 *Verses of Review of Treatise on Cold Damage*), *Wen Bing Fang Ge* (《温病方歌》 *Formula Verses of Warm Diseases*), *Huo Luan Fang Ge* (《霍乱方歌》 *Formula Verses of Cholera*), *Wen Yi Ming Bian Ge Jue* (《瘟疫明辨歌诀》 *Verses of Differentiating Epidemic Diseases*), *Wen Bing Tiao Bian Zheng Fang Ge Kuo* (《温病条辨症方歌括》 *Summary Verses of Systematic Differentiation of Symptoms and Formulas of Warm Diseases*), *Wen Yi Chu Bu Ge Jue* (《瘟疫初步歌诀》 *Preliminary Verses of Epidemic Diseases*), etc.

Compiling verses and songs also played an important role in people's response to new epidemics. For example, at the end of the 19th century, when cholera was prevalent in the Jiangnan area, Lian Wenchong (连文冲), a doctor from Qiantang, set up a public office together with his colleagues to invite doctors to treat the epidemic. However, the public office "could only treat a limited number of patients, and could not care for the rest of the country." In view of the situation, Lian complied a book named *Huo Luan Shen Zheng Ju Yao* (《霍乱审证举要》 *Essentials on Diagnose and Treatment on Cholera*), "whose language was plain and simple while the contents were brief and clear, like an old woman teaching poetry, and everyone could understand."[46] The book aimed to popularize relevant knowledge of cholera, so that people could learn to diagnose the epidemic, take medicine, and protect themselves against it independently.

Second, to organize and arrange anti-epidemic knowledge in the form of questions and answers is common to realize the popularization of the compilation method of books of medical formularies, and to facilitate people's understanding and application. For example, in the 28th year of Guangxu (1902), cholera was prevalent in Wenzhou, Zhejiang, and deaths followed one after another. Chen Qiu (陈虬), a local physician treated it with *Bai Tou Weng Tang* (白头翁汤 Pulsatilla Decoction), and received good effects. For fear that many doctors could not distinguish between cold and heat, thus delayed the treatment of the disease, Chen compiled the book *Wen Yi Huo Luan Da Wen* (《瘟疫霍乱答问》 *Answers and Questions on the Epidemic Disease Cholera*) in the form of dialogs. With 54 questions and answers, Chen comprehensively elaborated on the etiology, treatment, and prevention of cholera, and attached 18 formula verses to the book. Liu Xiangsheng (刘祥胜), a leading figure in the Hunan Army, commented that "the book was clear and easy to understand. Although I am as ignorant as a servant, I also understand it in a twinkling."[47] At the end of the Qing dynasty and the beginning of the Republic of China, Gao Yuming (高愈明), a doctor from Gaiping in Liaoning, compiled a variety of anti-epidemic books of medical formularies in terms of questions and answers. These books included *Wen Zhen Su Yuan Da Wen* (《温疹溯源答问》 *Answers and Questions on Tracing back to Warm Rashes*), *Shu Yi Da Wen* (《鼠疫答问》 *Answers and Questions on Plague*), *Qiu Yi Da Wen* (《秋疫答问》 *Answers and Questions on Autumn Epidemics*), *Du Yi Wen Da* (《毒疫问答》 *Questions and Answers on Toxic Epidemics*), etc. They were very concise in both form and content.[48] During the plague in Northeast China in the late Qing dynasty, Gao Yuming and his second son were infected successively, and they were cured by relying on Gao's own experimental and improved methods. In order to gain everyone's trust and spread the treatment widely, Gao "complied *Du Yi Wen Da* in vernacular," and commented confidently that "If the doctors got this book, they could realize and discard their mistakes to cure people. If the people were infected with the plague, they could take the medicine according to the formulas in the book without the doctor's diagnose. If they neglected the formulas in the book and delayed patients' condition, it will be useless and harmful to them"[49] (Fig. 7).

Finally, doctors and literati would purposefully collect and compile the formulas, homemade remedies, and folk remedies into books of medical formularies. These formulas spread widely and were simple, convenient, cheap, verifying. Therefore, contents of such books were clear and easy to read, so as to popularize anti-epidemic knowledge and help ordinary people to prevent and control the disease. For example, the book *Za Yi Zheng Zhi* (《杂疫证治》 *Patterns and Treatment of Miscellaneous Epidemics*), which appeared in the Jiaqing period, outlined the symptoms and treatment methods of 72 miscellaneous diseases such as *Pu Tao Wen* (葡萄瘟 grape-like pestilence) and *Xia Mo Wen* (虾蟆瘟 epidemic parotiditis). Many of the formulas included in this book were "dictated by physicians or heard from old people in the villages." The book aimed to overcome the embarrassing situation of "doctors caught off guard by various strange epidemic diseases." It also wished to facilitate people to "read it in advance, so that they could respond to the diseases." At the end of the eighth year of Xianfeng (1858), an epidemic broke out in the Guanzhong plain in Shanxi. A local recluse named Qianzhai (潜斋居士) had many extraordinary experiences in "treating the


瘟疫霍亂答問

清 東甌 陳 虬蟄廬初稿

鄞縣 曹赤電炳章圈點

問、上吐下瀉。謂之霍亂。夏秋時有。何本年發早而多死。答、本年發者疫病也。能傳染。而患者多相似。而霍亂不過疫之見證。

問、何謂病證。答、病爲綱。而證爲目。如以霍亂爲病。則肢厥聲嘶。轉筋汗出爲證。以疫爲病。則霍亂又爲疫中之證。蓋疫病所發。不止霍亂。論疫各書。所列名目。多至七十餘種。霍亂僅居其一。

問、何以名疫。答、說文。民皆病也。

問、疫卽是瘟否。答、是。此病古僅稱溫。或天行。六朝時始有連稱瘟疫者。元和陸

瘟疫霍亂答問 一

Figure 7 *Wen Yi Huo Luan Da Wen* (*Answers and Questions on the Epidemic Disease Cholera*) published in 1936. (source from: https://book.kongfz.com/9322/1601814367/).

epidemic according to his homemade formulas." In the 2nd year of Guangxu (1876), there was a long drought in Taiyuan, and similar epidemics appeared from time to time. Qianzhai Jushi took out this book from his suitcase to "re-calibrate and publish it with several proven formulas on throat disorder and additional formulas by his friends attached to the book." The book was republished after revision.[50]

Mobilizing the enthusiasm and initiative of the general public and improving their awareness and ability of epidemic prevention were necessary measures to overcome the shortage of medical resources, ease the pressure of prevention and control, and improve prevention and control capabilities in the face of epidemic diseases. Books of medical formularies achieved these goals. The popularization of such books in terms of language, style, content, etc., had promoted anti-epidemic knowledge from elite to the public, from a few professionals to most non-professionals, and to a certain extent, it had transformed epidemic prevention and control from passive to proactive prevention.

In summary, the epidemic outbreak provided an opportunity for the integration and popularization of anti-epidemic knowledge, and books of medical formularies were one of the bases to unfold the process. With the publication and dissemination of such books, anti-epidemic knowledge came into people's daily lives. Before they appeared, anti-epidemic knowledge was limited by time, space, population, technology, professional, etc., and failed to maximize its function. Books of medical formularies allowed the knowledge to spread in a general sense, that is, they enabled relevant knowledge to be acquired, utilized, and inherited between all levels and between generations in a certain period of time with relatively low price.

5 Conclusion

Books are a social and cultural product, a medium, and an important force to promote social and cultural developments. As a special genre, books of medical formularies connected medicine and social culture. They were created and changed within each interaction between medicine, politics, economics, society and culture. At the same time, the books kept enhancing the ties maintained between these aspects, making them as portrayals of the complementary and mutual transformation of text and practice in historical contexts. Every epidemic disease outbreak as well as its prevention and control was accompanied by the generation and dissemination of a great deal of anti-epidemic knowledge. Similar to the generation and circulation of various "prevention and control plans," "anti-epidemic manuals," and "anti-epidemic knowledge" in the process of preventing and controlling COVID-19 today, there were also numerous anti-epidemic texts, that is, anti-epidemic books of medical formularies, created and spread during the epidemic prevention and control in the Qing dynasty. Publishing, dissemination, reading, application, and other practices related to such books were resulted from epidemic diseases. Furthermore, such activities became witnesses of the interaction between people and epidemic diseases, and an important part of epidemic prevention and control practices. In the historical situation of the Qing dynasty where the priority was laid on "epidemic treatment,"[51] a large number of anti-epidemic books of medical formularies played a unique and important role in "epidemic treatment." New forms of anti-epidemic practices had been created, including treating the infected patients, mobilizing forces to fight epidemics, integrating, and popularizing anti-epidemic knowledge, etc. For example, ordinary people could directly refer to books of medical formularies for treatment after infection; professional doctors and people from all walks of lives could make full use of the simple, popular, and practical advantages of such books to integrate and spread anti-epidemic knowledge; people from non-medical industries could edit and publish simple books of medical formularies to

treat patients and spread anti-epidemic knowledge under the guidance of the books, etc. These activities not only directly contributed to epidemic prevention and control, but also played an important role in accumulating epidemic response experience and improving the overall epidemic response capability of society. Therefore, disseminating the books was a crucial way to realize the links and interactions between relevant people, matters, and substance. They also acted as an "original force" for people to positively respond to the epidemics, control the epidemic, and maintain health.

Epidemic prevention and control is not a simple medical affair, but a holistic and comprehensive social activity. From the perspective of social culture, scholars have pointed out that the establishment of institutions to accommodate patients, the establishment of pharmacies to invite doctors to treat the patients, the distribution of medicines, and the publication of scattered medical formulas were the most important measures to deal with epidemic diseases in traditional Chinese society. However, these measures were basically due to temporary emergencies.[52,53] In fact, the roles and effects of these measures cannot be concluded easily. Among them, the compilation, publication, and dissemination of anti-epidemic books of medical formularies (including various types of anti-epidemic medical formulas) had three prominent roles and characteristics in epidemic prevention and control: First, the cost was low. Measures such as setting up institutions to accommodate patients, setting up pharmacies to invite doctors to treat the patients, and distributing medicines required considerable human, material, and financial support to better achieve the goals of prevention and control. It could be concluded that compilation, publication, and dissemination of books of medical formularies or medical formulas had fewer restrictions, and were flexible and changeable. Even in places where there existed no publishing or printing technology as well as a low education level, anti-epidemic knowledge could be transmitted from the books orally and personally to ordinary people. Second, it had strong conductivity and wide coverage. The establishment of institutions to accommodate patients, the establishment of pharmacies to invite doctors to treat the patients, and the distribution of medicines, etc., were often carried out under the conditions of relatively developed social economy, strong private forces, relatively concentrated population, and relatively sufficient medical resources. While the threshold of compilation, publication, and dissemination of anti-epidemic books of medical formularies was relatively low, so that the remote areas and the vast rural areas with underdeveloped social economy could also afford to fight the epidemic, enabling potential anti-epidemic forces be sent into prevent and control the epidemic. Third, the spillover effect was large. The establishment of institutions to accommodate patients, the establishment of pharmacies to invite doctors to treat the patients, the distribution of medicines, etc., basically began with the emergence of the epidemic and ended with the end of the epidemic. Controversially, anti-epidemic books of medical formularies integrated knowledge, and could be stored, learned, applied universally, and used to inspire people. In addition to their role during the epidemic, their compilation, publication, and dissemination were actually the basic components of the evolution of anti-epidemic knowledge production, which continued to affect people's understanding and their response to epidemic diseases, including the way, mentality, customs, etc. They could also be used to affect the innovation of epidemic knowledge.[5,54]

Isolation, quarantine, disinfection, sanitation, and other measures commonly used in modern Western health and epidemic prevention system basically relied on public powers to construct and operate, and had significant characteristics of concentration, coercion, and systemization. Therefore, modern Western health system resulted in a "visible network" consisting of public powers in the face of epidemics. In contrast, compilation, publication, and dissemination of anti-epidemic books of medical formularies were generally spontaneous, decentralized, and non-institutional measures among the people. In the publication activities of such books, the central government of the Qing dynasty rarely participated, while the local governments and officials participated in related activities positively in personal. Most of the officials only resorted to individuals and their medical contributions during the epidemic in order to promote "benevolent governance," so as to maintain order in their jurisdiction. They had not consciously or effectively improved the extent of organization, centralization, standardization, and institutionalization of such publication activities. Therefore, the health system of the Qing dynasty resulted in "an invisible network" including government official personals and scattered individuals. The implementation and effectiveness of the former network should basically depend on the power, authority, organization, and execution of the government, while the latter network would require the participation of the majority of social forces and even every citizen and individual in order to generate maximum benefits. On the whole, the former network had significant advantages in discovering the source of infection and cutting off the chain of transmission, but it often only paid attention to the whole and ignored the individual, making it difficult to effectively protect individual rights and interests[55]; whereas the latter network played an important role in the treatment of epidemic diseases, and ultimately influenced individuals in society. It was also a symbol of self-determination, vitality, and creativity of the Chinese society. However, due to the lack of planning, organization, and unity, it might lead to problems such as duplication, disordered production, and low utilization of books of medical formularies. In the face of future epidemics, it is suggested that organically combining "a visible network" and "an invisible network," that is, integrating the powers of both the

government and individuals can minimize losses caused by epidemics, and well protect the overall order as well as individual rights and interests.

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Author contributions

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Conflicts of interest

The author declares no financial or other conflicts of interest.

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Research article

CHINESE 中医药文化(英文)
MEDICINE AND CULTURE

OPEN

A Preliminary Study of Medical Books on Health Care for the Elderly and Prolonging Life in the Early 20th Century

PI Kuoli[1,✉]

Abstract

The present research of Chinese medical history lack detailed discussions on Chinese medicine philology of the elderly and the various sorting of related literature of physiology and diseases both at home and abroad. Based on previous literature, the article aims to introduce the publishing trend of medical books on health cultivation and prolonging life on since modern times, generally describe its significance, and initially analyze the contents related to health cultivation for the elderly. The article finds out that after the scientific concepts were imported into China in large quantities from the beginning of the 20th century, the past superstitions rose again. The sciences of nutrition, bacteriology, and physiology in such books had all verified that the road to immortality was possible. The concept of longevity at the time emphasized a concept that could be controlled by science. With the advancement of scientific research and health concepts, people believed that they could eventually achieve immortality. It was obvious that people were filled with optimism about science at that time, thus gradually subverting the definition of the elderly.

Keywords: Healthcare; Health cultivation; Longevity; Prolonging life; The elderly

1 Introduction

Medical historians are committed to seeking new themes in the field of history and devoting to the mission of searching truth and facts in history. They explore various social and cultural history issues such as birth, aging, illness, and death of people in history,[1–3] and pay attention to issues of life and health various groups,[4] including research on medical practitioners,[5] religious medicine,[6,7] women,[8–11] children, and other groups.[12–14] Relevant researches have been published on these issues as well as historical data collection or specialist research, and more emphases are laid on pediatric medicine compared to geriatric medicine.[15,16] However, there still exists a number of research areas and issues worthy of research from the perspective of the culture of traditional Chinese medicine (TCM) knowledge production. Judging from the current research results of medical history, there is a lack of relevant discussion on the literature of the elderly and various sorting out of related physiology and disease history both at home and abroad in spite of exceptions.[17,18] Human beings will eventually get old. Most families have elderly people.[19] Humanistic historians should help people understand the body and recuperation details of the elderly people in history. In retrospect, TCM is a very special technique. It is not only "modern," but has a lot of empirical experience and effective techniques that may exist in the ancient books. Even what modern Chinese medicine has mastered is only a small amount of ancient classic knowledge, regardless of the transformation of Chinese medicine literature scholars required to find various empirical and scientific possibilities from ancient books. The example of Tu Youyou (屠呦呦) is a good illustration. People all over the world reported her achievements on discovering the therapeutic efficacy of artemisinin, while TCM scholars laid her success on the inspiration from *Zhou Hou Bei Ji Fang* (《肘后备急方》 *Emergency Formulas to Keep Up One's Sleeve*), an ancient TCM classic. In fact, Tu has already spent a lot of time investigating the diseases and treatment methods in various ancient books in the comparison of the curative effects in the early stage, which greatly contributed to her success. The example indicates that the ancient documents can also inspire new technological innovations to a certain extent.[20] TCM has practical values and benefits for the long-term care of the elderly, which has been confirmed by the scientific community. Many TCM scholars and practitioners have begun to explore the application of TCM from the perspective of

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empirical medicine.[21] Another example is the investigation and research conducted by Lin Wenyuan (林文源). He implemented science, technology, and society (STS) to reflect on the experience and meaning of TCM to explore TCM knowledge, in order to achieve the possibility of interdisciplinary intervention to explore the boundaries of knowledge and benefit clinical application of modern TCM.[22] This is the value of studying the history of TCM knowledge in the past.

2 Statistical analysis on ancient medical books on pension and life extension

There is a lack of in-depth research on the physiological characteristics, historical significance, and documentation of the elderly. The understanding of the medical community is still insufficient regarding the contribution of TCM health preservation to the physiology and disease treatment of the elderly during the Republic of China. Most literature briefly covers relevant issues from *Huang Di Nei Jing* (《黄帝内经》 *The Yellow Emperor's Inner Classic*), *Dao De Jing* (《道德经》 *The Book of The Way*), *Lyu Shi Chun Qiu* (《吕氏春秋》 *The Spring and Autumn of Lu Buwei*), etc, or generally introduces the idea of preventive treatment of diseases, indicating a lack of unity and historical depth.[23] In general, the knowledge of TCM on the elderly is preserved in health-preserving medical books, and its meaning is often based on the concept of prolonging life. The paper would focus on these books. Take the medical book titled *Shou Shi Bian* (《寿世编》 *Longevity Book*) in the early Qing Dynasty as an example. The title might indicate that it is related to the health care of the elderly. But in fact, the book is written for the diseases and health care of children and women, and there is no content about the elderly.[24] In contrast, *Yang Sheng Lei Yao* (《养生类要》 *Categorized Synopsis of Health Care*), a medical book in the Ming Dynasty covered a lot of knowledge about the physiology and medicine of the elderly. For example: "When people grow old, if they have short urination, the disease is advancing." The book also mentioned that the elderly would suffer yin deficiency, and the symptoms are as follows: "The muscles and bones of the elderly are weak, and they have no color on the dark face. They eat little, but they have much phlegm. They cough or gasp, and urinate quite a few times at night. They suffer impotence, and have weak feet and knees as well as a thin body. These symptoms are mostly due to long-term of kidney qi deficiency, triggering haggard sleep, sweating, fever, and thirst."[25] The book contained many descriptions of the physiological symptoms of the elderly. Therefore, even books on health preservation or medical books named after "longevity" and "old age" required relevant provisions for analysis, in order to truly grasp the essence of the books and knowledge of the elderly. However, the scope of the study must be narrowed in order to make solid studies (Fig. 1).

So-called health care is not necessarily about the knowledge of the elderly. In the future, we should focus on the understanding of medical care for the elderly. There have been many achievements in the research of body history in the academic circle.[26–28] The research results are particularly fruitful, especially in the aspect of gender body history.[29–31] However, little emphasis is laid on the body meaning and cultural meaning of the young and the elderly. A representative study by Dr. Li Zhende (李贞德) presented the knowledge of physiology to pay attention to the physiological changes of women in old age.[32,33] Doctoral dissertation of Xiao Qi (萧琪) was also very innovative. The study explained the integration of the concepts of "elderly care" and "health preservation," and theories and specific practices of medical care for the elderly under the development of medical theory since the Jin and Yuan dynasties.[34] The study has inspired the author to collect historical documents and literature. Therefore, how can these documents reflect the social and cultural significance of the body of the elderly? The scope of ancient Chinese medical books is quite broad, so it must be narrowed down. What kind of books and classics are worth sorting out? What changes have been made to the way they presented

Figure 1 A comic describing harm on the elderly due to bad habits, stimulants, and anesthetics from *Jian Kang Yao Jue* (*Essential Teachings on Health*). (source from: http://read.nlc.cn/OutOpenBook/OpenObjectBook?aid=416&bid=5970.0).

knowledge in modern times (1940–1949)? In order to answer these questions, this study have to first observe the medical books related to the health and treatment of the elderly in the history of Chinese medicine, and come up with an outline of the publication of a book before it can be effectively analyzed. The author sorted medical books on health care and cultivation for the elderly mainly from *General Catalogue of Ancient Books of Traditional Chinese Medicine*, and compiled them into *Statistical Survey of Books on Health Cultivation in Modern Chinese Medicine*. The survey is provided as an Appendix. The catalog with so many medical books is difficult to start. It is hard to find some of the books, such as *Ji Bing Bu Jiu Lu* (《疾病补救录》 *The Records of Remedies for Diseases*) compiled by Du Shizhang (杜时彰). It is difficult to prove that the book deals with the diseases of the elderly because the original book has not been seen. In other cases, health preservation in the title of the books sometimes refers to "rehabilitation" or "disease prevention." These contents may not necessarily refer to the elderly, so they can be omitted. Common features have to be found before the study could focus on a specific research issue. It may be difficult to find the connotation without comparison.

Statistical Survey of Books on Health Cultivation in Modern Chinese Medicine is mainly based on statistics of new published books in modern times. Before analyzing the catalogue, it is necessary to first discuss the publishing status of ancient books published before 1840 related to the health and treatment of the elderly in modern times, and find out the problems. After that, the analysis can be more comprehensive. The basic findings are as follows.

It is surprising to find that many ancient health-preserving medical books have disappeared or at least not easily accessed in modern times. Compared with books on TCM such as cold damage or heat diseases, the books on traditional knowledge of health preservation and life extension have been seriously neglected in modern times.[35] The following books were published before the late Qing Dynasty (1840), and some were republished during the Republic of China. They are arranged in chronological order. These books included: *Can Tong Qi Zheng Wen* (《参同契正文》 *Main Text of Kinship of the Three*) (219), *Yang Sheng Lun* (《养生论》 *On Health Preservation*), *Bao Pu Zi Nei Wai Pian* (《抱朴子(内外篇)》 *The Inner and Outer Analects of Bao Pu-zi*), *Yang Xing Yan Ming Lu* (《养性延命录》 *Records on Nurturing Nature and Prolonging Life*), *Tian Yin Zi* (《天隐子》 *The Gentleman hiding in the Heaven*) (741), *Su Nyu Fang* (《素女方》 *Formulas of the Immaculate Maiden*), *She Sheng Xiao Xi Lun* (《摄生消息论》 *Treatise on Health Cultivation and Ups and Downs*), *Yan Shou Di Yi Shen Yan* (《延寿第一绅言》 *The First Important Sayings for Prolonging Longevity*) (1276), *Tiao Xie Lei Bian* (《调燮类编》 *Life Preservation Arranged by Category*) (1276), *She Sheng Yue Ling* (《摄生月令》 *Health Cultivation According to the 12-month Season*), *Hun Su Yi Sheng Lu* (《混俗颐生录》 *The Records of Preserving Life in the World*), *Si Shi Yi Ji* (《四时宜忌》 *Taboos of Four Seasons*), *Xiu Ling Yao Zhi* (《修龄要旨》 *The Essential Teachings of Prolonging Life*) (1442), *Si Shi She Sheng Tu* (《四时摄生图》 *Graphs on Health Cultivation in Four Seasons*) (2 editions), *Zhi Yan Zong Yang Sheng Pian* (《至言总养生篇》 *Collection of Essential Teachings on Health Cultivation*) (1449), *Jiang She Bao Ming Pian* (《将摄保命篇》 *The Volume on Health Cultivation and Life Preservation*) (1449), *Fu Qi Chang Sheng Bi Gu Fa* (《服气长生辟谷法》 *Fulfilling Qi and Longevity by Fasting*) (1449), *Tui Peng Nuo Yu* (《推蓬寤语》 *Sayings after Removing Obstacles and Waking Up*) (1570), *She Sheng San Yao* (《摄生三要》 *Three Essential Teachings for Life Cultivation*) (1591), *Yang Sheng Fu Yu* (《养生肤语》 *Plain Sayings on Life Cultivation*), *Shi Se Shen Yan* (《食色绅言》 *Important Sayings on Food and Sex*) (1615), *Tian Xian Zheng Li Zhi Lun Zeng Zhu* (《天仙正理直论增注》 *Additional Commentaries to the Righteous Sayings of the Fairies*), *Huang Di Shou San Zi Xuan Nyu Jing* (《黄帝授三子玄女经》 *The Yellow Emperor's Presenting the Sutra of Mysterious Female to Three Sons*) and other books. These books probably had only one version during the period of the Republic of China, and they were all included in other books, including *Cong Shu Ji Cheng Chu Bian* (《丛书集成初编》 *Preliminary Compilation of Book Series*), *Dao Zang Ju Yao* (《道藏举要》 *Quotes of Taoist Canon*), *Dao Zang Jing Hua Lu* (《道藏精华录》 *Records of Essences of Taoist Canon*), *San San Yi Shu* (《三三医书》 *Medical Books of Three Generations' Experiences*), etc. These books were published in other books rather than in a single volume. Therefore, the academic values lay more in the function of preservation and research more than dissemination and circulation.

A small proportion of medical books were not only included in other books. They were also published as separate editions, and some books even had several editions, which had a great influence on the circulation of knowledge. Among them, *Shou Qin Yang Lao Xin Shu* (《寿亲养老新书》 *New Book on Longevity and Health Cultivation*) (1307) originally written by Chen Zhi (陈直), supplemented by Zou Xuan (邹铉) of the Yuan dynasty was the most special. There were four block-printed editions of this book in the late Qing dynasty. In the Republic of China, there were three single editions of this book published in 1916, 1919, and 1935. The book was followed by *Zun Sheng Ba Jian* (《遵生八笺》 *Eight Letter on Life Cultivation*), with many editions in the late Qing Dynasty. During the Republic of China, there were two editions of *Zun Sheng Ba Jian* published as a single edition. As for other important medical books, such as *Yang Lao Feng Qin Shu* (《养老奉亲书》 *Book on Healthcare for the Elderly and Parents*) by Chen Zhi in the Northern Song dynasty, *Yang Sheng Lei Zuan* (《养生类纂》 *Compilation of Health Cultivation*), and

Yang Sheng Yue Lan (《养生阅览》 *Readings on Health Cultivation*) (1220) by Zhou Shouzhong (周守中), etc., it is surprising that there were no separate editions in the Republic of China.[36] There were two editions of *Shou Shi Qing Bian* (《寿世青编》 *Compilation of Prolonging Life*) (1667), one of which was preserved in *Zhen Ben Yi Shu Ji Cheng* (《珍本医书集成》 *Complete Records of Rare Medical Books*). *Yang Sheng Jing* (《养生镜》 *Health Cultivation Mirror*) (1709) of the Qing dynasty had two printed editions in 1922 and 1933. As for the medical books with a single edition, there were the 1922 lithographic edition of *Wan Shou Dan Shu* (《万寿丹书》 *The Elixir Book of Longevity*) published by Jinan Benevolence Altar in 1624, and the printed edition of *Shen Bao Ba Fa* (《神保八法》 *Eight Laws of Ancestral Spirits*) published by Leshan Charity Society of the Republic of China in about 1820. Other medical books on health cultivation and longevity before the late Qing Dynasty had no publications. Compared with the special medical books on heat diseases, most books on health cultivation had few editions. Many books had only single editions or transcripts, which indicated that the number of people willing to read health cultivation books might be much less than those willing to read professional TCM books. Although longevity was the pursuit of ordinary people, curing diseases was obviously more urgent. If the disease could not be cured, longevity could not be achieved.

3 Publishing situation of relevant medical books in modern times

The section would focus on the continuation of versions of medical books in modern times. We will first look into the publishing situation in the late Qing dynasty (1840–1911). For example, there were three editions of *Lao Lao Heng Yan* (《老老恒言》 *Eternal Teachings on Health Care for the Elderly*) (1773) in the late Qing Dynasty. There also existed a lithographic edition of the book published by Shanghai Hongzhang Publishing House in 1928 during the Republic of China. Another special book was *Wei Ji Yu Bian* (《卫济余编》 *Additional Compilation of Healthcare and Longevity*) (1813) compiled by Wang Rangtang (王纕堂) in the late Qing dynasty. In addition to introducing the method of preserving health and prolonging life, this book covered all aspects of daily life, such as daily activities, communication, clothing, diet, and games, which were beneficial to physical and mental health. This book was published in nine editions throughout the 19th century, and it was widely circulated, which was worthy of further research. However, the book was not published in the Republic of China.[37] In a nutshell, health cultivation books had few editions and were not widely circulated compared to books on various TCM theories during the Republic of China. Health cultivation books were very influential in the late Qing dynasty. However, with a more prosperous publication industry in the Republic of China, these books disappeared from the market. What was the reason behind it? The study believes that there might be newer and more influential theories or publications replacing the existing knowledge system. The old knowledge system had not completely disappeared, because there were still health cultivation books published in separate editions, indicating that there was a market. However, it was still necessary to explore the appearance of new knowledge, and the conflicts and dialogs between knowledge carriers.

It could be concluded from *Statistical Survey of Books on Health Cultivation in Modern Chinese Medicine* (Appendix) that as for the newly published medical books since the late Qing dynasty, the ones that had actually printed more than two editions from the late Qing dynasty to the Republic of China included three editions of *Yi Shen Ji* (《颐身集》 *Collection of Recuperating Body and Mind*) (1850), five editions of *Yang Bing Yong Yan* (《养病庸言》 *C ommonplace Sayings on Conditioning and Recovering*) (1877), two editions of *Zhen Shang San Zi Jue* (《枕上三字诀》 *Three Character Teachings on Sleeping*) (1879), 11 editions of *Zhong Wai Wei Sheng Yao Zhi* (《中外卫生要旨》 *Essentials of Chinese and Foreign Health*) (1883), eight editions of *Yang Sheng Bao Ming Lu* (《养生保命录》 *Records on Health Cultivation and Preservation*) (1890), two editions of *Bao Shen Bi Lan* (《保身必览》 *Required Readings on Health Preservation*) (1900). *Wei Sheng Xue Wen Da* (《卫生学问答》 *Questions and Answers on Health Care*) (1901) had a total of 6 editions, but only one edition during the Republic of China. The books mentioned above were initially published in the late Qing Dynasty, but only *Yang Sheng Bao Ming Lu* was printed in seven editions during the Republic of China. Other books were only published in the late Qing Dynasty, and were not published again after the founding of the Republic of China. For example, the famous *Zhong Wai Wei Sheng Yao Zhi* was published in large quantities in the late Qing Dynasty, but it was not reprinted by the time of the Republic of China. As for the publication of medical books after the Republic of China, there were nine editions of *Xin Shen Qiang Jian Zhi Mi Jue* (《心身强健之秘诀》 *The Secrets of Mental and Physical Health*) (1913); two editions of *Jin Shi Chang Shou Fa* (《近世长寿法》 *The laws of Longevity in the Modern Times*) (1913), two editions of *Yan Shou Xin Fa* (《延寿新法》 *New Laws on Prolonging Life*) (1914), two editions of *Qi Da Jian Kang Fa* (《七大健康法》 *Seven Great Health Laws*) (1914), two editions of *Chang Sheng Shu* (《长生术》 *The Techniques of Longevity*) (1916), three editions of *Chang Sheng Bu Lao Zhi Mi Jue* (《长生不老之秘诀》 *The Secrets of Immortality*) (1917), two editions of *She Sheng Lun* (《摄生论》 *The Theory of Health Cultivation*) (1918), two editions of *Kang Jian Lun* (《康健论》 *Health Theories*) (1921), three editions of *Yan Shou Yao Yan* (《延寿药言》 *Suggestions on Prolonging*

Life) (1924), two editions of *Jian Kang Mi Jue* (《健康秘诀》 *Secrets of Health*) (1930), two editions of *Zhong Guo Yang Sheng Shuo Ji Lan* (《中国养生说辑览》 *General Compilation of Chinese Health Cultivation Theories*) (1930), three editions of *Yang Sheng Yi Yao Qian Shuo* (《养生医药浅说》 *Preliminary Comments on Health Cultivating Medicine*) (1938), and two editions of *Chang Shou Zhi Tiao Jian* (《长寿之条件》 *Conditions for Longevity*) (1949) (Note 1).

4 An analysis of new published health cultivating medical books in the Republic of China

From the preliminary statistics, *Xin Shen Qiang Jian Zhi Mi Jue* by Fujita Leisai (藤田齡斋) and *Jin Shi Chang Shou Fa* by Tanaka Yukichi (田中佑吉) were translated into Chinese in 1913. The latter was translated by Ding Fubao (丁福保) (1874–1952). In the following year, Wu Tingfang (伍廷芳) (1842–1922) published *Yan Shou Xin Fa*, and *Qi Da Jian Kang Fa* edited by Matsuo Lai from Japan was also translated in the same year. It was obvious that a large number of new books on prolonging life, longevity, health cultivation, and immortality appeared between 1913 and 1918. For example, the popular translation book *Xin Shen Qiang Jian Zhi Mi Jue* in the Republic of China regarded that Japan had instead revived the ancient Chinese theories of health and health cultivation.[38] The books did not emphasize material and science, but emphasized the relationship between spirit and body, focusing on various relationships of health cultivation with the body and the mind. Furthermore, they laid emphasis on techniques such as meditation, breathing, and inhaling, which was rather unique at the time. The books combined longevity of the people with national strengths, enhancing the importance of prolonging lifespan and healthy life to national development.[39] To some extent, the discussion of health cultivation and longevity or the elderly in modern medical books was influenced by Japanese medicine in the early stage. There were quite a few medical books translated from Japan, and some of them were not mentioned in the *General Catalogue of Ancient Books of Traditional Chinese Medicine*. There existed severe mistakes in sorting out the editions of such books, and the value of these books were underestimated. Take *Jiang Jian Shi Xin Shen Duan Lian Fa* (《江间式心身锻炼法》 *Sound mind and body*) (1919) as an example. From its publication in 1919–1925, the book had more than four editions in print. The book claimed that the health cultivating activities in the book had similar sayings with those of Daoism and Buddhism, and emphasized on belly breathing and meditation. To cultivate health and achieve longevity was indeed one of its important purposes.[40] However, these books were not dedicated to health cultivation of the elderly. Instead, they introduced these techniques as new popular means to cultivate health (Fig. 2).

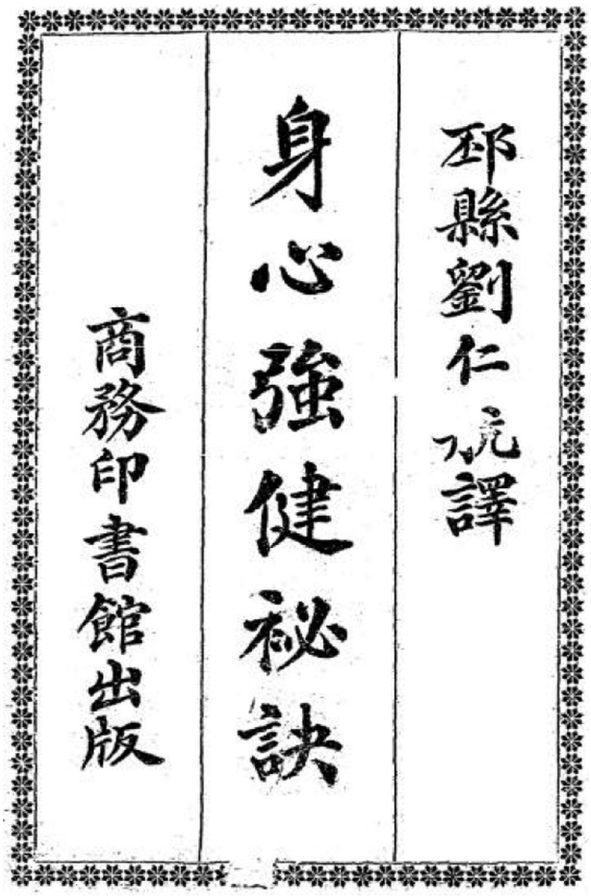

Figure 2 Front cover of *Shen Xin Qiang Jian Mi Jue* (*Secret Teachings on Physical and Mental Health*). (source from: http://read.nlc.cn/OutOpenBook/OpenObjectBook?aid=416&bid=93814.0).

Another obvious trend was the transformation from health preservation and cultivation to longevity and immortality. It showed a great gap between people in this era and the elderly who need long-term care in the current sense in the face of "getting old." At the beginning of the 20th century, various new researches on physiology and basic medicine of Western medicine had been taken place one by one. The advancement of nutritional chemistry enabled life span and physical fitness to be controlled by the nutrients from diets.[41] Life span could be extended through scientific research and taking additional nutrients or medicines.[42] As a popular saying went, "Longevity lies in food." It was essential for the elderly to pay attention to their daily diets and methods to take them in order to maintain health.[43] According to the definition around 1930, healthcare was defined as "the study of maintaining health," which had the function of prolonging life. The theory believed that longevity could be achieved as long as the body could be strengthened so that the organs could perform their proper functions, and the source of diseases be eliminated so that infectious diseases would not invade the body. Some people believed that by paying attention to the two aspects mentioned above, mankind could prolong their lives,

"increase the average life-span," and enjoyed the happiness of life to serve the society. Eliminating the source of diseases could be attributed to TCM and Western internal medicine, while strengthening the body in modern times usually referred to several major aspects such as rest, fatigue control, brain power, sexual desire, and supplementing various new nutrients.[44]

Several examples would be provided. *Chang Sheng Bu Lao Zhi Mi Jue* by Gu Shi (顾实) published in 1917 was actually a translation of the book *Immortality* written by a Japanese author Yuubi Aoyagi (青柳有美) published by Tokyo Sangyo no Sekaisha (Tokyo Industrial World Publishing House) in 1916. The book introduced a wide range of new Western health knowledge, as well as the Japanese meditation and breathing methods. Thus, it was in line with the inference above that to some extent, modern Chinese medical books on healthcare for the elderly were influenced by the knowledge of Japanese medical books. When Gu Shi translated this book, he mentioned that many of the examples in the original book were stories of foreigners prolonging their lives, which were not friendly to Chinese readers. Therefore, he added many Chinese examples, and the content was somewhat different. The author would add Chinese health cultivation methods, believing that they could "promote the quintessence of the country."[45] In addition, the advertisements at the end of the book emphasized that even though Japanese meditation and breathing methods were introduced, the concept of "longevity" mentioned in the book were actually the principles of Daoism. Therefore, the value of this book lay in using scientific methods to explain the existing Taoist theories.[46] The book had several themes, with special emphasis on knowledge about diet, spirit, daily life, and other aspects. Overall, it focused on "abstinence" and "a careful diet." The book mentioned achieving immortality by dieting, and it had already mentioned the discovery of vitamins,[47] but the name of vitamin was not widely accepted. It was not until the 1920s did Chinese people become familiar to this name.[48] In the chapter "Bu Lao Bu Si Fa Zhi Xin Fa Jian" (不老不死法之新发见 New Discoveries of Immortality), the book focused on bacterial treatments and discoveries of new nutrients. Since infectious diseases were still the main causes of the high death rate among Chinese people at that time,[49] this book concluded that human beings could realize the dream of immortality by paying attention to the prevention of infectious diseases. Additionally, the book also introduced the technology of producing serum at that time, and believed that in the future, chemical enzymes secreted by longitudinal cells in white blood cells can be extracted from animal plasma to produce new serum, which could be injected into the bodies of the elderly. After that, the bacteria that dominated the destruction and decomposition of the body could no longer destroy the cells, and mankind would naturally achieve immortality. The book quoted the research of Mechnikov (Илья Ильич Мечников, 1845–1916), who believed that human beings could live up to 145 years old and achieve an ideal "immortality." In a nutshell, the book was filled with optimism about the progress that an unknown science could deduce within a reasonable range.[50]

Wu Tingfang compiled and published *Yan Shou Xin Fa*. His friend Qu Hongji (翟鸿禨) pointed out that Wu once served as an official with him. He reminded that Wu loved taking about "the essentials of healthcare," and stuck to the methods including eating vegetarian food, paying attention to daily life and rules, taking deep breaths of fresh air every day, and etc. After more than 10 years apart, the two met in Shanghai. Qu was amazed that Wu who was over 70 years old looked like what he was in his forties. Moreover, Wu was full of vigor. His ears and eyes were bright, his beard and hair were black, and his teeth were strong. He did not appear to be old. Wu pointed out that he achieved all this by referring to rules of healthcare. After that, Wu wished to compile the book, and intended to teach the Chinese people, hoping that everyone in the world could achieve longevity.[51] The book was interesting that Wu intended to introduce a law of not getting old or getting old slowly, rather than things that people who were already old should pay attention to. The book revealed great optimism towards modern scientific laws about healthcare, and its language presented a thinking of anti-aging under the theory. It was the writing style of books published under the name of "prolonging life" or "longevity" at that time. Similar traces could be found in books named after healthcare or health for the elderly. A translated book *Jian Kang Yao Jue* (《健康要诀》 *Essential Teachings on Health*) pointed out that some people were very old at 50, whereas some people were not old at 70. A quotation from the book read "Age cannot be measured by years." Such discussion obviously chose health as the criterion for measuring peoples' age. The book believed that the most important things to achieve health were diet nutrition and prevention of germs and bacteria, and translated the latter as "anti-virus."[52] Many life extension books discussed food hygiene, including cooking, kitchen cleanliness, and food safety. They would mention the relationship between vectors, including mice, mosquitoes, and flies, and ingredients. Using Western scientific methods to eliminate diseases was a major content in books on longevity.[53] As for the prevention of diseases, the titles of the books could be deceiving. For instance, a book titled *Shi Yong Chang Shou Fa* (《实用长寿法》 *Practical Laws on Longevity*) seemed to introduce laws on health cultivation and Longevity at first glance. However, the book did not mention any contents about the elderly. It was a special book on disease prevention and treatment, and discussed mainly on achieving longevity by preventing tuberculosis.[54] Therefore, the original book must be found for review before further

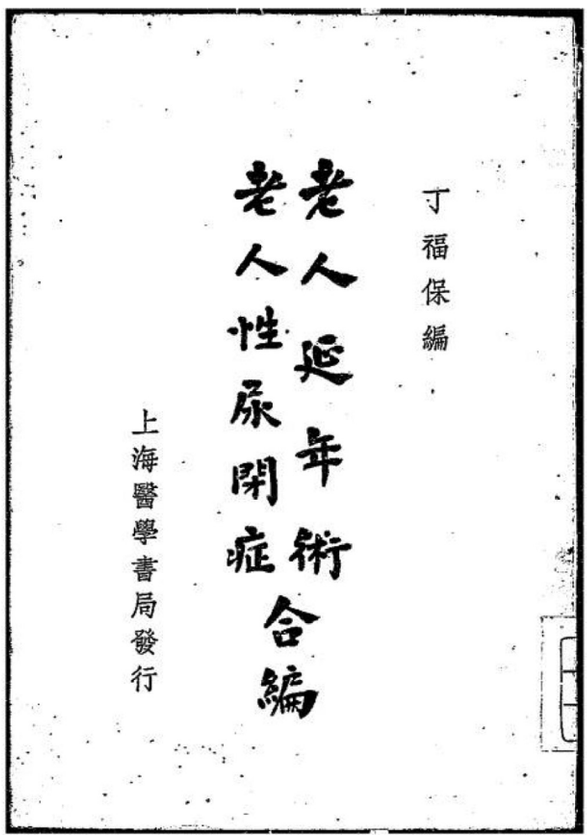

Figure 3 Front cover of *Lao Ren Yan Nian Shu Yu Lao Ren Xing Niao Bi Zheng He Bian* (*A Combined Compilation on the Methods of Prolonging Life and Senile Urinary Syndrome for the Elderly*). (source from: http://read.nlc.cn/OutOpenBook/OpenObjectBook?aid=416&bid=97636.0).

analysis, rather than relying solely on the titles and the catalogues (Fig. 3).

In addition, Ding Fubao published *Lao Ren Yan Nian Shu Yu Lao Ren Xing Niao Bi Zheng He Bian* (《老人延年术与老人性尿闭症合编》 *A Combined Compilation on the Methods of Prolonging Life and Senile Urinary Syndrome for the Elderly*) in the mid-1930s. The exact publication date of the book remains unclear. Yet, Ding mentioned that the book was published after his 60s in the preface, so that the book might be published in year 1934 or 1935. The book was a combination of health cultivation and pathology, featuring an emphasis on daily diet. Ding pointed out that: "The secret of longevity may lie in one's diet. A big eater would boast of his good appetite. However, the ancient health regimens all took the precept of not being too full every meal, and it is appropriate to not overeat. This is an excellent lesson. Therefore, those who want to live a long life should limit their drinking and eating when they are young and strong. For those who are fond of drinking, as they grow older, they would drink less and less, and prefer plain vegetables than greasy meat. The preference of their diet corresponds to their age."[55] The saying basically focused on not overeating or eating too much, and the elderly should prefer a plain and light diet. During the period of the Republic of China, there were discussions on which food, meat or vegetables, was better for the body. Those who advocated eating more meat believed that eating more grains, vegetables, and less meat would reduce the resistance to diseases. At the same time, Westerners had a more meat-based diet, and they cast great influence to the East, so the trend of meat eating was very popular. However, Ding did not think so. He believed that according to statistics, a person with a meat-based diet was more likely to suffer from diseases such as cerebral hemorrhage and gastric cancer. He thought that "These diseases which were most common in the elderly and young people were all due to the harm of eating meat." Therefore, from Ding's perspective, ordinary people promoted eating meat to increase physical strength, but they suffered the opposite outcomes.[56] Ding believed that longevity could only be achieved by a moderate diet, and this point of view was the traditional Chinese view of life and health cultivation.[57] Smoking and drinking were even more taboo for those who pursue longevity. Ding mentioned that:

> "Drinking a small amount of alcohol is not harmful, but drinking a large amount or drinking strong alcohol, such as whiskey, brandy, etc., is of course unhealthy. Smoking cigarettes is of little harm, but strong cigarettes such as cigars and so on are harmful to the heart. People who want to live a long life must not damage the heart and blood vessels. Therefore, they must quit smoking and drinking that are harmful to the heart and blood vessels. If young and strong people smoke cigars frequently, their bodies will lose weight immediately. If they quit smoking, they will gain weight, become strong, and regain appetite. Therefore, smoking is extremely unsuitable for old people with weak bodies."[58]

Ding's theory of longevity often used actual pathology as the basis to explain the principles of various taboos for the elderly. Ding's book also introduced several new technologies on health cultivation in the West, one of which was the "rejuvenation" method that was popular at that time. The author has already discussed it in a special monograph.[59] An example would be provided to show that Ding believed the method could not be trusted, thus revealing a multi-dimensional thinking at that time. Ding wrote that:

> "Recently, there is a so-called rejuvenating method which claims to be able to turn the elderly into the youth. The method stems from the hope of the elderly, who have the rejuvenation surgery operated. Other people do not need to stop the operation naturally. However, doctors should not persuade the elderly to perform the rejuvenation surgery. In the contrast, the doctors should suggest the people pay attention their deeds. In order to live longer, one must live a life in accordance with the laws of healthcare from a young age, so as not to quickly get old. Once one grows old, and he seeks to use the method of rejuvenating to regain youth, whether it will have any effect is not credible."[60]

Ding believed that the so-called rejuvenation method was actually the "self maintaining method" for the elderly,

and of course family members should also help. If the elderly were not able to support life on their own, there should be a institution similar to the Western "nursing home." Ding thought that, "…gather such elderly people in one place, and give them a considerable amount of work in accordance with their age, so that they can live and provide for themselves. Such social undertakings should be carried out by the state government, or be managed by local governments. Furthermore, they could be established by individuals as charity." Unfortunately, Ding did not discuss further on this issue.[61] His book still laid a general emphasis on dietary care, thus revealing that dietary therapy should be the focus of elderly care and health cultivation during this period, which was worthy of further study and research.

5 Conclusion

There were various books on medicine, divination, and astrology among the traditional Chinese classics and literature, which was an important phenomenon in the history of books. As far as medicine is concerned, traditional Chinese literature covered a wide range of aspects including internal medicine, surgery, gynecology, pediatrics, and other subjects, whereas geriatrics was missing. Therefore, it is necessary to examine the traces of the elderly mentioned in traditional Chinese literature mainly from books on health cultivation supplemented by books about medical prescriptions, to capture the historical features of the elderly and its related knowledge. It could be concluded from the study that the trend of "canonicalization" of such medical literature was not strong.[62,63] Many famous ancient books disappeared during the Republic of China, and few doctors recited and annotated these books repeatedly. The old theories were very easy to integrate with new ones, so new books on health cultivation for the elderly appeared before and after, which were the characteristics of medical books on longevity.

It is human nature to cherish life and avoid death. The pursuit of longevity or immortality has been the common hope of mankind since ancient times. Immortality is regarded as a special state of health cultivation especially in the Chinese culture, but unfortunately no one can achieve it. However, after the concept of science was imported into China at the beginning of the 20th century, many ancient superstitions were subverted. Achieving immortality should have been proved unreasonable. However, people's dreams of pursuing it took a step further with the development of science. At least, prolonging long, or pursuing longevity is no longer unrealistic. The study found that that science, including nutrition, bacteriology, physiology and other aspects, worked together to verify that pursuing immortality is somehow feasible. At the special period, TCM and Taoist theory were compatible with new Western theories, rather than being considered as an old thinking which needed to be discarded or put into a museum.[64] The study concludes that new theories from the West and Japan could be integrated with traditional concepts or health cultivation philosophies. The appeals of traditional culture, such as pleasurable emotions, diet control, desires, etc, could be continuously found in the books on health cultivation and longevity in the early 20th century. They were not eliminated due to the evolution of social concepts.

The concept of longevity in the early 20th century emphasized a concept that could be controlled by science. It believed that with the development of scientific research and progress, mankind would eventually achieve immortality, though it would surely take time. As Gu Shi mentioned in his book: "Modern people got the way for immortality, which Emperor Qin failed to find in Penglai."[65] The statement indicated optimism about the science on longevity in the future, and was trying to gradually subvert the definition of aging in the past. The study has not discussed in detail the diet discussed by people at that time. In addition to food and diet, there are also concepts of medicine and supplements, which are also related to immortality. The detailed content and operation methods need to be further demonstrated.

Notes

Note 1: These books did not include those with little reference to health cultivation, including two editions of *Jing Fa Xu Zhi* (《净发须知》 *Instructions for Clearing Hair*) (1895), two editions of *Qing Nang Mi Lu* (《青囊秘录》 *Secret Records about Medicine*) (1922), two editions of *Ya Pian Yu Wei Sheng* (《鸦片与卫生》 *Opium and Health Care*) (1928), etc.

Note 2: *Shou Shi Quan Shu* (《寿世全书》 *Encyclopedia of Longevity*) included six books, which were: *Xian Shu Mi Ku* (《（脱俗超凡）仙术秘库》 *Vault of Immortality*) compiled by Wang Kentang (王肯堂) and proofread by Qinglanshi (清岚氏), *Shi Yan Chang Ming Fa* (《（古今中外）实验长命法》 *Pursuing Longevity by Experiments*) complied by Hu Jiaying (胡嘉英) and Ye Guanqun (叶冠群), *Nan Nyu Yang Sheng Shu* (《（延年益寿）男女养生术》 *Health Cultivation of Men and Women*) compiled by Wu Lyuji (吴履吉), *Bai Bing Zhi Liao Fa* (《（妙手回春）百病治疗法》 *Cure for All Diseases*), *Yu Er Zhi Nan* (《（家庭必备）育儿指南》 *Parenting Guide*), and *Nan Nyu Jie Yu Bao Jian* (《男女节欲宝鉴》 *Precious Mirror of Abstinence for Men and Women*) compiled by Liu Renda (刘仁达).

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the project, which included health-preserving prescription books from TCM literature. The project focuses on clinical practice, so it is not possible to comprehensively sort out the connotations of medical books in this part, but it has given the general direction of the types of data collected in this article. The project is funded by Research Institute of Chinese Medicine, MOHW, and the project number is MOHW106-NRICM-C-124-000005.

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Ethical approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

Author contributions

PI Kuoli has done the research and the writing of the paper.

Conflicts of interest

The author declares no financial or other conflicts of interest.

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Appendix

Statistical survey of books on Health Cultivation in Modern Chinese Medicine

Authors and translators	Book title	Year of publication	Important editions and versions
Eds. Fujita Leisai, Trans. Liu Renhang (刘仁航)	*Xin Shen Qiang Jian Zhi Mi Jue* (《心身强健之秘诀》 *The Secrets of Mental and Physical Health*)	A.D.1913	9 editions. 1 printed version in 1913, and 8 printed versions by the Commercial Press in 1917, 1920, and 1931.
Eds. Tongzhi Society (同志学社)	*Wei Sheng Cui Yan* (《卫生粹言》 *Sayings on Health Care*)	A.D. 1913	1 edition. Lithograph version by Jing Hua Bookstore in 1913.
Tanaka Yukichi, Trans. Ding Fubao (丁福保)	*Jin Shi Chang Shou Fa* (《近世长寿法》 *The laws of Longevity in the Modern Times*)	A.D. 1913	2 editions. Printed versions in 1913 and 1914.
Wu Tingfang (伍廷芳)	*Yan Shou Xin Fa* (《延寿新法》 *New Laws on Prolonging Life*)	A.D. 1914	2 editions. Printed and copies by the Commercial Press in 1914 and 1918.
Tang Huaizhi (唐怀之)	*Wei Sheng Hebi* (《卫生合璧》 *Combination of Health Care*)	A.D. 1914	1 edition. Manuscript in 1914.
An Zhen (安贞)	*Sushi Wei Sheng Xue* (《素食卫生学》 *Hygiene of Vegetarian Diet*)	A.D. 1914	1 edition. Engraved copy by School of Health Care in 1914.
Eds. Matunoo Agasa, Trans. Liu Renhang	*Qi Da Jian Kang Fa* (《七大健康法》 *Seven Great Health Laws*)	A.D. 1914	2 editions. Printed versions by Wenming Publishing House in 1917, by Jiangzuo Bookstore in 1917.
Liu Renhang	*Le Tian Que Bing Fa* (《乐天却病法》 *Treatment of Diseases in a Happy Mode*)	A.D. 1915	5 editions. Printed versions by the Commercial Press in 1916, 1920, 1927, 1928, and 1936.
Eds. Jiang Weiqiao (蒋维乔)	*Jian Kang Bu Lao Fei Zhi Zhao Shi Lun* (《健康不老废止朝食论》 *Sayings on Abandoning Breakfast to Stay Healthy and Young*)	A.D. 1915	1 edition. Printed version by the Commercial Press in 1915.
Eds. Gu Shi (顾实)	*Chang Sheng Bu Lao Fa* (《长生不老法》 *Way of Immortality*)	A.D. 1916	2 editions. Printed versions by the Commercial Press in 1916 and 1928.
Xiao Ping (萧萍)	*Chang Sheng Shu* (《长生术》 *Methods of Immortality*)	A.D. 1916	2 editions. Printed version by Shanghai Dadong Publishing House in 1933, printed version by Shanghai Popular Publishing House in 1936.
Gu Mingsheng (顾鸣盛)	*Chang Sheng Bu Lao Zhi Mi Jue* (《长生不老之秘诀》 *The Secrets of Immortality*)	A.D. 1917	4 editions. Printed version in 1917, printed versions by Shanghai Civilization Publishing House in 1922 and 1931, printed version by Shanghai Progress Publishing House.
Shi Lieming (施列明)	*Yan Nian Yi Shou* (《延年益寿》 *Prolonging Life*)	A.D. 1918	1 edition. Printed version by The Signs of the Times Publishing House in 1918.
Hu Xuanming (胡宣明)	*She Sheng Lun* (《摄生论》 *The Theory of Health Cultivation*)	A.D. 1918	2 editions. Printed versions in 1918, and printed version by the Commercial Press in 1919.
Wang Licai (王立才)	*Sheng Huo Jing* (《生活镜》 *The Mirror of Life*)	A.D. 1920	1 edition. Printed version in 1920.
Liu Tieqin (刘铁琴)	*Shou Ren Jing* (《寿人经》 *Laws on Longevity*)	A.D. 1920	1 edition. Printed version in 1920.
Qin Tongpei (秦同培)	*Jing Shen Yang sheng Lun* (《精神养生论》 *Theory on Spiritual Health Cultivation*)	A.D. 1920	1 edition. Printed version by the Commercial Press in 1920.
Master Haoran (浩然主人)	*Xian Shu Mi Chuan* (《仙术秘传》 *Secret Teachings on Immortality*)	A.D. 1920	1 edition. Printed version by Shenzhou Society in 1920.
Zhou Yilao (周一老),Transcribed by Teng Feiqing (滕非青)	*Shen Jing Duan Lian Fa* (《神精锻炼法》 *Mental and Spirit Exercise*)	A.D. 1921	1 edition. Printed version by Shaoxing Yicheng Hall Bookstore in 1921.
Eds. Ding Zhongying (丁仲英), Chen Cunren (陈存仁)	*Kang Jian Lun* (《康健论》 *Health Theories*)	A.D. 1921	2 editions. Printed version by Shanghai Health Newspaper Agency in 1921, and printed version in 1927.
Hua Tuo (华陀), Sun Simiao (孙思邈), Eds. Jinan Daoyuan	*Qing Nang Mi Lu* (《青囊秘录》 *Secret Records about Medicine*)	A.D.1922	2 editions. Printed versions by Jinan Daoyuan in 1923, and printed version in 1932.
Eds. Longevity Society	*Shou Shi Quan Shu* (《寿世全书》 *Encyclopedia of Longevity*)	A.D. 1922	1 edition. Printed version by Shanghai Continental Publishing House in 1922. (Note 2)

Continued

Authors and translators	Book title	Year of publication	Important editions and versions
Eds. Gu Mingsheng (顾鸣盛)	*Wu Yao Yi Bing Fa* (《勿药医病法》 *Methods of Treating Diseases without Medicine*)	A.D. 1922	2 editions. Printed versions by the Commercial Press in 1922 and 1926.
Eds. Guo Renji (郭人骥), Li Renlin (俪人麟)	*Nyu Xing Yang Sheng Jian* (《女性养生鉴》 *Guide to Health Cultivation of Women*)	A.D. 1922	2 editions. Printed versions by the Commercial Press in 1922 and 1928.
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Anonymous	*Nan Nyu Yang Sheng Bao Jian* (《男女养生宝鉴》 *Teachings on Health Cultivation for Men and Women*)	A.D. 1923	1 edition. Printed version by Shanghai Zhonghua Bookstore in 1923.
Eds. Yang Zhangfu (杨章父), Sun Tagong (孙鼗公)	*Su Shi Yang Sheng Lun* (《素食养生论》 *Vegetarian Health Cultivation Theory*)	A.D. 1923	1 edition. Printed version by Shanghai Zhonghua Bookstore in 1923.
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Eds. Wei Zhaoliang (魏兆良)	*Bai Ling Fu Shou Quan Shu* (《百龄福寿全书》 *The Encyclopedia of Good Fortune and Longevity*)	A.D. 1926	1 edition. Printed version by Shanghai Jiufu Company in 1926.
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Zhao Bichen (赵璧尘)	*Wei Sheng Sheng Li Xue Ming Zhi* (《卫生生理学明指》 *Clear Analysis of Hygienic Physiology*)	A.D. 1933	1 edition. Printed version by Beijing Charity Organization in 1933.
Zhao Bichen (赵璧尘)	*Wei Sheng San Zi Fa Jue Jing* (《卫生三字法诀经》 *Three-Character Teachings on Hygiene*)	A.D. 1933	1 version. Appendix to *Wei Sheng Shenglixue Mingzhi*.
Eds. Zhang Henian (章鹤年)	*Wei Sheng Gai Yao* (《卫生概要》 *Summary of Hygiene*)	A.D. 1933	2 editions. Printed version by Shanghai New Chinese Medicine Research Institute in 1934, printed version included in *Series of Books of Questions and Answers on Various Subjects of Traditional Chinese Medicine* in 1934.
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Wei Hongsheng (魏鸿声)	*Jing Shen Duan Lian Zhi Liao Shi Yan Wen Da* (《精神锻炼治疗实验问答》 *Questions and Answers on Experiments of Mental Exercise and Therapy*)	A.D. 1934	1 edition. Printed version by Beijing Hongsheng Asylum in 1934.
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Ding Fubao	*Chang Shou Zhi Tiao Jian* (《长寿之条件》 *Requirements of Longevity*)	Unclear	2 editions. Printed version by Shanghai Medical Publishing House, and Printed versions in the Republic of China.

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Food and Medicine: Qualities and Efficacies in Chinese Ethnic Medicines

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Abstract

Drawing on our research in China's southern mountains about ethnic medicines, and intrigued by the proverbial Chinese view that *Yao Shi Tong Yuan* (food and medicine have the same source), this article traces the eventfulness and powers at play in healing and eating when they are seen as closely related forms of life. Ancient and modern traditional Chinese medicine understandings of flavor are here shown to be a common basis for the healing and harming powers of both food and medicine. The term *Wu Wei*, or five flavors is explored as both experiences of eating and cooking, and some patterns of qi movement that animate and invigorate the body. Following Vivienne Lo's term "potent flavors," practices of harmonizing (*He*, *Tiao He*) flavors in Chinese medicine, as in cooking, express a world of natural powers and expert embodiment that goes far beyond mere taste.

Keywords: Chinese ethnic medicines; *Wu Wei*; *Yao Shi Tong Yuan*

> The beauty of a flavorful stew lies in the combining of differences, while the benefit of above and below is in their being able to cross each other.
> 夫和羹之美，在于合异，上下之益，在能相济。
> From *Records of the Three Kingdoms*, "Biography of Xia Hou Xuan"[1]
> Western Jin, c. 280 C.E.

1 Introduction

This ancient text suggests that the key to making a beautiful stew is the proper mixing of diversities and the masterful management of water (above) and fire (below). The term *He Geng* (和羹), which translates as flavorful stew, is even older than the *Three Kingdoms*. It was first seen in the *Book of Documents* where the king of Shang praised his prime minister: "*Ruo Zuo He Geng, Er Wei Yan Mei* (若作和羹，尔惟盐梅 you are like the salt and the plums for my making of a flavorful stew)."[2] The salt and plums that provide salty and tart tastes are compared to the prime minister's personal virtues, revealed in his service to his lord. The social and even political importance of modulating flavors, heat, and water is made explicit in these Chinese classics. Further, there is an argument to be made regarding the importance of culinary and medical domains of practice as they relate to each other.

The word for stew (or thick soup) is *Geng* (羹), a character that combines *Gao* (羔)for lamb with *Mei* (美)for beauty. Roel Sterckx, in his work on food, politics, and sacrifice in Chinese antiquity,[3] asserts that "the prime dish was the stew, or *Geng*, a soup consisting of meat, vegetables or cereals, or a mixture of these. The stew was known throughout Chinese antiquity where it also served as an important sacrificial offering." *Geng* is a water-based mixture of diverse foods. It is generally thought as "*Wu Wei Tiao He De Nong Tang*" (五味调和的浓汤 a thick soup with the five flavors harmonized). *Geng* itself is always already flavor-full and to cook *He* (和)-flavorful *Geng*, the key is to harmonize the *Wu Wei* (五味 five flavors), which includes the flavors sour, bitter, sweet, pungent, and salty. All foods can be classified by the five-flavor system, though this system has a far-from simple relationship with the sensible flavors of plants and meats. As the epigraph states eloquently, a simple *He Yi* (合异combining of different varieties of things) is not yet harmonizing, or *He*. The soup needs to be slowly cooked over a fire, the work of harmonizing involves not only flavors but the heat of fire and the moistening of water. Thought of in yin-yang terms, yin water flows down while yang fire rises upward. The yin-downward water and yang-upward fire, above and below, "cross each other." The No. 63 hexagram, *Ji Ji* (既济), of the *Book of Changes* depicts this image.[4] A *He Geng*, after water and fire have crossed, and *Yin Yang Xiang He* (阴阳相和 yin and yang have corresponded), is the outcome of this dynamic transforming process.

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Thus, a *Geng* being *He*-flavorful means much more than just tasty. By harmonizing the world's myriad heterogeneities, it gives specific character to human experience. Through cooking and eating it nourishes human beings (Fig. 1).

The "above and below " that "cross" in the opening epigraph certainly refer to the yin-yang interaction of Heaven and Earth and also the gathering and intertwining qi of light and dark, warm and cool. Food has *Xing* (性 character) and *Wei* (味 flavor), and thus has healing or harming powers. Consider the language of a classic exchange on the *Zhong Jiao* (中焦 middle burner)[5]:

> "Huang Di said, I want to hear about what comes from the middle burner. Qi Bo replied, the qi of the middle burner emerges from the stomach… The qi received there is secreted [downward] as the dregs of wine and grains, steamed [upward] as the various body fluids, and transformed into essential nutrients, which pour upward to the lung system [the upper burner) where they are transformed into blood which in turn provides life to the body. What could be more precious!"
> (Original Chinese translation:
> 黄帝曰：愿闻中焦之所出。歧伯答曰：中焦亦并胃中… 此所受气者，泌糟粕，蒸津液，化其精微，上注于肺脉，乃化而为血，以奉生身，莫贵于此...")

All these terms that refer to cooking are reflected in the language of modern traditional Chinese medicine (TCM) texts, perhaps most markedly when they are speaking of the hot and moist kitchen of the middle burner.

The relations of corresponding and harmonizing found both in the natural world and in qi-transforming physiology govern the making of Chinese medical decoctions. The herbal "soup" combines differently flavored herbs and requires cooking, which is considered a proper control of water and fire. Both *Geng* (stew) and *Tang Yao* (汤药 decoction) are orally consumed and interact with processes in bodies. Even the word in modern Chinese for the soups that are food (*tang* 汤) and the decoctions that are medicine (*tang* 汤) is the same.

Figure 1 Meat stew, field work picture taken by the authors in *Tu Jia* area.

In this discussion, the proverbial Chinese view that *Yao Shi Tong Yuan* (药食同源 food and medicine have the same source) is the starting point. The qualities and efficacies of nutritional and medicinal plants are the focus by tracing the eventfulness and powers at play in healing, especially when medicine is thought of as deeply akin to cooking and eating food. In research in the worlds of mainstream TCM and in some minority nationality medical practices, we have encountered the practice of such experts who exhibit these skills, both medical and culinary, and healers who harmonize different flavors and transform patients or diners' bodies and experiences through the mediation of medical cooking (Note 1). And we ask, what is the role of human perception, craft, and generosity in making good mixtures, or making mixtures flavor-full and efficacious?

2 The way of flavor (味道 *Wei Dao*)

Yi Yin (伊尹), a legendary cook of the early Shang dynasty (1649–1550 BCE), is said to have cooked food to cure diseases, and he is considered to be the inventor of medicinal soups for curing diseases. The *Zhou Li* (《周礼》 *Rites of Zhou*) records one kind of *Tian Guan* (天官 heavenly official) specifically in charge of *Shi Yi* (食医 food medicine). The same book states, "the five flavors, five grains and five medicines should be used for nurturing the sick,"[6] thus already juxtaposing food and medicine. The term *Wu Wei* (the five flavors) found in the even earlier text *Zuo Zhuan* (《左传》 *Zuo Zhuan*) already speaks of the five flavors' power to stimulate and influence the movement of qi animating and invigorating the body (Note 2). Furthermore, as part of the *Wu Xing* (五行 five phases) system of cosmic correspondences, the five flavors were each associated with an organ system: the lungs, spleen, kidneys, liver, and heart. These correspondences are outlined in the medical classic *Huang Di Nei Jing Su Wen* (《黄帝内经素问》 *The Yellow Emperor's Inner Classic: Basic Questions*).

It is foundational to the logic of Chinese herbal medicine, which still draws on these early classics, that natural medicines have properties and characters, and that they have affinities with particular organ systems of *Zang Fu* (脏腑 function) and *Jing Luo* (经络 circulation tracks). Along with the classic notion of *Si Qi* (四气 four characters or qualities), heating, warming, cooling, and chilling, the *Wu Wei* (five flavors, such as sour, bitter, sweet, pungent, and salty) remain central concepts in popular and technical medical discourses on health and well-being. In any TCM materia medica text, every drug listed or explained has a known flavor, sometimes two. Understanding the "five flavors" in Chinese medicine requires seeing them as both classificatory rubrics (gathering, distinguishing, and comparing diverse things with diverse properties, or *He Yi*) and as direct efficacies

in themselves. Correlated with the five great organ systems of the body and classified with the micro- and macrocosmic five phases, the five flavors have powers that a healer or cook can work with (Table 1). Like the five phases, there are relations of *Sheng Ke* (生克 production and restraint) between things of differing flavors. Sweet replenishes, sour constricts, and so forth (Note 3).

Flavors in European usage, by contrast, are confined mainly to the realm of cooking and eating food. Flavors are weak and epiphenomenal to the nutritional factors that we learn from reading package labels (Note 4). The biomedical magic bullet, moreover, like an antibiotic, is a flavorless pill. Its powers engage pathology outside of our experience. All it has in common with medicinal soups is that it is swallowed.

In the research, we have been doing on ethnic medicines in China's southwest, there are a great many local herbals in use that have not made it into the national or even regional materia medica handbooks. We have wondered how local gatherers and users of natural medicines have determined the flavor classification of the previously unknown things they use in their medical practices. Trained in TCM, we tend to presume that it would be impossible for anyone to *Pei Yao* (配药 combine drugs) without having memorized the "traditional Chinese medicine" classificatory system of the five flavors and the four qi. The technical complexities of the TCM specialty of formulary are well known because there is both an archive of classic formulas which are analyzed and understood partly with reference to the matched flavors they include and there is a logic and techniques for designing tailor-made formulas in ways that can maximize the efficacies of flavors and characters while avoiding clashes and cross-purposes. This is a kind of harmonizing, translated into present-day practice as the Chinese medical subdiscipline of formulary.

As mountain herbalists were sought out in the research, the legendary sage *Shen Nong* (神农 Divine Husbandman), who is said to have "tasted the 100 herbs" comes to mind. We asked many healers in southern China whether they personally tasted the herbs they gathered and used. Most said they did, some of them emphasizing that this way of testing unknown substances with their own bodies was the experiential foundation of their knowledge and practice. Moreover, it takes an informed palate to classify the taste of a natural substance for medical use. It could be considered easy to say whether a leaf or root has sweet or astringent qualities, but this unknown plant also has a number of other flavors that may or may not be medically powerful. The immediate taste in the mouth of a relatively unfamiliar plant, collected in the forest, is only the first step in understanding how a type of flavor might translate into a predictable therapeutic effect. Some "clinical" experimentation, beginning with the vulnerable body of the healer, is required to characterize local and novel drugs in a way that can lead to more effective, safe, and harmonious combinations.

Table 1 Correspondence between five phases and five flavors

Five phases	Five flavors	Five viscera	Five seasons
Wood	Sour	Liver	Spring
Fire	Bitter	Heart	Kidney
Earth	Sweet	Spleen	(Late Summer)
Metal	Pungent/acrid	Lung	Fall
Water	Salty	Kidney	Winter

We suggest there are two moments in the practice of a mountain herbalist that are crucial to the making of good therapeutic soups. One is the tasting of individual herbs, or in the case of already known herbs the experiential understanding of "official" classificatory taste. Two is the rare ability to combine them in an effective decoction or herbal plaster that meets and engages the particular qualities of the disordered body or person being treated. Indeed, many of those in the south mention one key difference between a mere "folk" herbalist and a genuine practitioner of a local system of medicine is the latter's ability to efficaciously combine herbs (Note 5). Healers have special skills both to know medicines with an informed sense of taste gained from the time spent gathering and sampling medicines and how to incorporate these findings into soups and cooking for reliably good results (Note 6).

3 Field note one: Sister Wang tasting herbs

Some researchers studying the development of ethnic medicines say they have found it difficult to persuade ethnic healers to share the theory behind their practices (Note 7). Most of the healers we have seen would rather discuss the natural drugs they collect, expressing considerable respect for the thing itself. Possibly great cooks don't think much about "the five flavors" in theory too. Instead, they know from experience, and from being taught at stoveside, what particular foods work together well and achieve a uniquely flavorful and efficacious unity.

Sister Wang (Fig. 2) is a *Li* (黎) ethnic healer who practices herbal medicine in Hainan Island with her daughter-in-law disciple. Like others we have met, she has traveled around her home province, often with others interested in herbal medicine. She is well-known to locals as a person who *Dong* (懂 understands) herbs. However, this does not mean that she could evoke the theory of the five flavors and five phases to talk about her practice.

Wang's local reputation is formidable. She is known in Hainan as a true healer, a *Yao Wang* (药王 herb king), and a local authority on the field botany of medicinal plants. We found her with the help of two sisters, named

Yang, who are among the very few educated authorities to have published on the characteristics of *Li* ethnic herbal medicines. The Yang sisters' main book is an illustrated guide to Hainan's medicinal plants and their uses in local *Li* ethnic medicine (Note 8). Like many other local and regional herbal medicine handbooks—a genre that was revived into national importance in the 1970s and 1980s—this handbook, *Anthology of Folk Herbals of the Li People*,[11] gathers photographs, names, and identifying information for several hundred Hainan plants, arrayed one or two to a page over 150-plus pages. After several visits to the Yang sisters' clinic in the county town, we began to realize that Sister Wang had been a very important consulting resource for the two textbook-writing sisters.

We were therefore surprised to hear Sister Wang say that she was illiterate. We found this hard to believe, especially as we admired her very orderly and well-labeled shelves full of herbs, both in the restaurant she runs featuring *Yao Shan* (药膳 medicinal meals) and at her home. What kind of knowledge does an unlettered local expert like Sister Wang command? It seemed uniquely tied to her home near one of Hainan's famously unspoiled mountain ranges. As we traveled in the area, we noticed, for example, that local usage in Hainan tended not to refer to medical work as *Kan Bing* (看病 treat illness), in the usual Chinese-language way. Rather, *Li* ethnic experts spoke of *Zhao Yao* (找药 finding medicines) to match the illness situations they must address. Wang said, "*Bing Ren Lai Wo Jiu Zhao Yao*" (病人来我就找药 When a patient comes, I find the medicine then). This mundane usage replaces a vision-centered contemplation of an illness object, or *Kan Bing*, with an embodied project of searching for apt tools, *Zhao Yao*. This effort to find the specific match to always-specific signs and symptoms departs from modern practice in both Western and Chinese medicine. Sister Wang no doubt felt that we would never understand just what this searching and finding really involved. Indeed, she has little confidence in anybody's ability to "understand" plants and illnesses, flavors and efficacies in her special way. Like other healers we have met, she used the word "understand" to distinguish those who can really find, see, relate to and use natural powers [both the *Xing Wei* (性味 nature and flavor) of herbs and the *Qi Hua* (气化 qi transformation)of physiology and pathology] from those who know chiefly through language and images.

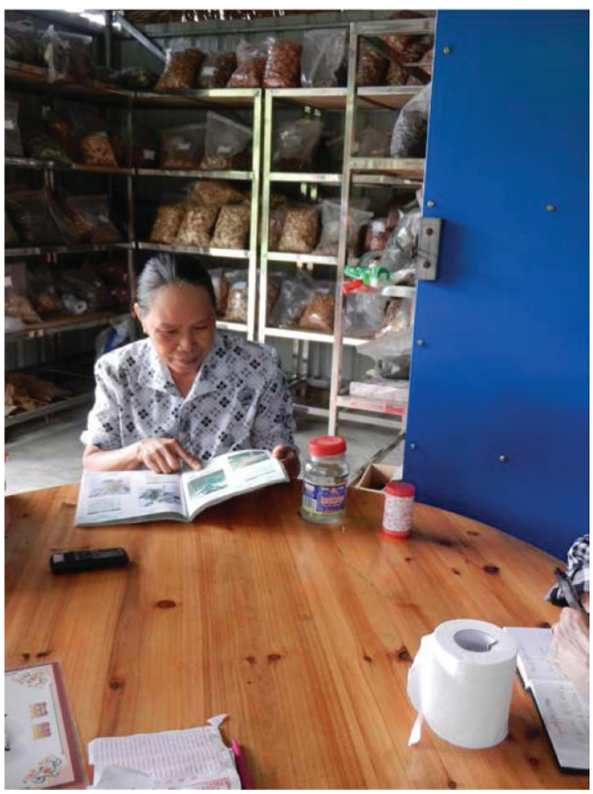

Figure 2 Sister Wang, field work picture taken by the authors.

Seeking to get a sense of how Sister Wang had been accumulating and sharing her expertise over many years, our colleague, a TCM herbal medicine specialist, sat down with her to go through the Yang sisters' pharmaco-botany text. Looking at the pictures, Sister Wang confidently rattled off useful information about every pictured item. At times she wanted to argue with the text, pointing out, for example, that a drawing for a certain plant was wrong or misleading. We could easily see what a great resource she must have been to the formally trained and rather scientifically oriented Yang sisters. She spoke of spending many days with them in past years, wandering in the mountains, identifying, photographing, gathering, and discussing plants. Nowadays she spends little time in town at their clinic because her contribution to the province-wide movement to develop Li ethnic medicine is long-standing.

But as we have hinted, Wang's understanding of local herbs is of a particular kind and different from what ended up in the textbooks. She was not, for example, interested in identifying or providing a rationale for the *Xing Wei* of the plants (Note 9). These classified properties were supplied with each item, provided by the authors and editors of the handbook. We still want to know by what means the Yang sisters and their editorial colleagues decided on the "proper" functional properties and classifications of all these previously unreported entities.

We do know how Sister Wang comes to understand the character of these local herbs and she accomplishes that through tasting them. She tastes them fresh, while gathering them, and teaches her daughter-in-law as they go to recognize particular types of plants and degrees of efficacy within each type. She compares herbs by taste, classifying together things with the similar qualities and efficacies that she infers in this process. She can then substitute different plants for one another, depending on availability, as she composes prescriptions. And she understands (without explaining to us, or perhaps even

to her disciple) how certain flavors meet and engage certain disorders and discomforts in human bodies. When we ask her to compare her process of recognizing and classifying drugs with that of the Yang sisters, she says, "when it comes to treatments and recipes, they couldn't do it without me."

This is not to say that the Yang sisters are bad doctors when they use local medicines. Visiting the Yangs' clinic and talking with the older sister (a former barefoot doctor) and people who were waiting, we could see that she is respected as an especially sensitive and even prescient doctor. Moreover, she also tastes the herbs. During one of our visits, she was recovering from gastritis that had resulted from her taste-testing an unfamiliar drug more toxic than she expected. Though she seemed physically fragile, she is, like Sister Wang, proud of her long history of wandering Hainan's mountains to find medicines.

Sister Wang has had similar experiences of incorporating the powers of medicines, putting her own body and health on the line as she finds herbs for the different manifestations of illnesses that come to her for treatment. Taste for her seems to be literal, having little access to writing, it would seem that she must bypass the standardized classifications of drug properties to keep idiosyncratic classification tables in her head, as it were. When she assembles a medical prescription, she doesn't weigh or otherwise quantify the amounts. Being at the same time a cook who runs a restaurant specializing in healthful foods, she works with food and medicine in a similar way, she harmonizes them with her own hands and stove.

4 Field note two: Master Li's healing magic

With Sister Wang's story, we have suggested that TCM's literate systems of herbal medicine, and formulary, pharmacology might be irrelevant for some practitioners' direct understanding of the subtle potencies of herbal medicines. An embodied knowledge of how to combine herbs and how to make a flavor-full therapeutic soup, is not only a feature of "ethnic" or "folk" medicines. All medicines in China, including TCM in the Han nationality, are committed to the principle of *Yin Ren Yin Shi Yin Di Zhi Yi* (因人因时因地制宜 treating in accord with specificities of time, place, and person). Even if the technicalities of flavor classification in Chinese medicine are not much emphasized among southern herbalists, their expert work can still be seen as quite similar to great cooking. Master Li, who when we met him was running a clinic of *Qiang* ethnic (羌族) medicine, did not use a written prescription or scale while assembling herbal prescriptions because according to him, "This is just like cooking. You can feel it in your hands. (Fig. 3)"

After the catastrophic 2008 earthquake in Sichuan, when the mountainside where his family home had perched was

Figure 3 Doctor Li, field work picture taken by the authors.

destroyed by landslides, Li Lao (the local people honored Master Li with the name Li Lao) was invited by the local health authority to run a clinic in the county hospital and this is where we first met him. He regularly goes farther up into the mountains in search of wild herbs and has transplanted and cultivated about 20 different kinds of herbs in the hillside ruins of his large Qiang-style stone house. Along with his transplanted varieties, he finds many different kinds of wild herbs in the partly reforested slopes around and above his mountain home.

His consulting room in the county hospital also housed his personal pharmacy. The walls were lined with dried herbs and powders sorted into plastic bins on large metal shelves. He had more than 200 different kinds. Unlike the usual *Kan Bing* practice in hospital clinics, where the doctor writes a formula on a prescription form for a pharmacy located elsewhere, Master Li exclusively used his own collection of medicines. After examining each patient, he would turn to look at the herbs on his shelves, mentally formulating his prescription in the process of seeing, grasping, and assembling small piles of processed herbs. He gathers what he needs by handfuls from the boxes and bins around the room. Like Sister Wang, he does not use a scale to measure the dosage. After he finishes assembling the herbs for one dose with every ingredient displayed separately on a sheet of newspaper, his youngest son and disciple, Li Junior, studies the "formula," quietly concentrating on the ingredients arrayed before him in piles. He memorizes the combination, then

proceeds to assemble the herbs for the second and third doses. Although the Li junior is a college graduate and quite literate in Chinese (his father is officially "illiterate"), he also gathers the herbs by hand and by memory without using a scale (Note 10).

Local people in this earthquake-stricken county refer to Master Li as a *Shen Yi* (神医 divine healer), an appellation that refers mostly to the unusual effectiveness of his therapies. Residents of a village near the county town all know how he brought a pancreatitis patient back from the edge of death with his amazingly effective treatments. Li Junior drove us to this patient's house for a visit, so we could better perceive the quality of Master Li's healing powers.

This village-dwelling mother and grandmother had stayed for 70 days in the tertiary-care provincial hospital, where her condition had been treated in many very expensive ways. Eventually, however, she was discharged by her doctors, who had decided there was little hope of a cure. Taken home by way of the county hospital, severe vomiting of blood induced circulatory shock. Everyone thought she was dying and her children bought her coffin and made funeral preparations. They brought her home, but three days later she was still struggling tenaciously at the edge of death. Master Li the divine healer was fetched by the families to make a last try at treating her illness.

It is worth noting that *Yi Xian Yan* (胰腺炎 pancreatitis) could have meant little or nothing to Li Lao. Even in mainstream TCM theory, the pancreas barely exists, and such internal organs are not usually thought of as the sole cause of symptoms. The illness that was presented to Li Lao by these *Qiang* villagers was not a diseased anatomical site, rather it was a pattern of severe symptoms involving the whole body, which needed to be engaged and nudged into more wholesome ways. Li Junior, introducing us to this complex case and the patient, explained a bit of his father's thinking: "when we first arrived at her bedside, her feet were swollen and her abdomen also looked very swollen. On top of this, the most urgent situation was her constant hematemesis, so the pressing matter of the moment was to stop this vomiting of blood. Otherwise, no medicine would work. If we succeeded, we could hope to carry on [and treat the more fundamental disorders]."

On that first visit, Master Li only gave the patient an herbal paste, administered externally, for stopping bleeding and told her family members, if there was any improvement, to come to his clinic the following morning for custom-made medicines. Leaving the patient in the early evening, Li Lao and his son went directly to their clinic, where they spent three hours working among their own herbal medicines discussing how to assemble a proper formula. This involved what drugs to choose and how the combination would take effect on what symptoms. The most challenging issue was the combination of swelling and bleeding, which demanded contradictory operations because to relieve swelling (a form of stasis in a digestive and circulatory system), one needs to promote qi movement. However, to stop bleeding, it is better for qi movement to be moderated. Second, given the patient's long-standing and excessive loss of blood, there was also a pressing need to replenish blood. Third, the relief of abdominal swelling, and the restoration of a proper downward flow of food and nutrients (Note 11), requires rather potent medicines, but the patient was too weak to survive any strong intervention. "These were all extremely delicate issues as we were wracking our brains," Li Junior told us.

Luckily, the patient's vomiting slowed after the herbal plaster was applied. Her family came the next morning for the first formula. Li Junior told us that, in such a severe illness, the first eight formulas are essential. Usually in Li Lao's practice, patients eat one formula of medicine for 7–10 days, but in this case each formula was used only for three days. Each successive formula was revised after the doctors' close observation of how the patient's body was responding. Li Junior told us in detail, for example, of another "delicate" moment:

> "After taking the third formula [successfully] for three days, the patient's condition suddenly became aggravated. She had begun to vomit blood-streaked black-watery stuff, which was a very bad sign. If she suffered this kind of bloody vomiting again, my father would not be able to bring her back to life again. We rushed to her house immediately, inquiring about what she had eaten. The family finally admitted that, in addition to her medicine, she had eaten four fermented soybeans."

Li Lao revised the third formula, focusing on stopping bleeding and suppressing coughing while addressing pain, dysuria, weak heartbeat, and respiratory problems. These are all signs of disorder in the regular downward flow and upward transformation of qi, blood, and nutrients. Li Junior lamented how hard it had been "to combine and mobilize all the drugs in the formulas to work on those intertwined situations."

This "intertwining" was taking place as the patient slowly recovered while Master Li and his son monitored interactions between the body, medicine, and food. She confessed to them that she had felt so much better after the first two formulas that, by the time of the third dose, she had really wanted to eat some food with flavor. But just four fermented soybeans, with their complex flavors, triggered a serious bodily reaction. Apparently the efficacies of food and medicine really can be thought about in the same way, they "have the same source." One principle that governs the intertwining of symptoms and of drug powers is *Wei Dao* (味道 flavor).

5 The potency of flavor

Doctors of ethnic medicines, such as Li Lao and Sister Wang, and practitioners of TCM know their plants' efficacies even as they continue to experiment with them. The five flavors in TCM are first identified by taste, that is, by

human sensory organs' reaction to contact with drugs. Then, they are abstractly summarized as "the five flavors," classificatory rubrics that guide practitioners as they combine different plants according to the five-phase system. Experts work with principles such as sour constricts, bitter firms, sweet replenishes, pungent disperses, salty softens. These functions make reference to processes of qi transformation. It is suspected that practitioners in ethnic areas follow similar general principles even though both Sister Wang and Master Li lack formal training and are thought of as illiterate. When it comes to making out prescriptions, unlike college-trained Chinese medicine doctors, they do not presume the conventionally assigned flavors of each plant according to the *Xing Wei* found in TCM classics such as *Yao Xing Fu* (《药性赋》 *Poems of Medicinal Propensities*) and *Tang Tou Ge* (《汤头歌》*Soup Recipe Songs*). Their knowledge comes from bodily practices of collecting, tasting, processing, and combining medicines, as they learn from both their successes and their failures with patients. At the time they are first gathered, the quality and flavor of drugs are not self-evident. "Knowing" them requires not only the doctors' own bodily perceptions but also a considerable period of rather experimental clinical application. To a great degree, the skills of southern ethnic doctors in tasting the flavors of plants require more than just sensory perceptions. Their knowledge is cultivated through long-term and not only individual experiences of gathering, tasting, mixing, and putting drugs to use. This concept is also seen in "traditional" knowledge that is passed down from seniors to disciples is more experiential rather than formal or systematic (Fig. 4). To the doctors who are known as "herbals kings" and "miracle doctors," the efficacy of their healing strategies is related to their skills of combining drugs but also dependent on the quality of the plants (the potency of their flavor) and the qualities inhering in bodies (those of both doctors and patients). This is significantly different from the expertise of an academic TCM expert who memorizes the famous medical classics (Note 12).

In southern ethnic areas, there are many doctors who, like Sister Wang and Master Li, do not rely heavily on written materials. Their medical expertise tends to be passed on in verbal form and remembered through habituated practices. Seeking to understand this local difference, we asked a number of those we interviewed how they knew what "flavor" any of their special wild medicines "belonged to." Though many of these interviewees considered themselves to be primarily *Cao Yi* (草医 herbalists), and though many of them do consult a few published materia medica sources, most were uninterested in telling us how they classify their drugs according to flavor and other standard characteristics. Was this a matter of "keeping secrets" from outside researchers, as some of our local research partners suspected? As researchers, we tried to respect herbalists' confidentiality and appreciate their sense of the hard-earned value of their formulas and ideas.

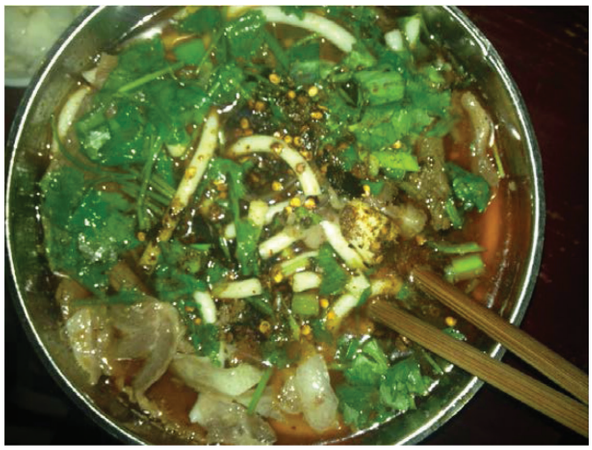

Figure 4 A rice noodle soup, field work picture taken by the authors.

However, we gradually realized that doctors' silence is often not about confidentiality, privacy, or secrets, but rather a function of our own research questions, which had come from rather different knowledge systems than southern ethnic knowing practices. Consider Sister Wang: she insists on tasting all her medicines, but the flavors she tastes might not accord with the "four qi and five flavors" written in Hainan's official materia medica handbook. As she pointed out to us, the book's explanations are too general to be practical, and so are the suggested flavors and dosages. For instance, when one drug displays flavors both bitter and pungent, how should you decide which flavor is to be taken into primary consideration in making the prescription? When we ask these local healers to describe their own system for assigning flavor properties, they have to remain reticent: their work is all about doing instead of saying. While college-educated researchers suspect the ethnic doctors of "keeping secrets," the doctors wonder if we can really *Dong* what they do. Our willingness to communicate with them symmetrically and on an equal footing is beside the point.

In Chinese medicine pharmacology at present, the emphasis is on the laboratory analysis of chemical components of medicinal plants. This is remote from the understanding of local herbs that is enjoyed by southern herbalists. These ethnic medicine doctors have gone far beyond the dichotomies of nature/culture, body/mind, object/subject, and knowledge/practice on which scientific pharmacology is founded. Since their knowing practice is beyond being explained in language, they appear to be unwilling to reveal the "secret." But neither Sister Wang's daughter-in-law nor Li Junior would consider their mentors' relative silence to be "keeping secrets." They understand perfectly that learning the qualities and efficacies of drugs is a long-term process of immersion and comprehensive training. Sister Wang as she talked with us always asked, "Do you understand?" She did not seem to have much hope that we researchers, who visited her only a few times, would be able to truly understand anything.

In our conversations with herbalists, we found that "flavor" was being used in several different ways. Some healers insisted that every natural drug had its own unique flavor – not just one of five possible flavors, or types—and that combining herbals into soups was a personal skill quite like cooking, pushing beyond all classifications, formularies, and recipe books. We are attracted to this "food and medicine have the same source" approach. After all, even in TCM, "five flavors" is only a suggested guide that can inform practitioners' efforts to combine drugs in accord with organ systems correlations and all manner of other (fivefold) expressions of organic process. But there is no substitute for experience: "This is like cooking; you can feel it in your hands."

6 Conclusion

Flavor, as Vivienne Lo points out, has been associated with potencies from a very early time in China. The manipulation of flavors links to a history of nourishment ideas that echoes today through everyday life across the country.[14] The shared sources of food and medicine invite practitioners to cook with flavor, to achieve an inspired mixture, a wise and skilled *Pei* (配 combination) and *He* (和 harmonization). Both healer and cook are able to combine flavors to directly address, and, through the human faculty of taste, share our hungry or uncomfortable embodiment. Further, the five flavors are not a mere sensation confined to the mouth. They are forces that bring about physiological results. Flavor both expresses the healer's hard-won experience and wisdom and addresses the patient's particular needs and situation. And it is not the flavor of each drug itself that really counts. Rather, it is the mixing of several that is truly, brilliantly efficacious. A miraculously effective drug formula developed by a local healer, once cooked up in a soup at home, cares for the patient's whole body of intertwined flows.

This article attempts an anthropology of the concrete that treats Chinese pharmacy as "an elaborate science of tangible qualities."[5] Flavors with their concrete qualities both classify medicinal and nutritional substances and name their concrete sensory, material characteristics. Both healer and cook understand and use flavor more with their hands, eyes, and mouths than with their minds and books and notes. Healing and cooking are simultaneous understanding and action that unite knowledge and experience, power and knowledge.

Notes

Note 1: In this article, there is a liberal understanding of "Yao Shi Tong Yuan" that is somewhat different from the existing medical texts, especially our attention to the cooking metaphor which is inspired both by ethnographic experiences and the early texts of the Shang and Zhou dynasties which go beyond medicine per se.

Note 2: Lo also indicates that medical historians prefer to translate Wei as "sapors" to emphasize the medical rather than culinary denotations of the term.[7] For the purpose of this paper, we use "flavors" is used to emphasize the blurred boundaries between food and medicine in Chinese cosmology.

Note 3: Judith Farquhar has discussed the flavor terms extensively in an earlier publication.[8]

Note 4: One need only look at Europe's foundational text of gastronomy, Jean Anthelme Brillat-Savarin's *The Physiology of Taste*, and his translator M. F. K. Fischer's worshipful extensions of his insights, to see the fundamental dualisms of nutrition vs. flavor, substance vs. appearance, which underpin the modern European experience of flavor.[9]

Note 5: Other kinds of combining expertise are also valued, such as the coordination of needling and massage techniques, or rituals and herbals, achieved by healers with excellent reputations. But for this paper we will explore only the herbal medicine versions of the combining of flavors is explored.

Note 6: The skill of combining drugs is not just acquired from experience of "gathering medicines in the mountains." These abilities tend to be developed over years, through apprenticeship relations with mentors and through personal experimentation with healers' own bodies and with the stubborn illnesses that seek out a "folk healer."

Note 7: See our discussion of this problem of "theory" in *Gathering Medicines*.[10] We thank Ma Kejian for wise tutelage on this issue.

Note 8: Both of the Yang sisters were on the editing committee of this volume, and they are generally credited with being the chief authors of its content.[11]

Note 9: In keeping with the argument of this chapter, we would be inclined, following Jullien, to translate *Xing* as propensities. Joseph Needham translates the term for ancient Chinese science as "inherent nature," in a context where he emphasizes the *Shi* (势 propensities) of each of the myriad things to seek out a certain place and show affinities and antipathies with certain things. This is a vision of the active specificity of all things that Needham draws on (and extends into his own vision of "organicism) from his reading of Zhuangzi and his contemporaries, the "Daoist school."[12] Further, A.C. Graham in a discussion of the word *Xing* (*hsing*) as it appears in the same early sources ends up translating the word as "nature." From the Zhuangzi, he defines it as "the course of *Sheng* (生 life) proper to a thing."[13]

Note 10: Among the more than 40 herbalists we met and interviewed at length in field research between 2005 and 2010 in southern and southwestern China, Sister Wang and Master Li were the only two who were officially classified as *Wen Mang* (文盲 illiterate). They were not, however, the only such healers who had a very organic and direct relationship with plants. Their practice holds lessons for all herbal medicine, however "educated" or mainstream it might be.

Note 11: For Chinese medicine physiology, *Yin Shi* (饮食 food) is not *Jing Wei* (精微 nutrients) until it is transformed by the digestive system ruled by the spleen/stomach system and *San Jiao* (三焦 three burner) processes. This transformation impresses us as a further cooking process that extends the work that is done in kitchens and pharmacies to produce flavorful soups.

Note 12: We recognize that the world of TCM offers many opportunities to doctors both young and old to learn from experience. There are probably very few practitioners above a certain age who operate a "textbook" TCM practice, and every respected doctor we know in TCM clinics, hospitals, and classrooms is explicit about being on a path of lifelong learning from their many encounters with illnesses and patients, drugs and food.

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Ethical approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

Author contributions

LAI Lili drafted the manuscript. Judith Farquhar revised the manuscript. Both authors contributed to the conception and design of the article and interpreting the relevant literature, reviewed the manuscript.

Conflicts of Interest

The authors declare no financial or other conflicts of interest.

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Sensing as Knowing: Medicines, the Senses, and Practical Expertise in Late Imperial China

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Abstract

The development of the medicinal trade and markets in late imperial China increased anxiety among scholarly physicians about the authenticity of medicines. Even though the market was typically depicted by scholarly physicians as a place full of tricks and deceptions, it was a repertoire where practical knowledge about authentication was created and circulated. The specialized knowledge was mainly transmitted through oral tradition. But in some instances, it was also written down by scholarly physicians or merchants, allowing us to reconstruct the techniques and their underlying rationales. Authentication of medicines mobilized multiple sensory perceptions of the human body, consisting of observing, tasting, smelling, touching, and performing small tests. All these techniques played different roles in the practice of authentication. Even though these sensory techniques seemed like a collection of trivial and practical records without any coherent rationales, an underlying episteme could be detected through a close investigation. Merchants and practitioners in the market did not understand the nature and materiality of medicines by any established theories. Instead, they actively engaged with the tangible form of medicines through the senses and bodily techniques. This sensory form of knowing indicates a type of practical expertise that is distant from the scholarly tradition of materia medica in late imperial China.

Keywords: Authentication; Market; Medicines; Senses; Practical expertise

> "Those who sell medicines have two eyes, those who prescribe them have only one eye, and those who take them have no eyes at all."
> Chen Jiamo (陳嘉謨), *Ben Cao Meng Quan* (《本草蒙筌》 *Enlightening Primer of Materia Medica*), 1573[1]

1 Introduction

A 16th-century work of *Ben Cao* (本草 materia medica) gave this wise advice in its introduction. For the next three centuries, this proverb had been quoted in multiple compilations and primers of *Ben Cao* in late imperial China. Indeed, most works of the *Ben Cao* published in the Ming and Qing periods were written by and for medical practitioners or elite readers who fell into the categories of "those who prescribe medicines" and "those who take them." In this regard, knowledge about the authenticity of medicines should be as crucial as their therapeutic value. However, the former kind of knowledge did not always stand out as a significant aspect in most printed *Ben Cao*. How could we approach the knowledge of authenticating medicines? Why did it matter? Was it ever recorded in any genre? How was it practiced? These are the first set of questions I intend to explore in this essay. The metaphor of "eye" in this proverb gives another hint. It implies that eyesight is susceptible to deceit, making it an unreliable authentication method. But what about other senses? The medicines and medicinal markets in late imperial China were a world of sensory knowledge that has not yet been fully exposed. This paper also attempts to investigate this realm of senses and its role in knowing medicines.

Senses, or the practice of sensing, are indispensable to both ancient and modern medicine.[2] While most relevant studies in Chinese medicine focuses on the use of sensory techniques in diagnosis,[3] this study turns to materia medica, another prominent aspect in which the senses are widely discussed and mobilized. Not only in China, but also in Europe, India, and the Islamic world, drugs and foods were historically evaluated by either taste or smell, or both.[4] These sensory qualities were thought to be indicators of their therapeutic virtue. *Wei* (味 taste/flavor) occupied a central place in Chinese *Ben Cao*. In the ancient lore of Divine Husbandman (神农), he tasted herbs and encountered 70 poisonous substances.[5] Even though some scholars may use these cases to argue that Chinese medicine was and still is an experience-based science, it is clear the tastes of medicines in *Ben Cao* do not coherently correspond to their actual flavors. It belongs to a unique style of philosophical thinking called "systematic correspondence," in which flavors,

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colors, climates, seasons, viscera, senses, and other natural and bodily things are interconnected within a five-phase system.[6]

The primacy of sight in early modern Europe on one hand downplayed the status of taste and smell, and on the other hand privileged the significance of visual culture in the study of natural history.[7] The lack of true-to-nature illustrations in Chinese *Ben Cao* was thus considered a backward feature of premodern Chinese "science." Nonetheless, recent studies tend to treat Chinese *Ben Cao* on its own terms, discovering its unique mode of knowledge production, categorization, and "innovation."[8] Other than the long genealogy of scholarly *Ben Cao* tradition, the vernacular mode of knowledge production stands out as another important topic in the study of Chinese medicines. These studies have uncovered a previously neglected aspect of Chinese medical knowledge, further articulating a set of latent yet crucial changes that occurred in China's early modern epistemic realm.[9]

This study aims to explore the sensory techniques used in the authentications of medicines during late imperial China, a period spanning from the 16th to 19th centuries. Instead of theoretical concern about the nature of drugs, it emphasizes the tangible and sensory properties of medicines, including shape, surface, color, smell, and taste. It argues that the body and the senses were key epistemic apparatus for practitioners to authenticate and to construct the materiality of medicines in the market. Even though the sensory practice seemed like a collection of trivial and pragmatic records without any coherent rationales, it reflects a practical expertise toward medicinal substances. Practitioners in the market did not understand the nature and materiality of medicines by any established theories but through an intimate connection with the tangible forms of the medicines and their properties.

2 Markets and fake medicines

The need for authenticating medicines rose alongside the development of the market. Since the 16th century, the commerce and market economy in China had developed into an unprecedented state. Vibrant trade facilitated the flow of commodities, including medicines, between different regions of the empire. The expansion of commercial and urban culture expedited an increasing demand for medicines. Not only the commonly used drugs but also new and exotic medicinal substances were brought from the borderland and coastal ports to the economic heartland. The commercialization and monetization of the medicinal trade conjured up a sense of uncertainty and crisis among scholarly physicians who mostly came from the community of learned literati and gained medical knowledge through reading books. They valued the theoretical knowledge from medical classics and also considered themselves bearing a highly moral burden of saving people. From their point of view, wholesale traders, peddlers, vendors, and brokers in the medicinal market were commonly depicted as greedy merchants who solely cared about profits rather than the quality of medicines. The unethical deeds further discredited the market as an unreliable source of knowledge. Scholarly physicians in late imperial China repeatedly emphasized the urgency to reclaim their authority over pharmaceutical knowledge, thus keeping the medical profession from being ruined by untrustworthy merchants.

Many medical writers suggested that one should take special caution when buying medicines. A 16th-century *Ben Cao* primer, *Ben Cao Meng Quan* advised one should "distinguish the fake from the genuine when buying medicine." After quoting the case of fake medicine from the *Ben Cao Jing Ji Zhu* (《本草经集注》 *Collective Commentaries on the Classic of Materia Medica*), the author further enumerated more than a dozen of malpractice he observed in contemporary market. Three categories of tricks employed by merchants can be identified: the manipulation of inferior medicines into a state resembling the superior kinds; the use of cheap substitutes for expensive medicines; adulteration of fake and inferior materials.[10]

This enduring sentiment among scholarly physicians survived the dynastic change in the mid-17th century and continued to prevail during the Qing dynasty. After the fall of Beijing in 1644, the Ming loyalist Li Yangang (李延罡 1628–1721) escaped to Jiaxing, where he practiced medicine for a living. He accidentally acquired a manuscript on the nature of medicines authored by a little-known physician in the late Ming dynasty. Deeply impressed by its innovative interpretation of medicines, Li decided to publish it with a piece of his own introductory essay in 1680. In Li's essay, he wrote a part titled "On Genuine and Fake Medicines."[11] He lamented that physicians in his time solely relied on market for the supply of medicines. Since they no longer prepare medicines themselves, they possessed little knowledge about the authenticity of drugs. Most cases of fake medicine he recorded were directly copied from earlier works, but Li further complicated the meaning of fake medicine. A fake medicine could be a different kind of herb, but in other cases, it also denoted medicinal substances collected from a different (non-authentic) place, taken from the wrong part of plants, or processed by unskillful hands. All these signified inferiorities in their therapeutic value.

A decade later, Wang Ang (汪昂 1615–1694), a scholarly physician from Anhui province, published an enlarged version of his best-seller *Zeng Ding Ben Cao Bei Yao* (《增订本草备要》 *Essentials of Materia Medica, An Enlarged version*) in 1694. He decided to add one paragraph at the end of the general introduction:

> "If one herb does not come from its authentic native place, its value will be reduced; if adulterated in the markets, the property and taste will be completely altered; if not collected in the correct season and time, the quality will be degraded; if the part of the plants is mistaken, the drugs will not be efficacious; if not delicately processed, the therapeutic value will not be fully achieved."[12]

Wang expressed a similar idea to Li's. The decline of the traditional practice of preparing medicines among doctors gave rise to a deep concern among scholarly physicians about the authenticity of medical substances in the market. They considered the malpractice in the market and the ignorance of mediocre physicians as two sides of the same coin, both deteriorating the therapeutic credibility of medical practitioners. For them, the knowledge about the authenticity of medicine was too important to be solely controlled by merchants. They suggested, just as the famous medical writer Xu Dachun (徐大椿 1693–1771) once appealed to the practitioners of his time: "Physicians must prepare medicines themselves!"[13]

All these elite discourses appeared at the turn of the 18th century when a new surge of commercial expansion spread all over the new empire after a temporary interruption during the Ming-Qing transition. This new period witnessed the formation of an integrated market system for medicinal trade in China. Several specialized market towns for medicines rose respectively in the north and south parts of the Qing empire, connecting the main trading routes where medicines from different regions circulated. Commercial pharmacies rapidly spread over most cities and market towns, making all kinds of medicines from remote lands readily available for urban consumers. The rising demand for medicines caused a decrease and even exhaustion of natural resources in many traditionally recognized regions. New sources of medicinal plants were founded, and herbal cultivation also grew in old areas of production. These new and lower priced substitutes appeared in the market, and further complicated the situation for both merchants and physicians.

3 The problem of authenticity

A renowned serial medical publication in the medical community of Suzhou, *Wu Yi Hui Jiang* (《吴医汇讲》 *Collected Notes of Suzhou Physicians*) provided two impressive cases that reflected the difficulty of identifying herbs in the market. The period of its compilation and publication covered nearly a decade, from 1792 to 1801. The whole collection gathered 143 short essays from 40 physicians from Suzhou, covering a wide range of topics from therapeutic discussion to medical ethics.[14] Tang Xueji (唐学吉), a medical superintendent of Wu County, was the only one who devoted several notes to discussing medicines, focusing not only on therapeutic value but also on authentication. He had once traveled to Sichuan in his 20s, where he got a chance to examine several local herbs. These herbs were also sold in the pharmacies of Suzhou. The identity of several kinds, according to him, was mistaken.[15]

The first herb Tang discussed was a purple resin called *Zi Rong* (紫茸). He referenced a pediatric manual from the 13th century, arguing the *Zi Rong* was the seedlings of *Zi Cao* (紫草 Radix Arnebiae). This herb had been applied in formulas for smallpox since the Song dynasty. In the Qing dynasty, the usage of *Zi Rong* increased with the establishment of the *Dou Ju* (痘局 Smallpox Bureau), official institution for promoting variolation in multiple localities. The *Zi Rong* Tang found in the local pharmacy of Suzhou, however, was in fact a purple resin. He thus felt the urgency to clarify the real identity of the herb to avoid incorrect usage of the substance.

The other case was a herbal tuber, *Yu Jin* (郁金 Radix Curcumae). Sichuan province used to provide high-quality wild-grown *Yu Jin*, which had a blackish color. With the exhaustion of natural sources, it had been rarely found during the late 18th century. However, Tang pointed out Suzhou pharmacy ignorantly took another herb, *E Zhu* (莪术 Rhizoma Curcumae), as wild *Yu Jin*, since the two herbs looked similar. Cultivated *Yu Jin*, the dominant type in the market, had white skin and yellow core. People in Suzhou, Tang asserted, mistakenly recognized it as *Jiang Huang* (姜黄 Rhizoma Curcumae Longae).

The two cases epitomized two ways in which marketization imposed thorny questions concerning the identity of medicines. First, as more and more exotic medicines from remote land were brought to the market, physicians encountered contradictions between medical commodities and *Ben Cao* texts. Tang was not the only one who questioned the identity of *Zi Rong*, also referred to as *Zi Cao Rong* (紫草茸) in some cases. It is evident that *Zi Rong* recorded in medical works before the 16th century was stems and roots from a particular herb.[16] However, physicians and medical authors during the 17th and 18th centuries noticed that this name was instead associated with a purple resinous substance in the market. Known as lac or *Zi Jiao Jie* (紫胶蚧 Kerria lacca) at present, it is the resinous secretion produced by an insect native to South and Southeast Asia.[17] It was newly introduced to China from India and Cambodia in the 17th century.

Second, the rise of cultivated species on one hand led to confusion among similar herbs, and on the other hand raised the value of rare wild-grown species. This further stimulated the adulteration of cheap substitutes for high-priced medicines. All the three herbs mentioned in Tang's second case belong to the curcuma genus in modern botanical terms. They were easily misrecognized even by experienced practitioners. Since the 8th century, medical authors had offered ways to differentiate them by observing their distinct colors.[18] Li Shizhen (李时珍) provided an alternative method: *Jiang Huang*

resembled the shape of dried ginger, while *Yu Jin* was analogous to the belly of cicada.[19] This method was frequently cited by medical authors in the Qing dynasty. Given that cultivated *Yu Jin*, which had a similar color to *Jiang Huang*, dominated the market, the new method proposed by Li was more feasible than the traditional color differentiation.

What else can we learn from these cases? Scholarly physicians, who were self-depicted as a prestigious group of medical practitioners, had to take mundane practice in the markets seriously. Even though they tended to despise market practice as full of trickery and deceits, it was also a repertoire they could also acquire new knowledge for "an ever-expanding pharmacy."[20] The need for authenticating medicines emerged with the commercialization of medicinal trade, yet the solution of it was ultimately acquired by consulting the practical knowledge among merchants and dealers in the market. Tang resolved his confusion by examining the substances both in the markets and the producing area. Regardless of all the controversies surrounding the *Zi Rong*, the newly introduced lac soon dominated the market and was then widely used to treat smallpox in Qing China, being the sole medical substance connected with the name *Zi Rong*. The similarity among the three curcuma herbs urged medical practitioners to record multiple methods to differentiate them. Except for Li Shizhen's approach, another author in the late 17th century offered an alternative examination of genuine *Yu Jin*: by simply grinding off a small part of the herb, those that had greenish color inside were authentic.[21]

These practical know-hows increasingly appeared in medical works, including *Ben Cao*, formula books, and medical notes, reflecting a growing concern among physicians on the authenticity of medicines. Such knowledge already appeared sporadically in many *Ben Cao* texts compiled during the medieval period, but they only focused on several precious and exotic items. In the late imperial period, however, the necessity for authentication had expanded to the most commonly used medicines in the market. Some of the knowledge was inherited from earlier texts, and many of them were newly written down by late imperial authors. Before venturing into this newly grown area, I will first introduce the main sources I used to reconstruct the intimate knowledge generated and circulated in the medicinal market.

4 Practical guides

Modern scholars of Chinese medicine tend to separate the knowledge within *Ben Cao* into two distinct types: the natural and the therapeutic. Natural knowledge of medicines includes their morphological description, producing area, harvesting and storage methods, and ways of authenticating and processing. Therapeutic knowledge refers to the healing properties of medicines, like qi, flavor, and main indications. *Ben Cao* texts after the 16th century, as argued by many scholars, was mostly therapeutic-oriented, with special focus on the discussion of therapeutic quality and clinical usage.[22] They were designed either as manuals for new learners or as a synthesis of the author's clinical wisdom. The methods of authentication, along with other kinds of natural knowledge, were largely omitted.

Comprehensive *Ben Cao* works like *Ben Cao Pin Hui Jing Yao* (《本草品汇精要》 *Essentials of Materia Medica Distinctions*), the state-commissioned pharmacopeia of Ming dynasty in 1505, had designed 24 subsections under each item, two of which were named *Yong* (用 parts for medicinal use) and *Zhi* (质 shape and texture). The content under these two subsections documented specific features that were used to identify superior medicines. Moreover, *Ben Cao Gang Mu* (《本草纲目》 *The Grand Compendium of Materia Medica*) had also recorded a considerable amount of authentication knowledge, which supposedly came from Li Shizhen's own experience. However, both compilations were too large to be used as first-hand guides in everyday practice and the former was not accessible for common practitioners in the late imperial period. The texts I'm going to investigate in this section cannot fall into a single category, but they similarly dedicated most or a major part of the content to the knowledge of authentication. Instead of comprehensive compilation, they were accessible and handy manuals that served as practical guides for either scholarly physicians or medicinal merchants.

Many modern traditional Chinese medicine researchers assume that the first published monograph dedicated to the authentication of medicines appeared at the turn of the 20th century. Zheng Xiaoyan (郑肖岩), a physician in Fujian province, was the first to write a book on this topic. In his *Wei Yao Tiao Bian* (《伪药条辨》 *Systematic Differentiation of Fake Medicines*), Zheng accused merchants and apothecaries of using their expertise to manipulate medicines. "Merchants are extremely greedy…They take the fake for the genuine, the cheap for the superior."[23]

Zheng Xiaoyan finished his work in 1901. For its publication, Zheng approached his friend Cao Bingzhang (曹炳章). Cao, a renowned physician in Shaoxing, was delighted to read Zheng's work. He further added his own annotations to each item and published it in a prestigious medical journal, *Shao Xing Yi Yao Xue Bao* (《绍兴医药学报》 *Shaoxing Journal of Medicine*), where he served as the chief editor. In his forward, Cao divided adulterations into two categories. First, in small businesses, merchants always use cheap substitutes with a similar appearance to adulterate the higher-priced medicines. Second, in big pharmacies, apothecaries valued medicines by their appearance rather than therapeutic efficacy.[24]

Even though Zheng and Cao's work remained the first comprehensive work on fake medicine in Chinese history, it does not mean that relevant information only became

popular at the end of the 19th century. Many types of genres, including *Ben Cao*, recipe books, botanical and zoological records, literary sketches, and local gazetteers in the Qing dynasty all consisted of multiple descriptions of medicines and the ways of authentication. An outstanding example was Zhao Xuemin's (赵学敏) *Ben Cao Gang Mu Shi Yi* (《本草纲目拾遗》 *Supplement to The Grand Compendium of Materia Medica*). In preparing the book, Zhao consulted more than 500 books, consisting of both medical and nonmedical titles, and sought information from more than 100 people, mostly local elites, physicians, and even common folks.[25] One of the unique groups of work was the herbal medicine literature. The *Bai Cao Jing* (《百草镜》 *Mirror of the Hundred Herbs*), a work on the local herbs in Zhejiang, was one of the most cited works in *Supplements*.[20] Works like *Cai Yao Lu* (《采药录》 *Records of Medicinal Harvest*) were concerning the knowledge of identifying medicinal plants in the natural environment. Other three titles, the *Yao Bian* (《药辨》 *On Distinguishing Medicines*), *Yao Jian* (《药检》 *On Examining Medicines*), and *Shi Yao Bian Wei* (《识药辨微》 *On the Identification of Medicines and Their Subtleties*), were most likely to be practical guides on the authentication of medicines.[26]

None of these works are extant today, which indicated that these herbal handbooks were probably circulated in manuscripts. Even more practical information on medicines was transmitted through oral account, gathered by Zhao through his real-life encounter with multiple practitioners.[20] Fortunately, there is one such manuscript preserved in the Unschuld Collection in Staatsbibliothek zu Berlin. The handbook, titled *Cai Yao Chu Chan Zhi Nan Quan Juan* (《采药出产指南全卷》 *A Complete Guide on the Producing Area of Medicines*, hereafter *Complete Guide*), was possibly in use during the late Qing and Republican period, owned by a merchant named Zhang Guozhong (张国忠).[27] (Fig. 1) It consists of 262 items, each with a list of producing area(s), the quality of products from different regions, and practical information on authentication. This manuscript is a rare source that was once actually used as a practical guide in the medicinal market. It provides a valuable source to probe into the mercantile knowledge and authentication of medicines.[28] Relevant information can also be found in earlier works. A 1707 recipe collection, *Jing Yan Dan Fang Hui Bian* (《经验丹方汇编》 *A Compilation of Tested Formulas*) authored by Qian Jun (钱峻 ca. early 18th century), attributed adulteration to ignorant buyers who were more interested in low price than in quality. Therefore, the author dedicated the first part of his work to the knowledge of authentication. He claimed that all the methods, 59 items in total, were tested by himself.[29]

A final group of works was manuals and monographs on individual medicines like ginseng and cinnamon. With the rise of ginseng as a high-demand panacea in the Qing dynasty, monographs on ginseng started to appear in the mid-18th century. Some of them showed the literati's interest in collecting historical and literary sources on ginseng, and others presented rich practical knowledge of the ginseng trade. Tang Bingjun's (唐秉钧) *Ren Shen Kao* (《人参考》 *A Treatise on Ginseng*) and Huang Shucan's (黄叔灿) *Shen Pu* (《参谱》 *A Record of Ginseng*) are particularly useful in constructing the empirical knowledge of ginseng trade. Tang made his living by practicing medicine and Huang was a ginseng merchant. They both lived and practiced near Suzhou, a major market for the transaction of ginseng, where they had the chance to observe or even engage in the trade themselves. Huang, as a merchant himself, claimed that his work originated from a conversation with a veteran in the ginseng business, reflecting a great deal of secret knowledge that was previously only possessed by insiders.[30] A similar monograph could be found about cinnamon, an herb cherished in the southern part of China as a panacea. Around 1887, Zhang Guangyu (张光裕), a local scholar from Chenzhou, once lived at the border area between Qing China and Vietnam. During his sojourn, he was able to conduct a broad survey on the cinnamon production. Two years later, he finished a book on the topic and put it into print.[31]

The main difference between these practical guides and mainstream *Ben Cao* was that they were handy rather than comprehensive, practical rather than theoretical, designed for everyday use rather than collecting a plethora of information. All the authors mentioned above proclaimed that their works contained practical expertise gained from experience. Furthermore, Zhang Guozhong and Huang Shucan, as insiders of the medicinal business, unveiled the "secrets" once only circulated among practitioners. Together, all these sources provide a vantage point for modern scholars to explore the rich vernacular realm of knowledge that previously had not been circulated in texts.

5 Sensory techniques in authentication

Before examining the sensory knowledge and techniques for authentication, I need to address a basic but important question: what were medicines in late imperial China? There were two types of common medical substances known in markets and pharmacies. The first was *Sheng Yao* (生药 crude medicines) derived from medicinal plants, minerals, or animal parts. The second was *Shu Yao* (熟药 prepared medicines), which were processed remedies including bolus, powders, plaster, and pellets. The prepared medicines usually underwent a series of complex processing procedures which turned the crude materials into readymade medicines that, in most cases, could be directly taken by patients. Crude medicines, also known as *Yao Cai* (药材 materials for medical use), are the main form of medicines I discuss in this paper. However, the name "crude medicines" did not necessarily mean it was "raw" or "natural." They were not fresh herbs or natural ores, but marketable merchandise that

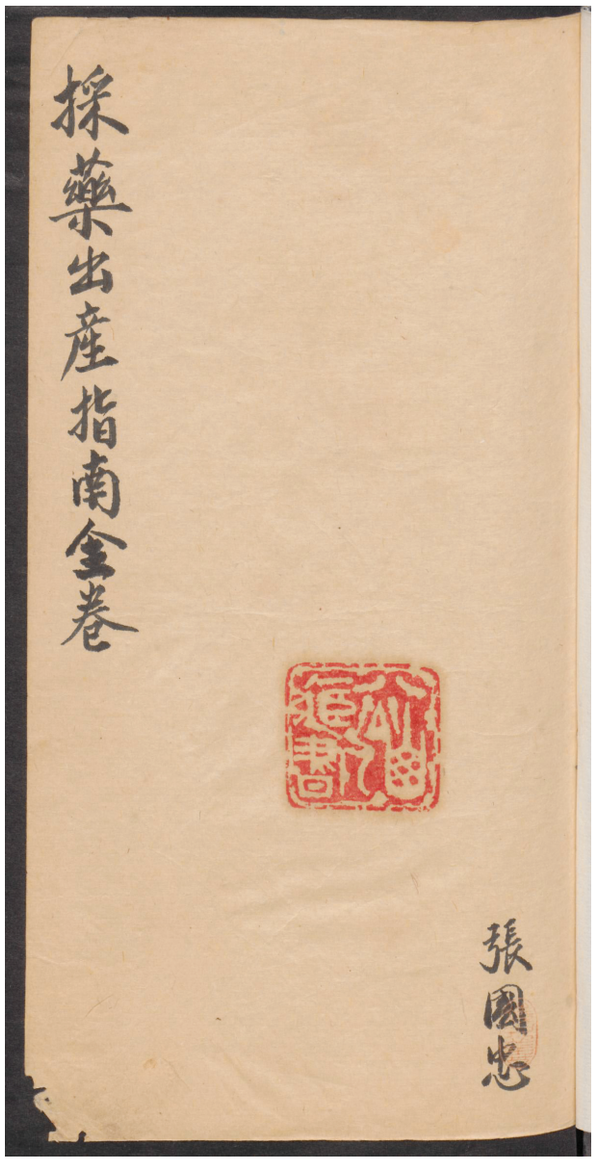

Figure 1. The cover page of *Cai Yao Chu Chan Zhi Nan Quan Juan* (《采药出产指南全卷》 *A Complete Guide on the Producing Area of Medicines*), courtesy of Staatsbibliothek zu Berlin – PK. (source from: https://digital.staatsbibliothek-berlin.de/werkansicht?PPN=PPN3346233030&PHYSID=PHYS_0007).

had gone through a whole set of technical procedures like desiccating, trimming, cutting, slicing, categorizing, and embellishing. In this regard, authentication of medicines in the market had much difference from identifying herbs in the natural environment. They called for distinct expertise and experiences in mercantile goods rather than in pure botanical traits.

5.1 Visual observation

As the epigraph suggested, eyes were not reliable in examining medicines. Since the trickery of merchants were mostly imitating the appearance of genuine medicines, eyesight alone could not determine the authenticity. Nonetheless, visual observation still constituted a considerable part of authentication techniques. One needed to scrutinize the color, shape, and particular characteristics of medicines to estimate their quality. The aim of the observation, in most cases, was not to distinguish the genuine from the fake, but to tell the superior from the inferior. Qian Jun advised that one should examine the entire body before medicines were cut up into pieces.[32] Zheng Xiaoyan agreed on this point since the shape, color, smell, and taste would be altered after cutting or grinding.[33]

In *Complete Guide*, the author listed different kinds of individual medicines, indicating their hierarchical quality by using the terms including *Ding Jia* (顶佳 the best), *Yi Jia* (亦佳 also good), *Ci Zhi* (次之 second grade), *You Ci Zhi* (又次之 third grade), *Ding Ci Zhi* 顶次之" (most inferior), *Bu Kan Yong* (不堪用not usable).[28] Medicines of different qualities came from different places. They were recognized and graded by their color, shape, and sometimes taste (Fig. 2). Qian Jun and Zheng Xiaoyan, however, took a rigid stance toward the quality of medicines. As medical practitioners, they judged the medicines as either genuine or fake. No middle standpoints were tolerated. To achieve the best effect, medical practitioners always prefer medicines of the best quality.

Nonetheless, in the viewpoint of merchants, grading commodities was a very common practice. Cao Bingzhang, as a medical practitioner, made compromises on this point. His annotations to Zheng Xiaoyan's work also embraced medicines of different qualities. It was understandable since medicines of the best quality were not always available or affordable. The record of the *Lu Rong* (鹿茸 Cornu Cervi Pantotrichum) is a good case in point. Qian valued the superior *Lu Rong* with the color of amber and length ranging from 3 to 5 *Cun* (寸, about 10 to 16 cm). Other kinds, according to him, were useless.[34] Zheng only mentioned that the most valuable part came from the blood-stained tip of an antler.[35] Zhang Guozhong, on the other hand, listed 10 kinds of antlers, each from a different original place, with distinct colors, shapes, and hairy surfaces. All were applicable but of varying quality.[36] Cao further graded *Lu Rong* into four categories: wax piece (white and oily), blood piece (yellowish white), wind piece (dark purple), and bone piece (color of bone).[37]

Color and shape were the basic criteria to judge medicines. Huang Shucan listed "ten primary criteria" for estimating ginseng, and nine of them required observation of different features of its outer appearance. He further composed a verse addressing these criteria:

> "Ginseng, king of herbs,
> It is more precious than gold and pearls.
> There are rules in distinguishing its quality,
> The best kind has a smooth surface, straight shape, short body, and texture resembling stick rice.
> The second grade is thick and strong, ripe and twisted,

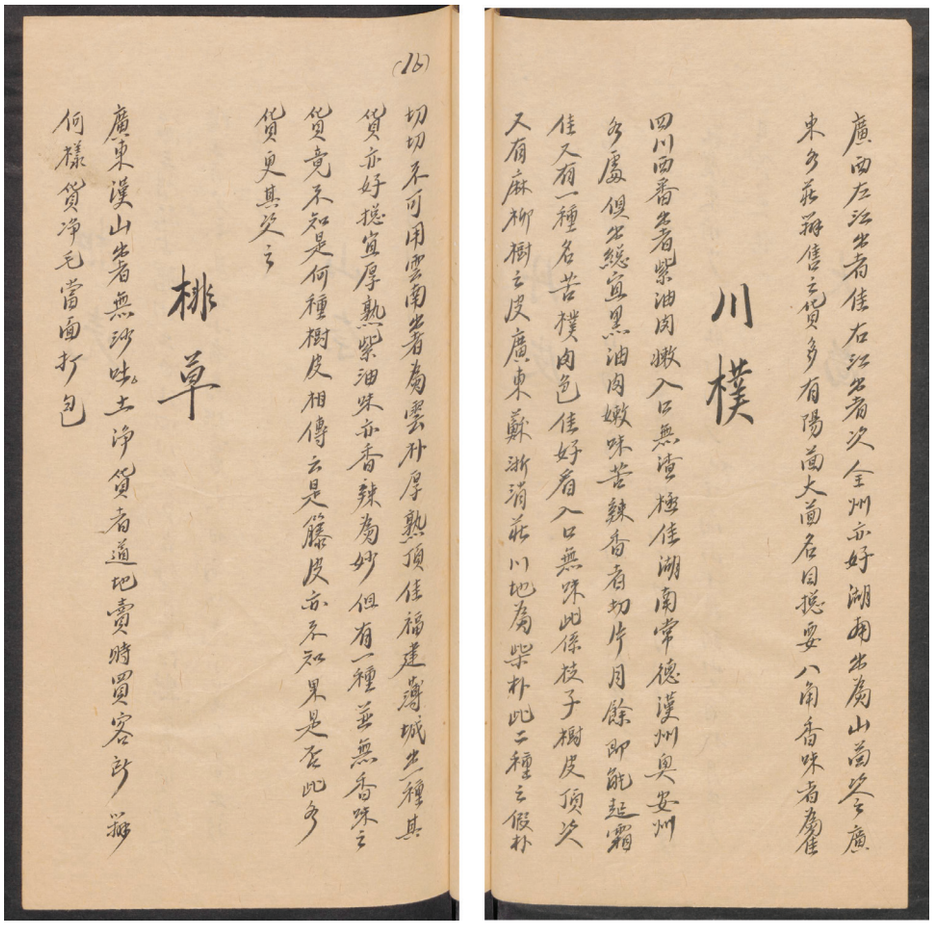

Figure 2 Record of Sichuanese *Hou Po* in *Cai Yao Chu Chan Zhi Nan Quan Juan*, courtesy of Staatsbibliothek zu Berlin – PK. (source from: https://digital.staatsbibliothek-berlin.de/werkansicht?PPN=PPN3346233030&PHYSID=PHYS_0007).

> While the third grade, lean, tiny, hackly on the surface, and loose in texture, cannot have enduring curative effects.
> The most inferior ones were hollow and shrunken,
> It is as worthless as common grass."[38] (Fig. 3)

The colors of medicines were not as apparent as they might seem. For the same herb, the colors of different kinds could be very similar. Yellow and black were easily distinguished. However, differences between yellow, greenish-yellow, reddish yellow, and yellowish white were harder to differentiate. The nuances in the color difference were not possibly transmitted through words, but by multiple comparisons and with years of experience. Sometimes the choice of words also required expertise to understand. In the case of *Dang Shen* (党参 Radix Codonopsis), the inner part of the superior kind was described as white and *Run* (润), while inferior ones had a color of *Dai Bai* (呆白 dull-white).[39] The concept of *Run* was hard to be translated into English. Generally, it was a term frequently used to characterize a particular sensation when one observed and touched a piece of high-quality jade, which was a combination of warm, moist, and smooth. When used in describing other objects, it denoted a jade-like consistency. The opposite feeling, portrayed as *Dai* or dull, expressed the sharp and boring white color that lacked nuance.

Shape and some distinct characteristics were more indicative in telling the quality of medicines. In the case of *Bai Zhu* (白术 Rhizoma Atractylodis Macrocephalae), those that resembled the shape of a gourd, chicken leg, and crane neck were valued as superior. It was a common practice to use analogies of animal or even human body parts to depict the shape of herbs. These pictographic descriptions, though effective among practitioners, were not that easy to be comprehended by non-specialists. It also required experience in comparing all the variations. The best kind of *Bai Zhu* was produced in Yuqian, a town near Hangzhou, and was described as having the shape of a "dragon head and phoenix tail." The dragon head refers to the hairy roots on one end of the stem, and the phoenix tail to the petiole and leaves on the other end. This characteristic was intentionally kept in the trimming of the products. Furthermore, after cutting up into pieces, the authentic Yuqian product would have vermillion dots on the cross sections.[40] Even though several indicative features were emphasized, the authenticity of medicines should be based on the overall examination rather than one single feature. In some

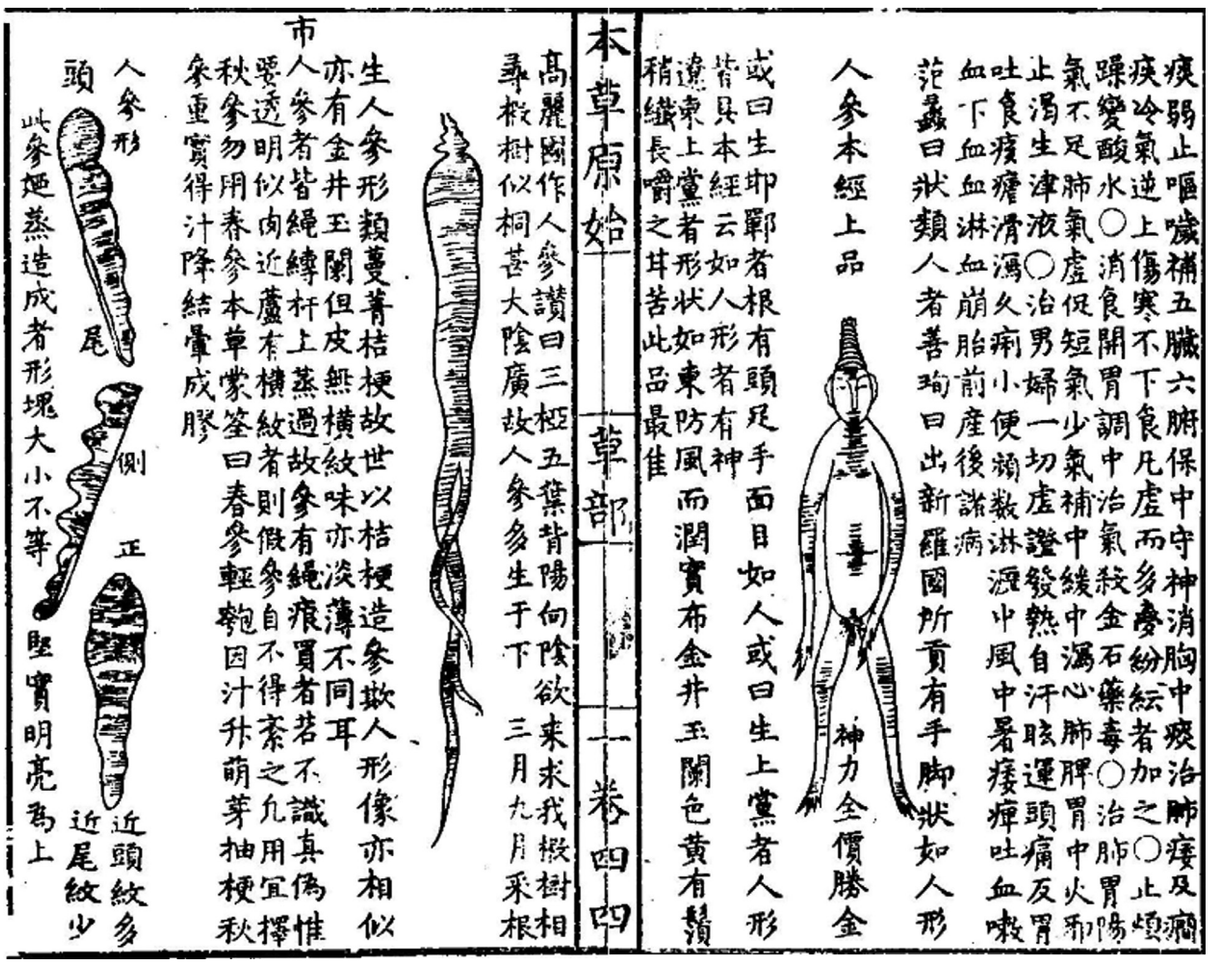

Figure 3 Illustrations of ginseng [source from: Li ZL. *Ben Cao Yuan Shi* (《本草原始》 *Origins of the Materia Medica*). Vol. 1. unknown publisher; 1612. p. 44. Chinese.].

cases, the feature described in textual records could only make sense when comparing materials. The shape of the best wild-grown *Bai Zhu* was described as the crane's neck. This metaphor vividly sketched out its slender and curved body. However, it was not easy for a beginner or an amateur to understand what counted as slender. Only by comparing with the cultivated species, which had a chubby body, could one have a better understanding of the "crane's neck."[41]

5.2 Tasting and smelling

In Chinese medical theory, the four qi and five flavors were the basic properties of medicines. The five flavors consisted of pungent, sweet, sour, bitter, and salty. In some cases, these tastes had an empirical basis. Ginseng tasted sweet, and goldthread had an unpleasant bitter flavor. However, the five flavors had far more connotations and implications than merely the flavors. Each of the flavors indicated a specific effect on the human body. The number "five" also made it possible to pair with the five colors, five viscera, and five phases in metaphysical reasoning. Taste and smell are discussed together since they are closely related both in words and in practice. In Chinese, the qi refers to both the property and the smell of medicines, and *Wei* denoted the taste as well as the smell or *Qi Wei* (气味). The term *Xiang* (香), which mostly refers to the aromatic scent, can also be applied to describing a pleasant flavor.

When used in authentication, practitioners needed to be more sensitive to distinguish the nuances in flavor. Both ginseng and Chinese yam were sweet. However, good ginseng should have a bitter after taste.[42] The Chinese yam produced in Huaiqing, one of the best quality, would give a slightly sour and alkaline flavor.[43] Peppermint and cassia twig tasted pungent. Whereas the best peppermint yielded a cooling effect when tasted, the second-grade product had a slightly bitter flavor.[44] Take a bit of superior cassia twig, its pungent flavor would spread over the whole mouth in a few seconds.[45]

Tian (甜, sweet, note that this is a colloquial word, not the literary term *Gan* [甘] in the five flavors system), *Xiang* (香 a pleasant flavor), *Ku* (苦 bitter), *Xin* (辛 pungent), and *Dan* (淡 insipid), a different

vocabulary of taste from the five-flavor system, were the most frequently used terms in describing the tastes. For those herbs with a sweet flavor, bitter and insipid always indicated an inferior quality. For pungent herbs, insipidity suggested a lower therapeutic effect. Tasting not only aimed to examine the flavor but also to feel the texture. The hardness, tenderness, and stickiness were all important criteria to evaluate the quality. After chewing, superior ginseng and *Hou Po* (厚朴 Cortex Magnoliae Officinalis) would turn into a smooth paste with very little debris left.[46] In the case of *Huang Qi* (黄芪 Radix Astragali), those that gave a sticky and soft sensation in the mouth were the best.[47]

The smell was crucial in examining aromatic medicines. In Chinese medicine, there was also a set of less-known terms, the "five odors," consisting of *Fu* (腐 rotten smell), *Jiao* (焦 burnt smell), *Shan* (羶 smell of mutton), *Xing* (腥 fishy smell), *Xiang* (香 fragrance). Sun Simiao (孙思邈 ca. 541–682) was the first to lay out the content of the five odors. However, unlike the five tastes, the five odors were seldom mentioned in *Ben Cao*. Instead, medical practitioners and medicinal merchants mostly employed the binary category of smell as *Xiang* (香 fragrance, pleasant smell) and *Chou* (臭 fetid, unpleasant smell).

In the *Wei Yao Tiao Bian*, Cao Bingzhang not only added annotations to Zheng's work but also categorized the content into eight sections. One section was dedicated to aromatic herbs. Both authors mentioned that strong or delicate fragrance was a preferable quality for these herbs, while lack of fragrance or any strange odor suggested fake or adulteration.[48] They did not provide further descriptions of smells, perhaps due to the lack of technical terms to describe the fragrance. In *Complete Guide*, only *Xi Jiao* (犀角 Cornu Rhinocerotic) was marked as resembling the smell of sesame.[49] In Chinese medicine, there were also several products, like *A Wei* (阿魏Resina Ferulae) and *Wu Yi* (芫荽 Fructus Ulmi Macrocarpae Praeparata), that emitted a very strong foul odor.[50] The smell was also used in judging the quality of medicines of animal origin. Since the animal parts were always said to have an innate unpleasant foul or fishy smell, the pleasant fragrance always suggested that these animal products were well processed and preserved, and thus considered superior.

A detailed description and categorization of smell were found in the case of cinnamon (*Rou Gui* 肉桂 Cortex Cinnamomi). As the bark of a tropical Asian evergreen tree, it was highly valued as a tonic in medicine and spice in cuisine. Some medical practitioners even compared cinnamon with ginseng, claiming they were the most valuable herbs, respectively, in the south and north borderlands.[51] Zhang Guangyu's work on cinnamon provided a rich knowledge on the examination of its appearance, smell, and taste. He suggested that first, by observing the appearance, one could learn the producing areas of cinnamon; second, by examining the smell, the genuine and the fake were distinguished; and finally, by tasting the flavor, one could tell the superiority among the authentic. The author set six criteria in examining the smell of cinnamon, including *Chun* (醇 pure), *Hou* (厚 thick), *Xin* (馨 pervasive), *Zao* (燥 arid), *La* (辣 pungent), and *Mu Shi Chou* (木虱臭 fetid smell of woodlouse). During the examination, one should rub the inner surface of the bark several times and smell the scent. The fragrance of superior cinnamon would be pure, thick, and pervasive, while the arid, pungent, and foul smell of woodlouse indicated inferiority. Zhang further gave examples of what counted as the smells of arid and pungent. The odor of Sichuanese pepper and clove was arid. *Shan Nai* (山奈 Rhizoma Kaempferiae) and *Zao Jiao* (皂角 Fructus Gleditsiae) smelled pungent. The analogies were effective since these herbs were common items used not only in medicine but also as spices or cleaning agents in everyday life. The fetid smell of woodlouse was a crucial indication of fake cinnamon. Long storage could eliminate the arid and irritant odor. The proper scent of cinnamon could be imitated.[52] Only the fetid smell of woodlouse would remain in the fake or inferior cinnamon.[53]

5.3 Touching

When examining the appearance of cinnamon, the process included more than observation of its color and shape. Local people in the border area between China and Vietnam gave vernacular names for different kinds of cinnamon barks by analogy, like lychee skin, longan skin, tung oil, dragon scales, five colors, iron armor, cinnabar, and crape. These analogies captured not only the color but also the texture of its outer and inner surfaces. According to Zhang Guangyu, the last two kinds were the best. The crape was a delicate silk textile with slight wrinkles. Likewise, superior cinnamon bark should have a textile-like surface with long, straight, and tightly arranged stripes. The lychee skin, longan skin, and dragon scales, those described a coarse surface, were not desirable features of cinnamon.

Zhang further suggested that it was not necessary to be strict regarding the vernacular names and their associate features. Wild-grown tree bark did not always have a predetermined shape that could perfectly fall into those categories. Instead, he proposed three practical criteria for identifying a superior bark, including sturdiness, smoothness, and cleanness. The first two were to be felt by hands. Zhang criticized one popular saying among merchants that superior cinnamon barks should have numerous horizontal stripes on the surface. According to him, the quality of cinnamon was not indicated by one feature, but by the overall examination of its texture and appearance. The best kind should be as sturdy as metal. When felt by hand, its surface was smooth and slippery. The inferior ones had a crumbly texture and

rough surface, which blocked the move of hands when rubbing on the surface.[54]

The case of cinnamon represented the touching examination for many vegetated medicines. Sturdiness, smoothness, and tenderness were the most desirable qualities. Meanwhile, the tongue was another sensitive body part used in examinations involving touch. Unlike tasting which only emphasized flavor, touching by tongue revealed multiple sensations. This examination was mostly used in medicines of mineral, animal, or even human origin. One would feel a sticky sensation when licking a piece of true *Long Gu* (龙骨 Os Draconis). The authentic *Chan Su* (蟾酥 Venenum Bufonis) produced a numb feeling on the tongue. Chewing a piece of *Mu Xiang* (木香 Radix Auckandiae) produced a sticky sensation on the tongue. *Qiu Shi* (秋石 a salty preparation made from children's urine) would immediately melt in the mouth. If not, it must have been adulterated.[55]

5.4 Testing

Even though the sensory techniques are examined separately, the authentication of medicines usually involves multiple senses. Taste and smell were generally regarded as more reliable than visual observation. Touching by hand was a useful supplement to visual observation in examining the appearance and texture, while using the tongue was a more definitive method to test the authenticity of the medicines. Hearing was the only sense not discussed above. As far as I could find, there was only one case that employed the sense of hearing in authentication: the antelope horn. One could hear a slight buzz sound when putting an authentic horn near one's ear. Besides the rich method of sensory examination, there was still another set of techniques applied by practitioners in the market. It employed a small test or experiments to manifest the inner property of medicines.

A newspaper in Tianjin published a set of photographs provided by *Yong Ren Tang* pharmacy in Beijing in 1935, showing a series of top-quality medicines displayed in their store. Among them, there was a piece of cinnamon bark with a label that read "genuine top-quality tributary 'green water and yellow oil' cinnamon bark from the old mountain of *Qing Hua* (真正顶上清花绿水黄油老山贡桂)."[56] (Fig. 4) This label included several jargons that were hard to get by an outsider. Qing Hua (better known as 清化 in Chinese), present-day Tinh Thanh Hóa in Vietnam, was known as the producing area for top-quality cinnamon in the Qing period. The phrase "green water and yellow oil" was a typical description of top-quality cinnamon at that time. But what does it mean?

In the *Complete Guide*, the best cinnamon produced in Qinghua was yellow in color and rich in oil. "Green water" was related to the taste examination as described in Zhang Guangyu's work. The examination of cinnamon's taste was not simply putting a small piece

Figure 4 One piece of Cinnamon bark preserved by *Yong Ren Tang* pharmacy, photography taken in 1935 [source from: Unknown author. *Illustrated Commercial Newspaper of Tianjin* (天津商报画刊) 1935; (15): 2.].

in the mouth. Instead, one needed to put a small part of cinnamon in boiled water and taste the decoction after cooling down. The criteria for taste were similar to those for smell, consisting of pure, thick, acrid, and pungent. This examination was not just a double verification of the characteristic already being examined in smell and taste. Zhang suggested one should observe the decoction first before tasting it. The color and consistency of the decoction indicated its quality. First, if the color was white, tea-like, or clear, the taste must be pure. Second, if the decoction was green in color, one needed to further notice its turbidity. Third, if the decoction was red, one had to taste it to determine the quality. In judging the color of cinnamon decoction, Zhang criticized a common idea among merchants. Generally, the merchants valued cinnamon that could yield green decoction. Zhang, however, claimed that some inferior cinnamon and even fake ones could also generate green color in boiled water. In his opinion, the turbidity of the decoction was far more reliable than the color.[57]

The examinations were not limited to tasting or observing. They were small tests or experiments that used other matters and simple processes to test the

authenticity. The tests could be as simple as putting the medicines in water. For example, an authentic *Chen Xiang* (沉香 Lignum Aquilariae Resinatum), literally translated as "aromatic that sinks," would sink and superior *Lu Gan Shi* (炉甘石 Calamina) would float.[58] The rationale of the tests was simple. Generally, a piece of wood would float in water, and stone would sink. However, as a wood of hard and dense texture and a stone of light and loose body, they would act just the opposite of the common expectation. The bear's gall bladder, an extremely rare medicine in the market, could also be examined by a simple process. Squeeze one drop of bile as big as a corn grain and drop it into a bowl of water, if it was genuine, the bile drop went directly to the bottom, forming a straight line in the water.[59] Since water was a common matter in everyday life, these tests were very easy to carry out. Other everyday matters applied include pig's blood, cloth, and lamp wick. A simple examination of *San Qi* (三七 Radix et Rhizoma Notoginseng), known as a powerful agent for hemostasis and detumescence, was to put it into pig's blood.[60] True *San Qi* would turn the blood into water, a clear materialization of its therapeutic effect.

These tests were related either to the texture and property of medicines or to a peculiar phenomenon that might be accidentally discovered in practice. It was not a very common practice to conduct small tests in the authentication. All these cases involved high-valued and rare items in the markets. It is hard to tell whether the authors conducted the tests themselves or they just recorded the information from hearsay. Nevertheless, the records demonstrated that relevant information circulated widely among practitioners. To some extent, these tests had a deeper implication. They manifested, or at least from the point of view of practitioners, the innate nature of medicine in a materialized way.

6 Conclusion

Many methods of authentication are still practiced today in China. Entering a traditional herbal market in China, you can easily find customers standing at a stall, carefully examining medicines by looking, rubbing, smelling, and tasting. Those who fail to do so will be considered novices in the business, prone to the deceptions of fraudulent merchants. To ensure the authenticity of herbal products, state regulations at present require lab test results of a particular marker compound. However, merchants in the herbal market continue to largely rely on their experience of sensory examination as a more reliable way of authenticating medicines. In their opinion, if the therapeutic efficacy of Chinese medicines cannot be fully explained by the existence of any "active components," neither should the authenticity of medicines be determined in a scientific way.

The authentication of medicines has been integrated into the curriculum of modern traditional Chinese medicine education. Many methods in this article are not strange to both traditional Chinese medicine doctors and pharmacists today, as such knowledge has become essential for their training and career. Rather than merely presenting a historical root of authentication knowledge in Chinese medicine, I intend to make a broader and deeper argument about the underlying episteme behind the highly practical expertise. Studies of artisanal practice in early modern Europe discover an "artisanal epistemology." It argues that artisan's practice, though seemingly not theoretical, has its distinct way of knowing nature through the bodily relationship with matter.[61] A similar pattern can be perceived in the case of authentication practice. Merchants and practitioners can also be considered as possessing special expertise, and thus being active knowers of medicines.

The authentication of medicines in the market formed another set of knowledge that diverged from two mainstream scholarly traditions of late imperial China, including both the neo-Confucianist inquiry of drugs' nature and the virtuosic interpretation of drugs' nature in clinical practice.[62] Practitioners in the market were aware of some basic knowledge of *Ben Cao* from popular medical primers,[63] but did not use any established framework in interpreting medicines and their nature. Instead, they actively engaged with the materials through bodily senses. The seemingly trivial and pragmatic expertise reflects an underlying rationale: the innate nature of drugs manifests and materializes through their sensory properties, and thus a deeper understanding of the medicines can be acquired through intimate examinations of their material forms.

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Ethical approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

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Research article

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OPEN

Reacting to Epidemics: The Innovative Imperial Public Health System during the Late Northern Song Dynasty

Asaf Goldschmidt[1,✉]

Abstract

Song China was a period in which China experienced a great increase in its population. Concurrently, the Song dynasty also experienced a rise in the frequency of epidemics and two major wars with the Western Xia and Liao dynasties during the 1000s and 1040s. The consequences of these changes were exacerbated by the increased geographical mobility of certain social groups such as traders and examinees attending civil service examinations. Thus, casualties of wars, epidemics, or disease, especially of people whose families were far away and could not care for them were left without care and "their corpses often lay bare along the roads." This new social environment created a need for general relief. The Northern Song government (960–1127 CE), especially during the reign of Emperor Huizong, established an innovative public health system to address this issue. The public health system included poorhouses, public hospitals, and pauper's cemeteries. The first were more of charity organizations, whereas the latter two promoted public health by providing medical services for the poor and burial for those that nobody cared for. In terms of rationale behind these institutions, on the one hand, they constituted an attempt to get the poor and homeless off the streets while providing them relief or burial. On the other hand, it seems that Huizong's deep concern with medicine propelled him to design and implement a comprehensive public health system oriented to prevent contagion and outbreak of epidemics. This article depicts the background, the organization, and the functions of the system. The article also discusses the conditions and reasons that gave rise to such a unique undertaking by the Northern Song government.

Keywords: Epidemics; History of medicine; Hospitals; Huizong; Public health; Pauper's cemetery; Song dynasty

1 Introduction

The 11th century was a period in which China experienced a great increase in its population along with an increase in trade volume and urbanization. Concurrently, the Song dynasty also experienced a rise in the frequency of epidemics as well as two major wars with the Western Xia and Liao dynasties during the 1000s and 1040s.[1,2] The consequences of these changes were exacerbated by the increased geographical mobility of certain social groups in Song China, such as traders, students, and examinees attending the civil service examinations. Thus, casualties of wars, epidemics, or disease, especially people whose families were far away and could not care for them were left without care and "their corpses often lay bare along the roads (死者暴露于道)."[3] This new social environment created a need for general relief in the form of shelters and hospitals. This article discusses how the Song government, especially during the reign of emperor Huizong (宋徽宗), established an innovative public health system to replace the Buddhist monasteries system that was in place from the Tang dynasty till the mid-11th century.

The studies on the history of public health as an organized governmental activity in the West often begin with the Renaissance. Despite this, isolation as a means of protection from epidemics actually began in Italy in the 14th century, when a number of city-states introduced quarantine to protect themselves against the major epidemic of bubonic plague that began in 1346, commonly known as the Black Death.[4] This initiative, however, did not involve public sanitation or therapy. It seems that in China the systematization of public health may have occurred during an even earlier era.

This article traces the establishment of the first public health system in China, which began during the second half of the 11th century but could not have fully materialized without the patronage of the Northern Song dynasty emperor Huizong (r. 1101–1026). Moreover, this public health system was only part of a large-scale reform Huizong implemented in the field of medicine (Note 1).[5] The article depicts the background, the

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organization, and the functions of the system. It also discusses the conditions and reasons that gave rise to such a unique undertaking by a 12th century government in China.

The public health system included poorhouses, public hospitals, and pauper's cemeteries. The first of the three was more of a charity organization, whereas the latter two promoted public health by providing medical services for the poor and burial for the indigent as well as for travelers from far places with no family to care for them. The rationale behind these institutions was likely twofold. On the one hand, they constituted an attempt to provide relief for the poor and to get them off the streets. On the other hand, it seems that Huizong's deep concern with and understanding of medicine propelled him to use his imperial authority to design and implement a public health system oriented to prevent contagion and outbreak of epidemics.[6,7]

2 Public health prior to Huizong's reign

The earliest mention of hospices with dispensaries dates back to the Southern Qi dynasty (late 5th century CE). The first reference to a government hospital dates slightly later to the Northern Wei dynasty (early 6th century).[8] During the Tang dynasty (618–907), both religious institutions and the government were involved in poor relief and public health operations, but neither was systematically organized. The earliest relief institutions of the Song dynasty (960–1276) operated on a small scale and were essentially a continuation of Tang dynasty practices but under a new name, the Blessed Field Houses (福田院).[9,10]

Poor relief underwent a major change during the late Northern Song dynasty (960–1127). It was transformed from a mostly private and often religious endeavor, into one in which the government played an ever-increasing role. The Song government continued to provide disaster relief, but in addition established relief institutions that functioned on a regular basis and not solely during catastrophes.[9]

3 The changing epidemiological environment during the Northern Song

Why did concern over what we term today as public health become a political issue during the Song dynasty? A number of factors consolidated to change the making of Chinese society during the Northern Song dynasty. One of the most striking changes is the stark increase in population. During this era the population doubled from a peak of around 50 to 60 million during the Tang dynasty to around 100 to 120 million during the turn of the 12th century.[11,12] This was not only a change in magnitude, but also of location. During the Northern Song, China's population balance shifted dramatically from the north—the traditional heartland of Chinese civilization—to the south.[13–15] By the end of the dynasty over 60% of the population lived in the south, a significant increase from approximately 40 percent during the Tang. The concentration of population and economic strength, away from the political center of gravity, stimulated the first significant large-scale long-distance trade in Chinese history.

The expanding trade and the sheer increase of population created a major social change. The Northern Song dynasty experienced an unprecedented growth of cities, in essence creating the first large-scale cities of nonpolitical character, as well as a multiplication of smaller market-centers in the countryside. It has been argued that the level of urbanization reached in the Song dynasty was, probably, never exceeded in later Chinese history.[16] Moreover, scholars claim that the development of the cities and the market-centers was an orderly process resulting in hierarchical and differential urban centers graded by size and specific marketing functions.[17,18] These changes created great wealth for some but also abundant poverty that concentrated mainly in the urban centers. Furthermore, the increase in population especially in the south, the increase in urbanization, and the increase in long-distance trade volume facilitated the spread of epidemics.[19] Nevertheless, all these changes did not prompt the government to take large-scale actions designed to enhance public health until the end of the 11th century.

4 The public health system during Huizong's reign

During Huizong's reign, more precisely during the first 4 years of his rule (A.D. 1101–1104), the government instituted a new system for poor relief, entitled the Poorhouse System (居养法, literally the Reside and Support System) (Note 2). This Poorhouse System was much more than a simple charity organization. It was likely designed to function as an elaborate public health system, to care for the homeless, sick, and family-less dead. The first question that comes to mind is whether this was indeed a comprehensive system or just a set of disjointed projects. In two edicts, dating to 1106 and 1112, Huizong provides us with his perception of how these institutions function as parts of a complete system:

> "At the present widows and widowers, the orphaned, and sole survivors, all have the Poorhouse System. [The state] uses it to aid the poor. But, what if they are sick and have no medicine or doctor? To solve this we established the Peace and Relief Hospitals. To deal with poor men who die and have no [means of] burial, we established the Pauper's Cemetery. My mind is deeply with the people." [20]
> "今鳏寡孤独。既有居养之法。以厚穷民。若疾而无医。则为之置安济坊。贫而不葬。则为之置漏泽园。朕之志于民深矣。"
> "The widows and widowers, the orphaned and sole survivors have the Poorhouses to be used for residence and support. The sick have the Hospitals for rest and relief (Huizong is using here the characters of the institutions

in reverse order to show their meaning and functions.). Those who have died have the Pauper's Cemeteries for burial. This is the foundation of the kingly way [Dao]. I have ordered the implementation of this system, but officials have not followed my orders." [21]
"鳏寡孤独。有院以居养。疾病者有坊以安济。死者有园以葬。王道之本也。诏令具在。而吏不奉法。"

The language Huizong uses here suggests that the emperor perceived the three institutions as complementary parts of a single integrated system.[9] It also hints to Huizong's conviction that implementing public health system was part of the sagely way of ruling the state or the "kingly Dao" in his own words, as recorded in the above edict.

The Poorhouse System included three separate institutions. The first was the Poorhouse (居养院), literally translated as the Reside and Support House, a hospice designed to provide shelter and food to the indigent (Note 3).[22] The second was the Peace and Relief Hospital (安济坊), literally translated as the Rest and Relief Office, a charity clinic designed to provide free medical care for those who could not afford medical treatment. The third was the Pauper's Cemetery (漏泽园), literally translated as the Left Out of Favor Funerary Park, an institution that provided free burial plots and services for both the poor, who could not afford burial and soldiers or travelers who died away from home without anyone to take care of their funeral arrangements (Note 4).

The government financed the Poorhouse System primarily by confiscating property of the heirless dead.[23] This new financial foundation enabled the government to establish a greater number of facilities and aid a greater share of the population than its Tang dynasty and early Song dynasty privately funded forerunners had. In addition, the new system functioned on a year round basis, unlike its precursors that operated only during emergencies. However, the system did not always function ideally. For example, in one surviving record the author complained that the system had outrun its resources.[24]

4.1 Poorhouses

The origins of the poorhouses can be traced to the last years of the reign of the Song emperor Zhezong (宋哲宗, 1086–1100). An imperial edict, dating to 1098, describes a governmental charity system, designed to provide shelter and health care for the poor and the indigent.

"The edict from the Office for the Editing of Imperial Pronouncements said: 'Regarding widows, widowers, the orphaned, sole survivors, the poor, and those who cannot support themselves, it is the duty of the Prefects, General-controllers, Magistrates, and Assistants to inspect and verify that officials are responsible for supporting and residing them [the indigent]. Regarding those who are sick they [should] provide them with medications. Circuit Supervisors when they arrive they [should] investigate and inspect [that officials] in charge of the Poorhouse provide the [allotted housing spaces titled] 'residence of childless families' to those in need. If there are not enough housing spaces [they should] use officials' residence [to house those in need]. If these housing spaces produces income [via renting them out], hand out the earned sum [to those in need] without limitation on the number of months. They should rely on the Stabilization System to provide them with rice and beans. If the emperor is not satisfied, then use the Stabilization interest funds to compliment. If officials will provide residence to those who can maintain themselves they will be dismissed from office.' Follow this!"[25,26]
"详定一司敕令所言：「鳏寡孤独贫乏不得自存者，知州、通判、县令、佐验实，官为居养之；疾病者仍给医药。监司所至检察阅视，应居养者，以户绝屋居，无户绝以官屋居之；及以户绝财产给其费，不限月分，依乞丐法给米豆，阙若不足者以常平息钱充。已居养而能由存者罢。」从之。"

This order was never implemented until the reign of Huizong who established these charity institutions as part of a larger public health system. The Poorhouses were designed to provide food, clothing, and shelter to the needy, which were defined as the aged poor, widows, orphans, and all those otherwise unable to care for themselves. The forms of aid varied according to local conditions and the age of the person.[27] Generally, each adult was to be allotted one *sheng* (升) of rice, which is approximately 0.7 L, and 10 cash per day, with children receiving half as much.[28,29] During the winter months, additional five cash per day was allotted for fuel. Over the years, poorhouses also provided residents with clothing, bedding, utensils, and at times even mosquito nets. The scope of relief was extended during the winter when the need for shelter became more acute, especially in cold northern China.[9]

In summary, the Poorhouses mainly served as a way to provide shelter for people living on the streets. The Poorhouses had only indirect effects since providing support and sustenance may have prevented sickness, in comparison to the other two institutions, on public health.

4.2 Peace and Relief Hospitals

The Peace and Relief Hospitals (Note 5), established in 1102, were modeled on an earlier infirmary founded by Su Shi (苏轼, 1036–1101) in Hangzhou. In 1089, Su Shi was appointed the prefect of Hangzhou. Confronted with poverty and a high rate of disease he established what might have been China's first specialized charity clinic, titled the Peace and Happiness Hospital (安乐坊). Su Shi funded the clinic mostly from private funds.[30,31] According to surviving records, during a 3-year span of operation, the clinic treated over a thousand poor patients free or charge. During Huizong's reign, Su Shi's privately operated Peace and Happiness Hospital was incorporated into the national system of hospitals.[32]

Huizong's government established the Peace and Relief Hospitals in response to a memorial submitted to the court in 1102 by Wu Juhou (吴居厚, 1037–1113),

the governor of the capital prefecture.[33] Wu urged that an institution, for which he suggested the title Rest and Recuperation Houses (将理院), be established in all prefectures to aid the poor, though this name was proposed but never adopted in practice.[34] Wu's memorial specified:

> "The Rest and Recuperation Houses ought to take the sick and separate them according to the severity of their illness and then place them in different wards. This is done to prevent contagion. There should also be a kitchen to decoct drugs and prepare food and drink for the patients. The living quarters of the attendants and the wards of the patients should be separated. Each of the wards, which are differentiated based on the severity of the patients' disease, should include up to ten rooms."[35]
> "将理院宜以病人轻重而异室处之。以防渐染。又作厨舍以为汤药饮食。人宿舍及病人分。轻重异室，逐处可修居屋一十间。"

Wu's proposal constitutes one of the earliest mentions of quarantining patients to prevent contagion. However, it is important to note that these quarantining measures were proposed only to the indigent, and are not found in other records discussing epidemics in general. To make these hospitals self sufficient, they were to have a pharmacy to prepare medicinal formulas as well as a kitchen to prepare food for the patients and to boil medicinal formulas before patients consumed.

Contrary to the more common procedure of starting such facilities in the capital, the network of hospitals was established first in the provinces. For example, there is a record stating that a hospital was established in Hebei in 1102.[36] Another source records that such a hospital was established in Hangzhou in 1104.[37] Huizong himself questioned leaving the capital out of this new network. In 1105, he personally wrote an edict to rectify the situation.

> "The capital is the heart of the land, the place where the king's transformative influence begins. Concerning widows and widowers, the orphaned, and sole survivors, along with those who are poor and without anyone to turn to, in the rest of the country the Poor House System has been put in place, but it has not yet reached the capital. This misses the idea of beginning with what is close at hand and then extending it to distant places. Now, although we have Blessed Fields Houses, they cannot care for many. At the coldest and hottest times of the year, the poor without anyone to turn to as well as the ill may lack places to live, which pains me deeply. I order Kaifeng prefecture to follow the law used in the outer prefectures to establish Poorhouses for widows and widowers, orphans, and sole survivors, as well as Peace and Relief Hospitals, thus according with my intentions."[38,39]
> "京师根本之地。王化之所先。鳏寡孤独与贫而无告者。居养之法。施于四海而未及京师。殆失自近及远之意。今虽有福田院。所养之数未广。祁寒盛暑。穷而无告及疾病者或失其所。朕甚悯。可令开封府依外州法。居养鳏寡孤独及置安济坊。以称朕意。"

Each Peace and Relief Hospital was designed to have several wards with administrators assigned to manage them. Each physician in the hospitals was required to keep accurate records of the cases he treated, listing the number of patients who were cured and the number who died under their treatment. At the end of the year, these records should be examined and should serve for evaluating the status of each physician based on his success rate.[40] Physicians would be compensated financially when they were successful in their treatment (Note 6).[41,42] Each clinic was to be managed by a staff of four people who were replaced seasonally.[9]

In summary, the hospitals treated the poor and were designed to prevent the outbreak of contagious diseases and epidemics. Unfortunately, there is little evidence concerning how many hospitals operated, where, and how.

4.3 Pauper's Cemetery

The need for public cemeteries was made more apparent by the social and geographical mobility of Northern Song China. Care for the sick and burial of the dead had long been viewed as family responsibilities in China, but the increasingly commercial and mobile nature of Song society brought merchants and opportunity-seekers, which included seekers to the cities without their kin. During the first century of the Song dynasty, Buddhist monasteries provided land and coffins for the poor to bury their dead. The Song government made a few attempts to take over this role, especially during the early 1020s, but with limited success.[9]

The year 1079 presents, probably, the point in time when the Song conceived the idea of Pauper's Cemeteries, when Chen Xiang (陈向), native of Muzhou, Zhejiang, *jin shi* (进士) in 1059[43] submitted a memorandum asking for government land to bury scattered skeletons or corpses (Note 7). A book authored by Chen's grandson, Xu Du (徐度, fl. 1138–1147), includes an interesting perspective of how this institution was conceived. It states that the system of Pauper's Cemeteries (漏泽园之法) arose during the Yuanfeng era (1078–1085). He writes that his grandfather on his mother side, once came to Kaifeng and stayed overnight in a Buddhist temple in Chenliu (陈留) area. In the middle of the night he was awoken by a commotion outside the walls. "My grandfather raised the candle and looked around, he saw piles of skeletons [or corpses] covering the field. All of them were skeletons of poor people whose families could not afford to bury them, so they just left them there [outside the walls]." Following this, his grandfather could not bear this situation and requested some land to bury them. When emperor Shenzong (宋神宗) heard about this he appointed Chen Xiang to manage these affairs. Chen buried 30 skeletons or corpses in each pit and mapped all of the pits. He constructed a small Buddhist temple at the edge of the plot and appointed a monk to care for the cemetery.[44] Shenzong also issued an edict instructing each district to allot land and funds for burial of unattended corpses once a year. This initiative was the first

time the government attempted to establish a system to bury the dead that no one was responsible to bury.[45]

Chen Xiang's initiative had only a short-term effect and was predominantly local in scope. The problems of bodies lying in the streets continued and posed an even more pressing hazard to public health than did the sick. The Secretary of the Court (中书) reported in 1104, "Prefectures and counties [in the empire] all have poor people who are without means to cover their own burial when they die. Also, there are visitors [from out of town] who die and their corpses lie exposed in the streets untouched. This is extremely sad and distressing."[46] The sanitation problems associated with the disposal of the bodies of the indigent as well as the traditional Confucian emphasis on filial piety made this matter one of great official concern.

The Pauper's Cemeteries were formally established in 1104. Originally, they were conceived as an improvement on the precedent set in Shenzong's reign (1067–1085).[46] Each prefecture was ordered to establish a cemetery enclosed by a wall on a plot of unfertile public land. The prefecture appointed officials to keep records and maps (图籍) of the cemeteries and to parcel out the burial plots when needed. Each body buried in these cemeteries was to be allotted an eight-*chi* (尺) plot (approximately 2.46 m) and a coffin. Each grave was to be dug at least three *chi* deep (approximately 0.92 m) "to ensure that the corpse will not be exposed."[40] Each grave was provided with a marker recording the name, age, dates and any other known details about the deceased. A central shrine was set up in each cemetery to provide a place for ancestral sacrifices.[47] During the 1960s, a Song dynasty Pauper's Cemetery was discovered in Xiazhou (present day in the city Sanmenxia 三门峡, Henan province). Following excavations conducted in the springs of 1985, 1993, and 1994, altogether 849 tombs have been unearthed at the site with records of burial dating to the years 1105–1116. From the excavations, we learn that many bodies were buried in clay coffins.[48] This archeological discovery of a pauper's cemetery is the only "hard evidence" we have of a unique and innovative attempt by an emperor to employ his authority to install a government-sponsored and operated public health program.

In summary, the cemeteries provided respectable burial to the poor and to people without relatives while ensuring that rotting corpses, a sure means to transmit pathogens for diseases and epidemics, will not lie bare in the streets.

5 The demise of the system

The idea behind the Poorhouse System was altruistic and noble and was meant to exemplify emperor Huizong's kingly Dao, but costs were high and corruption was a persistent problem. The first mention of corruption appears in 1105, when a report was made that prefectural officials were not keeping proper records of relief operations. Subsequently, inspectors were sent to check into the actual number of people being handled.[49] Surviving records mention that local officials padded the lists of relief recipients with names of healthy people or dead people to obtain more support from the government for their own use. Punishments for corruption often were harsh and included public beating.[50] Even Huizong lamented that officials did not carry out the system the way it was designed and thus brought grief instead of relief to the indigent.[51] The following testimony, dating to 1114, described the situation of the Poorhouse System:

> "I have ascertained that in the various prefectures the people who actually are elderly and who should be placed in a Poorhouse, those who actually are sick and should be hospitalized in a Peace and Relief Hospital, and those who actually should receive aid, suffer because those with family connections enter false claims and bend the regulations at will. The local officials protect one another making it impossible to investigate."[9]
> "臣僚言访闻诸路民之实老而正当居养，实病而真欲安济者，往往以亲戚识认为名，虚立案牍，随时遣逐使法，当收恤者复被其害。官吏相蒙，无以检察。"[52]

During Huizong's later years, the government cut back allocations to the public health system. Accordingly, the number of the poor and the indigent aided by the system declined significantly.[9,28] Although Huizong's public health system had to be cut back, it remained in place for at least a few more decades during the Southern Song. Its long-term impact, however, seems to have been limited.

6 The objective of the system: benefiting or policing the sick?

There is a question to be asked, why did Huizong establish such an elaborate and expansive public health system, one never before considered essential? Did he intend to benefit the indigent or was he determined to police the sick and the homeless in order to preserve public health?

Huizong had profound medical knowledge. He compiled a unique medical treatise *Sheng Ji Jing* (《圣济经》 *Canon of Sagely Benefaction*) that elucidated ancient canonical medical doctrines. He oversaw, and some scholars even claim that he participated in, the compilation of an enormous clinical formulary *Zheng He Sheng Ji Zong Lu* (《政和圣济总录》 *Medical Encyclopedia: A Sagely Benefaction of the Zhenghe Reign Period*). In addition he was personally involved in imperial initiatives to transform the status of medicine, as his government established a new medical school and added official medical positions, in an attempt to lure the sons of the elite to study and practice medicine.[5,53] Given Huizong's interest in and involvement with medicine, it is not surprising that he attempted to promote the health of the people and as a byproduct prevent the outbreak of epidemics. This was, according to him, the way the emperor

implements his "kingly Dao" or caring for the people by providing medical care.

Although some researchers claim that the Poorhouse System was inherently tied to the rocky career of Cai Jing (蔡京, 1046–1126), who served as grand councilor during the reign of Huizong, a closer analysis suggests that Huizong was personally involved and used his cultural authority to implement the public health system.[31,53–55] He wrote several edicts discussing the importance and the goals of the public health and relief system initiated by his government. These edicts, which specify the target population of each institution and its function, show that Huizong was concerned by the state of health among the common people in the empire. In one of them, he even claims that officials do not implement his orders to the letter as he expects. But by far, the most important proof of Huizong's personal involvement with the system comes from the preface he wrote to his medical book *Sheng Ji Jing*. There he states that he set up the different functions of the system. He also claims that constructing this system was part of his larger reforms in medicine, all actions that demonstrate his "kingly Dao."[56–58]

Reading the imperial edicts and official government documents as those presented above, we may come to the conclusion that Huizong's government established such a public health system for the sole purpose of benefiting the people, helping the indigent, and supporting the poor. This is indeed what we may expect from an emperor who wants to show his benevolence and care for the people. However, is this all there is to it? Was the Song government so enlightened or did it have other reasons or incentives? If this is the case, why did not it establish such institutions before Huizong era?

It seems that in addition to Huizong's interest in medicine and its relation to ruling the state, the growing problem of the indigent and the homeless also played a role in the decision to implement the system. Reading testimonies by imperial officials reveals a gruesome picture of the streets in Chinese cities. "In the winter cold, people who collapse are not being cared for. Beggars are falling down and sleeping in the streets beneath the imperial carriage."[53,59] Another record states, "In the capital during cold winters there are often uncovered beggars without cloths collapsing in the streets and thoroughfares. Those are beggars that the Poorhouses stopped housing… Therefore the Poorhouse System must be supported!"[60] In addition, there are records depicting a gruesome picture of unburied bodies in the public scene stating, "in prefectures and districts corpses of poor that no one buries as well as of visitors who have died lie bare in the streets."[61]

This growing hazard to public health, even without understanding contagion, necessitated suitable means to get the sick and the dead off the streets. It seems that despite Huizong's attempt to portray the system as an extension of a sage emperor, his officials conceptualized the system as a utilitarian tool, namely getting rid of a nuisance with minimal necessary cost. Accordingly, we find records that officials criticize prefectures and districts that are too "extravagant" in their operations, providing mosquito nets, wine and even delicacies to the residents of the Poorhouses and the hospitals. (Note 8)[62,63]

7 Conclusion

To sum up, it seems that emperor Huizong strived to implement what he terms as the "kingly Dao" and establish a system that would both promote health and benefit the poor. In contrast, his officials, it seems, attempted to satisfy the needs of the elite and run an economic system. Huizong saw the Poorhouse System as part of his larger reforms in medicine. Being knowledgeable in medicine he saw the establishment of such a health system as another facet of improving life in the empire by aiding the indigent while preventing epidemics at the same time. Thus, he used his cultural authority as an emperor and his professional authority as a physician, at least to his own perception, to implement an innovative public health system.

Notes

1. This reform included the establishment of a new medical school, reforms in the positions of physicians in the civil service, and expansion of medical institutions. One such institution was actually a related public health institution—the Imperial Pharmacy. Established in 1076, but largely expanded during Huizong's reign, the pharmacy, which operated all year long, sold prepared drugs and ready-made prescriptions in many locations throughout the empire. During times of catastrophes, the pharmacy dispensed the drugs free of charge upon orders from the Imperial Physician.

2. The term "Poorhouse System" is adopted here because it seems that the Song government and Huizong in particular conceptualized a system made of three different and specialized institutions.

3. There is a distinction between two terms when referring to poorhouse, *fa* (法) and *yuan* (院). According to Scogin ("Poor Relief," p. 33), the former refers to a system or approach, while the latter implies the existence of a specific facility. Prior to 1106, the term "Poorhouse System" (居养法) was used as a general term meaning either the system or the facility depending on whether the relief functions of the facility were listed or not. From 1106, the term Poorhouse (居养院) was used for the facility.

4. The imperial agency of the Left Out of Favor Funerary Park (漏泽园) does not appear in *A Dictionary of Official Titles in Imperial China* (Stanford: Stanford University Press, 1985) edited by Charles O. Hucker. For clarity I follow the title "Pauper's Cemetery" proposed by Scogin in "Poor Relief."

5. It is important to note that although I use the term "hospital," I do not presume that these institutions resembled modern-day hospitals.

6. Physicians who lost no more than twenty percent of their patients were rewarded according to the numbers of patients they treated in a year: if over a thousand, they received a Monastic Certificate (度牒); if over 500, 50 strings of cash; if over two hundred, twenty strings of cash. A physician who treated a thousand patients and lost no more than ten percent would receive a special bonus.

7. The character in the text is *Hai* (骸). The most common translation is "skeleton" however it also refers to "body.", The story probably refers to corpses, but I use "skeleton" as translation to remain close to the original meaning.

8. In another record, we find a reference that the hospitals were actually used to hold prisoners, which may further indicate that the system was more practical than sagely in reality.

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This study does not contain any studies with human or animal subjects performed by the author.

Author contributions

Asaf Goldschmidt did the research and wrote the paper.

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Continuity and Change in *Dao Yin*: Comparing and Contrasting the Therapeutic Exercises in *Yin Shu* (*The Book of Pulling*, c. 2nd Century BCE) and *Zhu Bing Yuan Hou Lun* (*Treatise on the Origins and Manifestations of Various Diseases*, 610 CE)

Dolly Yang[1,✉]

Abstract

The manuscript *Yin Shu* (*The Book of Pulling*), excavated from Zhangjiashan Han Tomb No. 247, is the earliest surviving text on therapeutic exercise known as *Dao Yin* (lit. guiding and pulling). Discovered in 1983, this *Dao Yin* text, together with the drawings of 44 figures performing "guiding and pulling" exercises found in the Mawangdui Han Tomb in 1974, are of great significance to the study of the early history of *Dao Yin*. Prior to these discoveries, researchers into *Dao Yin* relied mainly on material found in the *Dao Zang* (*the Daoist Canon*), compiled in 1145. This led to their conclusion that *Dao Yin* was essentially Daoist. The development of *Dao Yin* reached its zenith during the Sui Dynasty (581–618 CE), when it became one of the three medical departments at the imperial medical education institution. As part of the medical reform of the second Sui Emperor, *Yang Di*, *Dao Yin* became the treatment of choice, and the employment of a large number of *Dao Yin* specialists to the Sui court transformed the state medical service. The compilation of *Zhu Bing Yuan Hou Lun* (*Treatise on the Origins and Manifestations of Various Diseases*) under *Yang Di*'s decree, incorporated an abundance of resources on *Dao Yin*, enabling physicians to potentially "prescribe" *Dao Yin* to their patients. Situating both *Yin Shu* and *Zhu Bing Yuan Hou Lun* in their social and historical contexts, this article analyses their editorial treatments, examines their different objectives, styles, and readerships, and compares the various exercises described in the two texts. It emphasizes the fact that over a period of nearly a thousand years, from the late Warring States (475–221 BCE) to the Sui and Tang periods, *Dao Yin* was an important medical practice, culminating in its institutionalization by the Sui government.

Keywords: *Dao Yin*; Early and medieval Chinese medicine; Therapeutic exercise; *Yin Shu*; *Zhu Bing Yuan Hou Lun*

1 Introduction

Dao Yin (導引), literally meaning "guiding and pulling," is a form of physical exercise incorporating breathing, self-massage, visualization, incantation, and other techniques. The definition and understanding of *Dao Yin* differ according to contexts and historical periods. One definition, from 7th-century Chinese medical text *Zhu Bing Yuan Hou Lun* (《諸病源候論》*Treatise on the Origins and Manifestations of Various Diseases*), describes *Dao Yin* as a means to "pull out the pathogenic qi hidden in the aging body and in response to this pulling, the pathogenic qi is drawn out; thus the name *Dao Yin*."[1] English translations include terms such as "gymnastics", "callisthenics", "healing exercise" and "therapeutic exercise".

In her 1989 article, *Gymnastics: the Ancient Tradition*, French sinologist Catherine Despeux says:

> "Among the earliest documents on gymnastics there are the short commentary to the pictures of the *Dao Yin Tu* and certain recently discovered texts on bamboo slips (see *Wenwu* 1985). The latter were unearthed in Jiangling in Hunan, but they have not been studied yet. One of the more extensive early sources is a medical text dating from the Sui dynasty. Except for these, all the texts that deal with gymnastics in this early period have been transmitted in the Daoist Canon, which was only edited in the Ming dynasty (1368–1644 CE)."[2]

These three *Dao Yin* sources, which have never been part of the *Dao Zang* collection, are the *Dao Yin Tu* (《導引圖》*Drawing of Guiding and Pulling*), an excavated

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manuscript found in Mawangdui Han Tomb in 1974, the *Yin Shu* (《引書》 *the Book of Pulling*) another excavated manuscript found in Zhangjiashan Han Tomb in 1983 and the aforementioned *Zhu Bing Yuan Hou Lun*, a state-sponsored medical text of the Sui dynasty (581–618 CE). Each source gives evidence of the "non-Daoist" aspects of *Dao Yin* and is, therefore, invaluable. Before these Han manuscripts were excavated, *Dao Yin* was generally considered to belong first and foremost to Daoist traditions, a misconception still deeply rooted in academia, and particularly in Western scholarship, where most of the works on *Dao Yin* were written by Daoist or pro-Daoist scholars.[3] Such bias can be traced back as far as the 18th century, when *Dao Yin* was first introduced to the West by the Jesuits, who described *Dao Yin* as Laozi's kung-fu (Cong-fou des Bonzes Taosée).[4] Hence the considerable academic value of *Dao Yin Tu* and *Yin Shu*, which prove the popularity of *Dao Yin* among the Han nobles, predating the establishment of organized Daoist communities such as the *Tian Shi Dao* (天師道Way of the Celestial Masters) during the second century CE.

Another important early *Dao Yin* text mentioned by Despeux is *Zhu Bing Yuan Hou Lun*, which was compiled in 610 CE under the decree of the second Emperor of the Sui dynasty, *Yang Di* [隋煬帝 (r. 604–618)]. Its significance lies in the naming, describing, and classifying of all medical disorders known in early seventh-century China. This in itself is a remarkable medical innovation, especially when we consider that the earliest European texts on nosology, a branch of medicine dealing with the classification of diseases, such as "Nouvelles classes des maladies dans un ordre semblable à celui des botanistes" (1734) by François Boissier de Sauvages de Lacroix (1706–1767) and "Genera Morborum" (1763) by Swedish naturalist Carl Linnaeus (1707–1778), were not to appear for another thousand years.[5,6]

A striking feature of *Zhu Bing Yuan Hou Lun* is the inclusion of *Yang Sheng* (養生) practices, an important component of which is *Dao Yin*. The term *Yang Sheng* was understood very differently by different people during the Warring States, Qin and Han periods (481 BCE–220 CE); however, by the fourth century CE, when Zhang Zhan (張湛fl. 350–400 CE), an aristocrat of northern descent living in Jiankang [建康 (modern-day Nanjing)], compiled *Yang Sheng Yao Ji* (《養生要集》 *Essential Compendium on Nourishing Life*) "to help his fellow aristocrats stay healthy and live moderately,"[7] the association of *Yang Sheng* with bodily practices would have been well established. These self-cultivation practices include breathing exercises, *Dao Yin*, diet, meditation and visualization, sexual hygiene, and other preventative health practices.[3] In *Zhu Bing Yuan Hou Lun*, we can find an abundant resource of *Yang Sheng* materials drawing from various texts such as *Yang Sheng Yao Ji*, and in particular from the following two source materials: *Yang Sheng Fang* (《養生方》 *Yang Sheng Recipes*) and *Yang Sheng Fang Dao Yin Fa* (《養生方導引法》 *The Yang Sheng Recipes: The Dao Yin Methods*). The former offers advice on lifestyles such as diet, sleep, and personal hygiene. The latter gives *Dao Yin* instructions such as treatments for various diseases.

This paper analyses and compares the *Dao Yin* material in the Han excavated manuscript *Yin Shu* with that in the 7th-century medical text *Zhu Bing Yuan Hou Lun*, situating both texts in their social and historical contexts. It investigates the contexts of their production, their writing and editorial styles and their function as well as giving examples of exercises found in both texts. The paper demonstrates that *Dao Yin* exercise was an integral part of medical knowledge and practice from the Han period, and was originally connected with the longevity and immortality practices of the *Xian* (仙transcendent) cult, which emerged around the late third century BCE. By the time of the Sui dynasty, *Dao Yin* was officially endorsed as a medical treatment and elevated to be the main component of state medicine, with the largest department in the imperial medical academy dedicated to its teaching and learning. It was also systematically incorporated into the state-sponsored medical text, *Zhu Bing Yuan Hou Lun*.

2 Yin Shu (The Book of Pulling)

Written on approximately 113 bamboo slips with 4,000 graphs in total, *Yin Shu* was buried, along with another medical manuscript, *Mai Shu* (《脈書》 *The Book of Channels*), in a tomb at the Zhangjiashan burial site in Hubei. It is not known who was buried in this tomb. According to Gao Dalun (高大倫), the occupant was likely to be a low-ranking official who was buried in 186 BCE during the reign of Empress Lü Zhi (呂雉 r. 187–180 BCE), the consort of Gao Zu (高祖 r. 202–195 BCE) who founded the Han dynasty.[8] At this time the harsh law codes of the Qin (221–206 BCE) had been abolished and the milder edicts of the Han (202 BCE–220 CE) introduced, moving toward a more Confucian style of governing. As Unschuld remarks, "This is no longer the small feudal state and principality of the waning Zhou period, but rather the Confucian-Legalist administration system of the united empire."[9] A new medical paradigm, based on philosophical concepts such as qi, yin-yang and the five agents, began to emerge, as if reflecting the new unified and centralized political state. Representations of the body, the state and the cosmos were indicative of new ideas of correspondence between microcosm (the body and the state) and macrocosm (the cosmos).[10]

This new medical paradigm, described as a "medicine of systematic correspondence," became increasingly systematized and standardized toward the end of the Han dynasty, and is represented by medical texts such as *Huang Di Nei Jing* (《黃帝內經》 *The Yellow Emperor's Inner Classic*) and *Nan Jing* (《難經》 *The*

Figure 1 *Yin Shu* strip no. 1 (source from: Lo 2014[13]: 3).

Classic of Difficult Issues).[9] At the same time, excavated medical texts in various early Han tombs are noticeably heterogeneous and less sophisticated. They demonstrate that ancestral and demonological concepts of illness prevalent during the Shang and Zhou dynasties (ca. 1600–256 BCE) had begun to yield their dominant position to the new medical paradigm whereby an illness was seen to have a "natural" cause.[11,12] Excavated texts such as *Yin Shu* offer a window into this transitional period between the old and the new worlds of medicine, resonating with what was happening socially and politically.

Yin Shu is the first extant text focusing solely on *Dao Yin*, offering a comprehensive step-by-step guide to physical exercise for the educated Han nobility. Whereas most excavated manuscripts were untitled and only given names by modern archaeologists or conservation committees, *Yin Shu* is named with the two characters, *Yin* (引) and *Shu* (書), which were written on the back of the manuscript's first slip (Fig. 1).

According to *Shuo Wen Jie Zi* (《說文解字》 *Explaining Simple and Analysing Compound Characters*), the earliest extant dictionary compiled in the first century CE, *Dao* (導) was described as *Yin* (引), as in "opening a bow."[14] By the late Han, the two words had become cognate, with *yin* seeming to define the quality of guidance inherent in *Dao*, understood as a form of pulling. Thus *Yin Shu* would have been an appropriate title for a manuscript dedicated to *Dao Yin* exercise.

Both *Dao Yin Tu*, a drawing of 44 illustrations of human figures performing specific bodily movements, and *Yin Shu*, which describes in detail more than 100 *Dao Yin* exercises, demonstrate the popularity of this form of exercise among Chu elites in the Warring States and early imperial periods. As Harper observed, these literate elites had the time and money to engage in the pursuit of longevity and immortality practices and were "significant participants in the culture of secrecy and privileged knowledge."[12] Those who passed on such knowledge and techniques were the so-called *Fang Shi* (方士Masters of Formulas) who were specialists in "natural philosophy and occult knowledge."[12,15]

Sima Qian (司馬遷ca. 145–86 BCE) first uses the title *Fang Shi* for those who arrived at the court of the First Emperor of the Qin dynasty (r. 221–210 BCE) with techniques for the way of *Xian*, of releasing the form and interacting with ghosts and spirits.[16] Sima Qian describes these technical experts as followers of Zou Yan (騶衍ca. 305–240 BCE), who was reputed to have developed a theory of cosmogony, using yin-yang and the Wuxing (five phases) in order to explain the cyclical changes in nature and to predict the political fortunes of rulers.[16] Sivin stresses that the term *Fang Shi* was never used as a self-referent and was often derogatory.[17] Nevertheless, some *Fang Shi* with expertise in medical knowledge and *Yang Sheng* techniques attracted Han nobles, who became their patrons. While *Fang Shi* is an eclectic term referring to a range of specialists in technical arts, *Yi* (醫) was a more specific title for physicians, although in *Huang Di Nei Jing*, the term *Fang Shi* also appears as a reference to physicians.[18] Therefore, in some contexts, the terms *Fang Shi* and *Yi* would have been synonymous and interchangeable.

2.1 The structure of the text *Yin Shu* (*The Book of Pulling*)

Yin Shu can be divided into three parts. The first part deals with daily and year-round health care, including personal hygiene, diet, sleep, and sexual behavior. The second part, the main bulk of the manuscript, contains 41 sets of exercises, of which 37 are perfectly preserved. The third part outlines the etiology and prevention of certain diseases.

2.1.1 The first part of *Yin Shu*

The opening of *Yin Shu* evokes a legendary figure Pengzu (彭祖) who was known for his longevity through the practice of *Dao Yin* and sexual techniques:

> "春產，夏長，秋收，冬藏，此彭祖之道也。"
> (English translation:
> "In the spring generate, in the summer grow, in the autumn harvest, in the winter preserve, this is the way of Pengzu."[13])

The text goes on to describe the kind of regimen one should follow according to the season. "The way of Pengzu" in *Yin Shu* echoes the writing of *Zhuang Zi* (《莊子》 *Zhuang Zi*), a Warring States text attributed to the philosopher Zhuang Zhou (莊周370–287 BCE) where the earliest recorded instance of the term *Dao Yin* appears:

> "吹昫呼吸，吐故納新，熊經鳥伸，為壽而已矣。此道引之士，養形之人，彭祖壽考者之所好也。"
> (English translation:
> "The acts of exhaling and inhaling, breathing out the old and breathing in the new, hanging like a bear and stretching like a bird are simply methods for achieving longevity. These are what practitioners of *Dao Yin*, people who 'nourish their form' and pursue longevity like Pengzu, like to do."[19])

The authors of this *Zhuang Zi* chapter, writing in the context of advising rulers on effective government, were critical of those *Dao Yin* practitioners who followed the way of Pengzu and whose priority was to nourish their physical bodies. They, on the other hand, emphasized the importance of nourishing the spirit *Yang Shen* (養神) and would probably not have approved of the kind of bodily practices advocated in *Yin Shu*.

Sensitive to the fact that the term *Yang Sheng* did not appear in any of the Mawangdui medical manuscripts, Harper is reluctant to use the term to describe the type of bodily practices described in these manuscripts. He prefers to use the term "macrobiotic hygiene." Harper also objects to the assumption that bodily self-cultivation practices depicted in these Han excavated manuscripts must be Daoist or belong to Daoism:

> "The scholarly convention is to treat the complex ideas associated with both macrobiotic hygiene and the belief in *Xian* as aspects of a belief system loosely called Daoist…. The Mawangdui and Zhangjiashan macrobiotic hygiene texts are evidence enough that macrobiotic hygiene did not originate in so-called Daoist philosophy….In short, efforts to understand the development of ideas concerning macrobiotic hygiene and the *Xian* cult are not well served by a too easy use of the label Daoism."[12]

Although little is known about the early formation of the *Xian* cult, it had become prominent by the late third century BCE. Harper argues that "eremitism, shamanic religion, and ideas about flight to spirit paradises each played a role, as did new ideas about a drug of deathlessness and alchemical elixirs which began to circulate in the third century BCE."[12] Various ancient figures, depicted by Han and later writers as *Xian* have been portrayed as masters of *Dao Yin*, the most prominent of whom is Pengzu, evidenced in both *Yin Shu* and *Zhuang Zi*.

Two *Dao Yin*-related texts are listed in the *Shen Xian* (神仙spirit transcendence) subcategory under the *Fang Ji* (方技recipes and techniques) section of *Han Shu Yi Wen Zhi* (《漢書藝文志》 *The Bibliographic Treatise in the Book of Han*): *Huang Di Za Zi Bu Yin* (《黃帝雜子步引》 *The Yellow Emperor's Miscellaneous Walking and Pulling Exercises*) and *Huang Di Qi Bo An Mo* (《黃帝岐伯按摩》 *Massage and Therapeutic Exercises of the Yellow Emperor and Qi Bo*).[20] Together with the other three subcategories: *Yi Jing* (《醫經》 *Medical Classics*), *Jing Fang* (《經方》 *Canonical Recipes*), and *Fang Zhong* (《房中》 *Sexual Cultivation*), the texts listed in the *Fang Ji* represent early Chinese medical literature.

2.1.2 The second part of *Yin Shu*

The second part of *Yin Shu*, which contains 41 sets of exercises, can be further divided into two sections. The first section, headed by black dots on the slips, describes and names physical exercises. For example:

> ● 舉胕交股更上更下三十曰交股 ● 伸胕屈指三十曰尺蠖
> [English translation:
> "Raise the lower leg to cross the thigh, alternately raise and lower again thirty times. This is called 'Crossing the Thigh'. Extend the lower leg curling the toes thirty times. This is called the 'Inch Worm' (Strip no. 8)]."[13] (Fig. 2)
> ●以足摩胕陰陽各三十而更 ●正伸兩足三十曰引陽筋
> [English translation:
> "Massage the lower leg with the foot, thirty times on the yin aspect and thirty times on the yang aspect, alternating. Extend the two feet out straight thirty times. This is called 'Pulling the yang Muscles' (Strip no. 11)]."[13] (Fig. 3)

Terms such as yin, yang, and qi (but not the five agents) appear in *Yin Shu*, demonstrating how the instruction of *Dao Yin* was already employing the new technical language in vogue at that time.

The second section first names an illness before describing an appropriate exercise. For example:

> ● 引內癉危坐□尻左手撫項右手撫左手上扼（？）俯極因徐縱而精呴之端仰 而已定 ●又復之五而…
> [English translation:
> "Pulling inner exhaustion. Sit tall (on the haunches), X the buttocks, with the left-hand stroke the neck, with the right hand stroking the left hand, raise (the yoke). Bend forward as far as possible, then slow down, loosen up and concentrate exclusively on exhaling warm breath. Straighten up, raise the head and stop. Settle down, then repeat five times (Strip no. 29)]."[13] (Fig. 4)

Exercises in *Yin Shu* fall into three main categories: physical movement, breathing exercises, and self-massage. Certain exercises are to be repeated up to as many as a thousand times, and in one example 4000 times, a day. Lo, who has analyzed *Yin Shu* and translated it into

Figure 2 *Yin Shu* Strip no. 8(source from: Lo 2014:13).

Figure 3 *Yin Shu* Strip no. 11(source from: Lo 2014:19).

English, argues that the types of illnesses treated with *Dao Yin* in *Yin Shu* loosely match those associated with each of the 11 *Mai* (脈channels/vessels) described in *Mai Shu*.[21] This is significant, as Lo's observation supports the hypothesis advanced by Shen Shou (沈寿), who suggests that the eleven columns of *Dao Yin Tu* correspond to the 11 channels described in both Mawangdui and Zhangjiashan tomb texts.[22]

As part of the burial goods, *Yin Shu* was intended for use by the tomb's occupant. Lo notes that,

> "… the symptoms, although roughly grouped as ailments of the ankle or back, are randomly ordered and

Figure 4 *Yin Shu* Strip no. 29 (source from: Lo 2014[13]: 39).

> do not follow the neat head-to-toe format we have seen in other Chu texts. And unlike the *Wu Shi Er Bing Fang* (《五十二病方》*Formulas for Fifty-two Diseases*) which we saw provided contents lists matching signs of illness to specific sets of remedies, *Yin Shu* lacks an effective searching device."[23]

Not having an easy way to locate a particular illness or apply the recommended exercise makes the text hard to use as a quick reference manual. By contrast, the innovative classification of *Dao Yin* exercises in *Zhu Bing Yuan Hou Lun* greatly enhanced their accessibility.

2.1.3 The third part of *Yin Shu*

The third part of *Yin Shu* describes the etiology of diseases and ways of maintaining good health. For example, it talks about the relationship between disease and social class:

> "The reason that the nobility get illness is that they do not harmonise their joys and passions. If they are joyful then the yang qi is in excess. If they are angry then the yin qi is in excess…The reason that lowly people become ill is exhaustion from their labour, hunger and thirst; when the hundred sweats cease, they plunge themselves into water and then lie down in a cold and empty place. They do not know to put on more clothes and so they become ill from it. Also they do not know to expel air and breathe out (dry breath) to get rid of it. On account of this they have many illnesses and die easily."[13]

To summarize, *Yin Shu* testifies to the popularity of *Dao Yin* among the Han elites who had the time and money to engage themselves in various bodily practices. They learned the techniques from experts, generally referred to as *Fang Shi*, who were associated with the *Xian* cult of longevity and immortality practices. *Fang Shi* were not Daoists, nor were the Han elites. Therefore, it would be inappropriate to describe these exercises as "Daoist." In fact they were discredited by the authors of *Zhuang Zi*, which is often regarded as a Daoist text.

Being a tomb text, *Yin Shu* lacks a reliable searching device, which makes it hard to locate a specific exercise for a specific disease. Nevertheless, the material copied by the copyist of *Yin Shu* would have been conceived by those with a certain level of expertise, and would still be useful as a year-round health manual in the households of Han elites.

Several exercises from *Yin Shu* are found in *Zhu Bing Yuan Hou Lun*, a text compiled more than 800 years later, demonstrating some continuity in the tradition, albeit in different social and political contexts and for a different purpose and readership.

3 *Zhu Bing Yuan Hou Lun* (*Treatise on the Origins and Manifestations of Various Diseases*)

The Sui dynasty (581–618 CE), unified China after nearly four centuries of political fragmentation following the fall of the Han dynasty in 220 CE, and despite being short-lived, left an indelible mark in Chinese history. Two emperors span the Sui dynasty: *Wen Di* (隋文帝 [r.581–604]) and *Yang Di*. For almost 300 years, between the collapse of the Western Jin dynasty in 316 CE and the founding of the Sui dynasty, various non-Chinese nomadic groups dominated the political scene in northern China. Despite their *Xian Bei* (鮮卑) roots, both emperors of Sui dynasty regarded themselves as descendants of Han Chinese and promoted Chinese culture throughout their territory. Many of Wendi's

policies followed the old systems of the Han and Wei (魏 [220–266]) empires, adopting much of the "sinicized" policy of Emperor *Xiao Wen* of the Northern Wei (北魏孝文帝 [r. 471–499]). The aim was to create a single unified empire dominated by Chinese culture, Chinese systems of thought, art, law, and political organization, using the Chinese written language. Chen argues that in order to gain political legitimacy, the Sui and Tang rulers claimed to have been Han Chinese all along.[24] Thus medical knowledge and practice associated with the "medicine of systematic correspondence" during the Han dynasty and epitomized by medical texts such as the *Huang Di Nei Jing*, were advocated and supported during the Sui.

Significant among Sui reforms was the establishment of the Imperial Medical Office (太醫署) and with it a state-sponsored medical education system. Table 1 shows staffing levels at the Imperial Medical Office according to *Sui Shu* (《隋書》 *The Book of Sui*)[25].

Another set of data in *Tang Liu Dian* (《唐六典》 *The Six Statues of the Tang Dynasty*), records the positions and numbers of staff and students at the Imperial Medical Office when it was handed over to the Tang sovereign (Table 2)[26].

The two sets of data reflect staffing levels during the reigns of the two emperors. *Sui Shu* suggests initial staffing levels at the Imperial Medical Office when first established by the hard-working, diligent and extremely frugal *Wen Di*; whereas *Tang Liu Dian* shows the changes that took place under the reign of *Yang Di*, who was renowned for his extravagance and aversion to criticism.

According to *Tang Liu Dian*, the *An Mo* Erudites were responsible for teaching *An Mo* students breathing exercises and *Dao Yin* in order to get rid of eight types of illness; namely diseases associated with wind, cold, summer heat, damp, hunger, overeating, over-exertion, and over-indulgence.[26] The term *An Mo*, often problematically translated as massage, was used interchangeably with *Dao Yin* during the Sui and Tang period. In fact, most historical texts containing instructions for *An Mo* techniques, are essentially *Dao Yin* exercises with self-massage as an important component. Therefore, these *An Mo* experts were not doctors who practised "massage" the way we understand nowadays but rather *Dao Yin* practitioners.[3]

Not only were there a large number of *Dao Yin* specialists at the department of *An Mo* during *Yang Di*'s reign, but a comparable initiative was responsible for a similar expansion at the Palace Medical Service (尚藥局), whose main responsibility was to provide medical care to the emperor and the imperial family. After the Palace Medical Service was placed under the Department of Palace Attendance (殿内省) in 607, over 200 people were employed at the Palace Medical Service, including 120 *An Mo* Masters.[26] These *An Mo* Masters were, in many ways, assistants to the *An Mo* Erudites. Had *Yang Di* ordered the recruitment of 20 *An Mo* Erudites with 120 *An Mo* Masters at the Imperial Medical Office, and another 120 *An Mo* Masters at the Palace Medical Service while other staffing levels were disproportionally low in comparison, nobody would have argued with him.

While it was *Wen Di* who first established the three specialized medical departments, we can confidently assert that *Yang Di* had a particular vision of medical care which emphasized the role of *Dao Yin*. One of the reasons for *Yang Di*'s radical medical reform lies in his "southernisation." Having spent most of his adult life in the south, his access to books on a wide variety of subjects would have enabled him to gain knowledge in medicine and *Yang Sheng*, both of which were intertwined with southern religious communities such as the *Shangqing* School (上清派) and the *Tiantai* School (天台派), two religious sects with which he had a deep association. *Yang Di* also had an enthusiasm for occultism and would actively seek out people with unusual abilities, bringing them to his court. All these influences could have contributed to his vision of creating a new state medical service with *Dao Yin* at its core.

Although we do not have evidence to suggest that *Yang Di*'s initiative extended beyond the Sui's capitals, it is reasonable to deduce that his intention was to transform contemporary medical knowledge and practice by creating a new medical discourse, which would ultimately affect not only everyone within Sui empire but others further afield. Had *Yang Di*'s medical reform survived, the history of medicine in China would have been very different! Yet, the legacy of his vision is embodied and preserved in *Zhu Bing Yuan Hou Lun*.

As a text on nosology, *Zhu Bing Yuan Hou Lun* could simply have categorized individual diseases, without including any therapy, let alone *Yang Sheng* and/or *Dao Yin* instructions. It was on *Yang Di*'s order, however, that their insertion was carried out. *Yang Di* achieved two medical innovations in this state-sponsored medical text—the production of the first ever encyclopedic medical text on nosology in China and, possibly, in the world, and the creation of a new medical discourse elevating

Table 1 Staffing levels at the Imperial Medical Office according to *Sui Shu*

Job title (Chinese)	Job title (English)	No. of staff
太醫令	Imperial Physician	2
太醫丞	Aide to the Imperial Physician	2
主藥	Pharmacist	2
醫師	Master Physician	200
藥園師	Herbalist	2
醫博士	Erudite of Medicine	2
醫助教	Assistant of Medicine	2
按摩博士	Erudite of *An Mo*	2
咒禁博士	Erudite of Incantation and Interdiction	2
Total		216

Table 2 Staffing levels at the Imperial Medical Office according to *Tang Liu Dian*

Job titles (Chinese)	Job titles (English)	No. of staff and students
太醫令	Imperial Physician	2
太醫丞	Aide to the Imperial Physician	2
醫監	Medical Supervisor	5
醫正	Principal Practitioner	10
醫師	Master Physician	200
藥園師	Herbalist	2
藥生	Student herbalists	8
醫博士	Erudite of Medicine	2
醫助教	Assistant of Medicine	0
醫生	Student of Medicine	120
按摩博士	Erudite of *An Mo*	20
按摩師	*Amno* Master	120
按摩生	Student of *An Mo*	100
咒禁博士	Erudite of Incantation and Interdiction	1
Total		592

Dao Yin to its prominent position as the main medical therapy of the state medical service.

3.1 The structure of the text *Zhu Bing Yuan Hou Lun*

Two fundamental concepts in *Zhu Bing Yuan Hou Lun* are central to the formation of the text—*Bing* (病), meaning disease, illness or disorder, and *Hou* (候), which can be translated as manifestation, sign, syndrome or symptom. *Zhu Bing Yuan Hou Lun* is organized on two levels—that of *Bing*, which functions as a larger "disorder" category, and that of *Hou*, which functions as an individual disease. The *Bing* category, identifying illness as separate from the sufferer, runs contrary to the central premise of Chinese medicine, that it is the patient, not just the disease, that is being treated. Thus, the process described in *Zhu Bing Yuan Hou Lun*, of identifying different "disorders" and their various "signs" and "symptoms," has a modern ring to it, anticipating the extensive specialization of modern Western medicine.

According to Ding Guangdi's edition of *Zhu Bing Yuan Hou Lun*, there are a total of 1739 *Hou*, under 71 *Bing* in 50 scrolls.[1] *Dao Yin* exercises are prescribed for 110 out of 1739 *Hou* – about 6% of the *Hou* in *Zhu Bing Yuan Hou Lun*. However, these 110 *Hou* appear in 50 of the 71 *Bing*. By this measure, *Dao Yin* exercises are prescribed for over two-thirds of disorders in *Zhu Bing Yuan Hou Lun*. It is notable that many of the *Dao Yin* instructions appear at the beginning of each category, and the first *Hou* often bears the same name as the disorder itself. For example, the first *Hou* in the "Disorder of Deficiency Exhaustion" (虛勞病) is named "Symptoms of Deficiency Exhaustion" (虛勞候), and gives a general introduction to the whole *Bing* (disorder). Twelve *Dao Yin* exercises are recommended for the conditions described in this *Hou*. The fact that *Dao Yin* exercises appear in many of the introductory disease sections is significant, as they could potentially address all diseases in those categories, and therefore be relevant for two-thirds of all 1739 sets of signs and symptoms.

Table 3 shows the 50 *Bing* (disorders) categories *in Zhu Bing Yuan Hou Lun* for which *Dao Yin* exercises are prescribed, together with the numbers of exercises in each category, and whether or not the exercises appear in the first *Hou*.

Despeux makes the following observations about *Dao Yin* exercises in the Sui and Tang period:

> "The texts refer to gymnastics especially in connection with problems of the arms and legs, with muscle tensions, rheumatism, locomotive troubles, paralyses, and so on. All these, in large part, belong to a group of ailments classified traditionally as "disorder caused by wind". In the same group one finds also digestive troubles, psychosomatic disorders, weakness in the circulation of the blood, body fluids or respiratory symptoms. On the other hand, fevers, epidemics, and the various disorders related to the seven orifices (ears, eyes, nose, mouth etc.) are only occasionally mentioned as responding to gymnastics therapy."[2]

Lo notes similar types of illnesses which were treated by moxibustion, a form of heat therapy in which dried plant materials called "moxa" are burned on particular points of the body. Examining the moxibustion charts in the Dunhuang manuscripts of the Tang period found in a Buddhist cave on the Silk Road, Lo observes that:

> "For treatment of those non-fatal, non-contagious chronic illnesses, predominantly associated with pain, digestion and external attack by wind and cold, moxibustion and *Dao Yin* must have provided a practical and accessible form of home remedy, especially for those with no access or money to pay professional physicians."[27]

Thus, for both Despeux and Lo, *Dao Yin* exercises are most effective in treating locomotive muscular conditions, gastrointestinal disorders, pain, and sensory disturbance. However, examination of the diseases in *Zhu Bing Yuan Hou Lun* treated by *Dao Yin* exercises suggests that the picture is a more complex one. While some of the 50 disorder categories for which *Dao Yin* exercises are prescribed fit easily into the curative descriptions mentioned above, others are harder to classify. Disorders such as *Gu* (蟲poison), *Zhu* (注infixation, lit. residence), *Shi* (尸corpse), malignity stroke, and sudden turmoil, do not seem to fit neatly into the aforementioned categories. For example, the diseases of *Zhu* are often contagious but can be treated by *Dao Yin*. There is also an acute illness with a sudden uprising qi for which a *Dao Yin* remedy is recommended.[1]

It is interesting to note that *Dao Yin* is perceived as a practical, flexible, and accessible form of home remedy, in contrast to the effort made by the Sui government, demonstrated clearly in *Zhu Bing Yuan Hou Lun*, to formalize and standardize *Dao Yin* exercises.

Table 3 The 50 *Bing* categories *in Zhu Bing Yuan Hou Lun* (*Treatise on the Origins and Manifestations of Various Diseases*) for which *Dao Yin* exercises are prescribed, together with the number of exercises in each category and whether the *Dao Yin* instructions appear in the first *Hou* of a particular *Bing* category

No.	Name of disorders (in Chinese)	Name of disorders (in English)	No. of *Dao Yin* exercises	*Dao Yin* in the first *Hou*
1.	風病	Wind Disorder	65	13th
2.	虛勞病	Disorder of Deficiency Exhaustion	41	✓
3.	腰背病	Disorder of Lumbar Region	11	✓
4.	消渴病	Disorder of Wasting & Thirsting	2	✓
5.	傷寒病	Disorder of Cold-damage	2	✓
6.	時氣病	Seasonal Disorder	1	✓
7.	溫病	Warm Disorder	3	✓
8.	疫癘病	Epidemic Pestilential Disorder	2	✓
9.	冷熱病	Cold and Hot Disorder	9	✓
10.	氣病	Disorder of Qi	8	✓
11.	腳氣病	Disorder of Leg-qi	5	✓
12.	咳嗽病	Cough Disorder	3	10th
13.	淋病	*Lin* (Painful Urinary Dribbling) Disorder	5	✓
14.	小便病	Disorder of Bladder Movements	3	2nd
15.	大便病	Disorder of Bowel Movements	3	✓
16.	五臟六腑病	Disorder of Five *Zang* and Six *Fu*	11	✓
17.	腹痛病	Disorder of Abdominal Pain	11	✓
18.	心腹痛病	Disorder of Pain in the Heart Region	2	✓
19.	痢病	Dysentery Disorder	1	✓
20.	九蟲病	Disorder of Nine Worms	2	2nd
21.	積聚病	Disorder of Aggregation and Accumulation	7	✓
22.	癥瘕病	Disorder of Abdominal Mass	1	2nd
23.	疝病	Disorder of Bulging Disorder	3	2nd
24.	痰飲病	Phlegm-rheum Disorder	3	✓
25.	癖病	Disorder of Ensconced Lumps	1	✓
26.	否噎病	Disorder of Block and Choke	1	2nd
27.	脾胃病	Disorder of Spleen and Stomach	1	2nd
28.	嘔噦病	Retching Disorder	3	4th
29.	宿食不消病	Disorder of Indigestion	9	✓
30.	水腫病	Disorder of Water Swelling	5	✓
31.	霍亂病	Disorder of Sudden Turmoil	12	22nd
32.	中惡病	Disorder of Malignity Stroke	1	8th
33.	尸病	Disorder of Corpse	1	7th
34.	注病	Disorder of Infixation/Residence	2	✓
35.	蠱毒病	Disorder of Gu Poison	3	✓
36.	血病	Blood Disorder	1	✓
37.	毛髮病	Hair Disorder	7	✓
38.	目病	Eye Disorder	8	7th
39.	鼻病	Nose Disorder	4	✓
40.	耳病	Ear Disorder	2	✓
41.	牙齒病	Teeth Disorder	3	3rd
42.	唇口病	Disorder of Lips and Mouth	1	✓
43.	咽喉心胸病	Disorder of Throat, Heart and Chest	3	✓
44.	癭瘤等病	Disorder of Goitres and Tumors of the Neck	3	11th
45.	癰疽病	Disorder of Abscess and Swelling	2	15th
46.	瘡病	Disorder of Chronic Sore	2	34th
47.	痔病	Disorder of Hemorrhoid	4	✓
48.	瘡病	Disorder of Sore	2	3rd
49.	腕傷病	Disorder of Injury of Wrist	5	3rd
50.	婦人雜病	Women's Miscellaneous Disorder	2	133rd
		Total	292	

3.2 The editorial intention of the Text

The style of writing is lucid as well as formal in *Zhu Bing Yuan Hou Lun*, as might be expected from an official medical text. The etiology of an illness is described, together with its symptoms, and, often, its pulse. Where there are instructions for *Yang Sheng* and/or *Dao Yin* exercises, they are preceded by a standard phrase:

"其湯熨針石，別有正方，補養宣導，今附於後。"

(English translation:
"The orthodox prescriptions for decoction, hot compress, needles and *bian*-stones are given elsewhere. The *Yang Sheng* supplementation and *Dao Yin* instructions are now attached here below.")

Here is an example of a disease entry entitled "Symptoms of lopsidedness caused by wind":

"偏風者，風邪偏客於身一邊也。人體有偏虛者，風邪乘虛而傷之，故為偏風也。其狀，或不知痛癢，或緩

縱，或痺痛是也。其湯熨針石，別有正方，補養宣導，今附於後。《養生方·導引法》云：一手長舒，令掌仰，一手捉頦，挽之向外，一時極勢二七。左右亦然。手不動，兩向側極勢，急挽之，二七。去頸骨急強，頭風腦旋，喉痺，膊內冷注，偏風。"
[English translation:
"Lopsidedness caused by wind is when pathogenic *wind* is lodged on one side of the body. When the body is deficient on one side, pathogenic *wind* takes advantage of this and causes injury; hence a lopsidedness caused by wind. The signs are: an inability to feel pain, itch, being sluggish and lacking control, or having *Bi* pain. The orthodox prescriptions for decoction, hot compress, needles and *bian*-stones are given elsewhere. The *Yang Sheng* supplementation and *Dao Yin* instructions are now attached here below.
The Yang Sheng fang Dao Yin Fa says, 'Stretch one arm out fully, palm facing up. The other hand holds your chin and pulls it out. Extend the posture to its limit for a while, twice seven times, doing the same on both left and right. Then, keeping the hand in place, try to turn your head to both sides as much as possible whilst holding (your chin) tightly twice seven times. This gets rid of tension and stiffness in the neck, *head-wind*, dizziness, *throat-bi*, a cold sensation in the shoulders, and lopsidedness caused by wind.'"][1]

Notice that the last sentence describes the curative benefits of the exercise. The compilers of *Zhu Bing Yuan Hou Lun* seem to have followed the clue and inserted the same exercise into other relevant disease entries:

- Symptoms of head-spin caused by wind 風頭眩候
- Symptoms of cold residence 冷注候
- Symptoms of throat-*bi* 喉痹候

Unlike other *Dao Yin*-related materials, such as the ones recorded in *Yang Sheng Fang Dao Yin Fa*, whose exercise instructions tend to precede descriptions of their curative benefits, a new classification of exercises, in accordance with the etiology and symptoms of a given condition in *Zhu Bing Yuan Hou Lun*, created a new medical discourse and thereby put *Yang Di*'s vision of medicine and health into practice. The new nomenclature of medical disorders gave doctors at court greater expertise and ease of access to various *Yang Sheng* and *Dao Yin* instructions, enabling them both to diagnose the illness, and determine which *Yang Sheng* instructions and/or *Dao Yin* exercises would be appropriate to prescribe.

Five types of exercises appear in *Zhu Bing Yuan Hou Lun*:

1. physical movement
2. breathing exercises
3. self-massage
4. visualization
5. incantation.

These are frequently combined to form one particular exercise. For example, physical movement is often combined with specific breathing techniques, or visualization with self-massage. Visualization and incantations, absent in *Yin Shu*, are important components of the *Dao Yin* repertoire in *Zhu Bing Yuan Hou Lun*. For example, the treatment for "Symptoms of falling hair and beard, and baldness," is to comb the hair while reciting an incantation, to be carried out with the assistance of a servant.[1] This image of luxury epitomizes the literate elites from genteel families who were able to pay attention to their health and physical well-being. We can imagine them performing these incantations, invoking heavenly deities such as the Queen Mother of the West, a Daoist deity, in order to cure sickness and extend their lifespan. Such incantations also bear witness to the appropriation of religious practices by the state into the Sui's official medical system.

Zhu Bing Yuan Hou Lun would have also been used for pedagogical purposes, having been written from a doctor's perspective by medical officials at *Yang Di*'s court, at a time when the department of *An Mo* was at its largest. A standardized textbook on *Dao Yin* would have been required both as a teaching aid and for examinations.

The standardization of *Dao Yin* by the state had a regulatory function, ensuring the subordinate position of other healing practices performed by Daoists, Buddhists, or members of local cults. As *Dao Yin* was already popular as part of a regimen and as a household treatment among the elites, and among various religious communities as part of spiritual and religious training, the state was able to appropriate certain techniques, and patronize certain people, making exclusive claims to authority on *Dao Yin*.

4 *Dao Yin* exercises in *Yin Shu* and *Zhu Bing Yuan Hou Lun*

Several *Dao Yin* exercises in *Yin Shu* are found in *Zhu Bing Yuan Hou Lun*. For example, "clacking teeth" is recommended for toothache in both texts:

"黨以涿齒，令人不齲。其齲也，益涿之。"
[English translation:
"On waking knocking the teeth prevents tooth decay; if there is tooth decay knock
them more (*Yin Shu* Strip no. 98)."][13]
"東向坐，不息四通，上下琢齒三十六下。治齒痛。"
[English translation:
"Sit facing east, hold your breath four times, and clack together your teeth, up and down, thirty-six times. This cures toothache (*Zhu Bing Yuan Hou Lun*, *Juan* 29 Teeth Disorder, section 3: Symptom of Toothache)."][1]

This technique, appropriated by Daoists, later became a method of expelling ghosts, and as such it also appears in *Zhu Bing Yuan Hou Lun*:

"《養生方》云：《上清真人訣》曰：夜行常琢齒，殺鬼邪。"
[English translation:

> "The *Yang Sheng Fang* says, 'The Formula of the Perfected of the Great Clarity says, 'When walking in the night, always clack your teeth together. This kills ghost' (Juan 2 Wind Disorder, section 47: Symptoms of ghost deviance)."]¹

An instruction in *Yin Shu* for "Pulling Pain in the Eye," is to "rub the two hands together until the fingers are hot, and press on both eyes, stopping after ten times (Strip no. 91)."[13] This closely resembles the recommendation in *Zhu Bing Yuan Hou Lun* for curing "Poor Vision," that is, "Rub both hands together to make them hot, and press them against your eyes. Do this three times (*Juan* 28 Eye Disorder, section 12: Symptom of Poor Vision)"[1]

Yin Shu instructs those suffering from back pain to "lean forwards and backwards with the feet apart, touching the hands to the floor. Stop after ten times (Strip no. 50)."[13] *Zhu Bing Yuan Hou Lun*'s similar strategy for "Symptoms of Lumbar Pain, Inability to Bend Forwards or Backwards," is to "stretch out both legs, grab your toes, five on each foot, with both hands. Do this seven times."[1]

For throat-*bi* (blockage), *Yin Shu* suggests one should "stroke the chest, lift the chin, enclosing the top teeth within the bottom, vigorously look up three times and stop (Strip no. 83)."[13] For the same disease, *Zhu Bing Yuan Hou Lun* advises one to "hold the chin, pull it out and extend the posture to its limit for a while, twice seven times."[1]

Various breathing techniques are common to both *Yin Shu* and *Zhu Bing Yuan Hou Lun*. For example, terms such as *Wu Xi* (毋息 do not breathe) and *Bi Xi* (閉息 hold the breath) are used in *Yin Shu*; whereas terms such as *Bu Xi* (不息do not breathe) and *Bi Qi* (閉氣hold the breath) appear more than sixty times in *Zhu Bing Yuan Hou Lun*. The idea of *Yan Qi* (咽氣swallowing qi) is also present in both texts. Other technical terms, such as *Ji Zhi* (極之)and *Ji Yi* (極已), often translated as "as much as possible" or "as far as possible," feature in many *Dao Yin* instructions in *Yin Shu*, while the very similar term *Ji Shi* (極勢extreme posture, i.e., extending the posture as much as possible) also appears frequently in *Zhu Bing Yuan Hou Lun*.

From these examples, we can surmise that some *Dao Yin* exercises, as well as certain technical terms, had been passed down from the Han to the Sui. Adopted and adapted by different authors and compilers, they eventually found their way into the state-sponsored medical text of the Sui court.

5 Conclusion

Yin Shu tells us that during the Qin and early Han periods *Dao Yin* was popular among the nobles of the southern Chu state as a way to maintain their health and prolong their lives. Furthermore, *Yin Shu* was closely associated with the longevity and immortality practices of the *Xian* cult which swept through late third century BCE elite society. In particular, *Yin Shu* advocates the way of Peng Zu, which was criticized by the type of Daoists represented by the authors of *Zhuang Zi*. Being a tomb text, *Yin Shu* lacks a reliable searching device which makes it hard to locate a certain exercise for a particular disease.

The new classification of exercises in *Zhu Bing Yuan Hou Lun*, in accordance with the etiology and symptoms of a given condition, represents a significant advance in the development of *Dao Yin* during the Sui, as it greatly enhanced the accessibility of the exercises for physicians, enabling them first to identify the patient's illness and then to prescribe appropriate exercises as treatment. The inclusion of *Dao Yin* in *Zhu Bing Yuan Hou Lun* was, in many ways, a concrete example of the second Sui Emperor's radical medical reform, establishing *Dao Yin* exercise as the main component of state medicine and thus creating a distinct medical system with a greater emphasis on non-drug-based therapy.

While *Dao Yin* exercises in both *Yin Shu* and *Zhu Bing Yuan Hou Lun* are for the cure and prevention of disease, they were written for different readerships. Most of *Yin Shu*'s readers were Han dignitaries and nobles, while those of *Zhu Bing Yuan Hou Lun* were physicians and medical students. The transmission of medical knowledge had evolved from "secret or semi-secret transmission" during the Warring States, Qin and Han periods, via family-oriented transmission during the Six Dynasties, to the medical school system of the Sui and Tang periods. Apart from several *Dao Yin* exercises in *Zhu Bing Yuan Hou Lun* which can be traced to their Daoist origins, the majority of the exercises in both texts can hardly be interpreted as Daoist. The rich *Dao Yin* materials in both texts demonstrate clearly that *Dao Yin* had always been an integral part of medical knowledge and practice in early and medieval China.

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Research article

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Collecting Knowledge about Medicinal Ingredients in Northwestern Sichuan in the 1950s

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Abstract

This article explores China's state-level knowledge production on medicinal ingredients in northwestern Sichuan in the 1950s. Drawing on county-level archives, published materials and interviews, this historical article traces how different levels of governments and state-owned trading companies produced knowledge about medicinal ingredients and its production. It argues that on one hand the state's procurement standards codified the knowledge about medicinal ingredients from the marketplace and the local producers. On the other hand, direct extraction of knowledge from the medicine gatherers and cultivators verbalized and collected the previously tacit local knowledge about the production of medicinal ingredients, which would help to alleviate the shortage in the supply of traditional Chinese medicines throughout the 1950s.

Key Words: Chinese medicine; Knowledge production; Medicinal ingredients; Pharmacy; Traditional Chinese medicine

1 Introduction

On June 4, 1956, *People's Daily* commented on the shortage in medicinal ingredients across China and analyzed that one factor was lack of emphasis on production:

> "Originally, cultivating medicinal herbs requires much more labor and money than growing crops. Some home-grown medicinal herbs need five or six years to mature, requiring more fertilizer and certain skills; meanwhile, peasants who collect wild medicinal ingredients often have to take dry food with them and climb mountains for long periods of time, living in deep forests for days or even months. For example, the *Zhu Sha Lian* (朱砂莲 Radix Aristolochiae Kaempferi) in Emei County is a medicinal plant whose root grows on rocky cliffs and it requires risking one's life by hanging from a rope for dozens of feet to collect it."[1]

Both gathering medicinal ingredients from the wild and cultivating medicines required specialized knowledge and techniques. Nevertheless, the producers were not respected and the techniques were not valued. According to the author, this was one of the factors that contributed to the drop in the amount of available Chinese medicinal ingredients on the market (Note 1). This commentary was just one of many that called for more attention to the techniques and knowledge in medicinal ingredients in the mid-1950s. Previous research has demonstrated that there was a shortage of medicinal ingredients across China in the mid-1950s.[2] However, we know little about the issue raised in the above quote–if there was a scarcity of medicinal ingredients, how did the government increase production? How, specifically, did the attention to the knowledge of producing medicinal ingredients really work?

This article explores the knowledge production projects that were carried out by different state actors on medicinal ingredients in Northwestern Sichuan in the 1950s (Note 2). Drawing on county-level archives, published materials and interviews, this article traces how the Chinese state produced knowledge about medicinal ingredients and its production. The knowledge production process was significant not only because it influenced the output of ingredients, and hence the supply of core materials to fulfill market demand for Chinese medicines, but also because the state established itself as the authority and owner of the knowledge.[3]

Previous studies have shown that Chinese imperial courts have a long history in commissioning and supervising the compiling and formalization of the pharmacopeias, known as *Ben Cao* (本草 materia medica) in China. As He Bian shows, *Ben Cao* literature used to be state-sanctioned activities, indicating the courts' efforts at standardizing and regulating the usage of

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medicinal ingredients.[4] Apart from commissioning the complications of the *Ben Cao* literature, as Asaf Goldschmidt observes, during the Song Dynasty an Imperial Pharmacy was designed to monitor the drug markets and then transformed into a public-health-oriented institution.[5] From the seventeenth century onwards, with the "amateurization" of *Ben Cao* and the development of the long-distance trade of medicines, more people participated in the complication of Ben Cao texts, making it hard for any single text to claim authority and be "official".[6] The transition from official commission to civic participation in the compilation of Chinese pharmacopeia paralleled the evolution of the medicine market in China. The commodification of medicinal ingredients during the Ming and Qing dynasties ushered in the emergence of merchants and medicine houses as the primary actors in the trade in Chinese medicines.[7] From the mid-nineteenth century on, while Chinese medicine encountered Western medicine, the trade in Chinese medicinal products prospered in the process of globalization and experienced ups and downs in the Republican era.[8]

After the establishment of the People's Republic of China (PRC) in 1949, healthcare was one of the state's priorities. Current studies have shown the central government's efforts to tackle epidemics such as anti-schistosomiasis campaigns, to promote public hygiene, and to construct rural health stations.[9] However, we have little information about the materials that were critical to Chinese medicine: the medicinal ingredients.[10] Through the previous studies on the medicinal ingredients in the PRC period, we knew two things. First, the 1950s witnessed several waves of shortage in medicinal ingredients. Second, the fate of traditional Chinese medicine was interwoven with the evolving state policies and shifting attitudes among political leaders and elites in medical community.[11] Most of the current studies focused on the period between 1953 and 1956, the so-called socialist transformation period. By using local archives, this article pays special attention to the early years of the PRC, especially before the mid-1950s. while scholars show that the government was "late" in the management of Chinese medicinal ingredients, in the medicine-sourcing localities, medicinal ingredients were deemed as important commodities that were crucial for provincial and county level income. Actually, it was under these local efforts that knowledge production started not as a top-down policy which usually was seen as from the center to the locality, but rather from the locality and then converged with nation-wide trends.

Focusing on knowledge production in Chinese pharmacy, this article is particularly relevant to previous research on the social epistemology of Chinese medicine. It specifically converges with the studies on the production, standardization, and systematization of Chinese medicine knowledge. Current studies, the majority of which are conducted by anthropologists, have revealed the interwoven relationship between state-building and the reinvention of Chinese medicine traditions, the standardization of Chinese medical knowledge as transmissible and "teachable", the institutionalization of ethnic minority medicine, and the cross-cultural "worlding" of Chinese medicine.[12] Nonetheless, we know little about how the PRC produced, collected, transcribed, and standardized knowledge about the original medicinal materials after its establishment in 1949. This marked a watershed moment for Chinese history in many aspects, but did it also pinpoint a watershed moment for China's medical and pharmaceutical history? How did the "New China" deal with its past traditions of healing and therapeutics while striving for a modernized and scientific medical system? How has the knowledge of Chinese medicine and pharmacy evolved with the changing state policies in relation to market and social transformations?

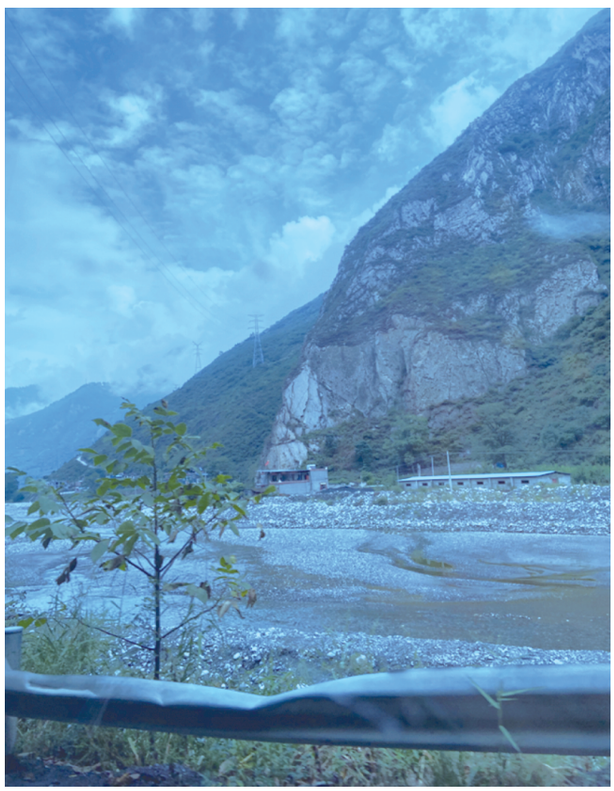

Figure 1 The typical valley topography in Northwestern Sichuan taken by the author

This article attempts to answer these questions through the case study of the production of the knowledge about Chinese domestic medicinal ingredients in northwestern Sichuan. (Fig. 1) This article examines knowledge production from two aspects: first the "quality" of the ingredients as knowledge encoded in the ingredients. The author demonstrates how, on the one hand, the state-owned trading companies and commerce organs' purchasing rules and standards crystalized market expectations and hence

knowledge about the ingredients — the physiological characteristics of the ingredients in relation to efficacy and authenticity. The standards, on the other hand, formalized the expertise of medicine gatherers, who collected wild medicinal components with their hands. Gatherers have to coordinate their skills in handling raw materials in order to fulfill the state-administrated commercial institutions' procurement criteria. Secondly, another aspect of knowledge production is direct rationalizing and verbalizing the medicine peasants' knowledge about collecting medicinal ingredients from the wild. By examining these two aspects of knowledge production about medicinal ingredients, this article argues that the government's knowledge production in the field of medicinal ingredients was an important part of its management of the medicine trade. At the same time, the government built itself as the authority of the knowledge that originally came from the medicine gatherers.

2 New administration of the circulation of medicinal ingredients

Up to the eve of the founding of the PRC in 1949, there was limited state intervention on the circulations of medicinal ingredients. Medicinal ingredients used to be in the hands of the merchants who were brokers or were agents in trading medicines. This network has existed in China for a long time. Meanwhile, current scholarship remarks that the changing political regimes in Chinese history indeed had enacted various texts that functioned like "codes of conduct" in the pharmaceutical industry. For instance, Tang Tingyou in *History of Chinese Pharmaceutical History*, regards various *Ben Cao* literature such *as Shen Nong Ben Cao Jing* (神农本草经 *Shen Nong's Classic of Materia Medica*) as the canons for drug prescriptions in medical formulas.[13] Also, the famous Chinese pharmacologist Xue Yu (薛愚) traced the history of Chinese pharmacy back to ancient times and included imperial laws, medicinal formulas and *Ben Cao* literature all as texts that had an instructional function in the usage of drugs.[14] Nevertheless, there were no regulations or standards that were enforced by governing authorities on the usage of drugs.[15]

After the Nationalist Government united China and consolidated its regime in Nanjing in 1927, public health became a major concern for the Nationalist state's political legitimacy.[16] In the arena of pharmacy, the compilation and publication of China's first modern pharmacopeia—*Zhong Hua Yao Dian* (中华药典 *Chinese Pharmacopeia*) in 1930 could be seen as a milestone.[17] As Paul Unschuld points out, China has a long history of *Ben Cao* literature which could be seen as drug encyclopedia, but "none of these could justly be called a pharmacopeia in the modern sense of this term, simply because they were not designed to provide physicians or pharmacists with fixed standards of drug quality and drug usage, adherence to which was enforced by government authorities."[15] According to one of the key compilers of the 1930 *Chinese Pharmacopeia* Meng Mudi (孟目的 Moody Meng), originally the Ministry of Health wanted to adopt the British pharmacopeia and made some minor revisions.[18] There were some additions of drugs that were traditionally used in Chinese pharmacy in the final published edition. The compilation process attempted to incorporate domestic usage, which was especially relevant to Chinese domestic medicinal ingredients. In the principles for compilation, the authors Moody Meng and Pu Chen wrote:

> "The original plants or animals should be recorded for crude drugs. Except for those that are well-known, all crude drugs should bear their academic names and the family and genus to which they belonged. For those that are indigenous to our country, the sourcing localities should be noted in order to pique our people's interest in domestically produced medicinal ingredients."[19]

The 1930 Chinese Pharmacopeia could be interpreted as an attempt by the Nationalist Government to standardize drug use in China. Nonetheless, while some Chinese herbs such as *Da Huang* (大黄 Radix et Rhizoma Rhei), *She Xiang* (麝香 Moschus) and *Gan Cao* (甘草 Radix et Rhizoma Glycyrrhizae) were included, it was primarily a pharmacopeia published for people who had knowledge of modern pharmacology.[20] Aside from that, there were no standards or market grading for the majority of medicinal ingredients that circulated in society and used in people's everyday life. To a large extent, previous political authorities had limited interventions on the social use and circulation of Chinese medicinal ingredients when the PRC was established in 1949.

The establishment of the PRC did not result in a watershed moment for the commerce and regulation of medicinal ingredients. Between 1950 and 1953, in the arena of public health, the state's priority was controlling epidemics, establishing health infrastructure and promoting public hygiene.[21] Particularly, even in the pharmaceutical industry, the state paid more attention to the industrialization and manufacturing of biomedicine pharmaceuticals. In the "first five-year plan (1953-1957)", the "medical and pharmaceutical industry" was placed under "light industry":

> "In the next five years, the construction of the pharmaceutical industry will focus on (producing/manufacturing) antibiotics, chemically synthesized special drugs and various related chemical intermediates that have a significant effect on people's health. Meanwhile, we should pay attention to the research and experiment of Chinese medicine and cultivation and processing of medicinal ingredients."[22]

A modern pharmaceutical industry capable of producing antibiotics and synthetic drugs was the focus of the state's economic development plan. While

it indeed mentioned China's domestic medicinal ingredients, they seemed not to be the top priority in establishing China's pharmaceutical industry.[23] Recounting the early years in the development of China's medical industry, many commentaries published in the mid-1950s agreed that there was a lack of attention on developing Chinese medicine when compared with western medicine. For instance, in a commentary published by Xinhua News Agency in 1958, it criticized that: "in the past, the units in the pharmaceutical industry did not acknowledge the significance of Chinese pharmacy. The staff think that people who developed western drugs did not have to know about Chinese pharmacy, while those effective Chinese medicines were researched by foreigners, and then Chinese go to learn from the foreigners."[24]

In general, the circulation and commerce of medicinal ingredients in urban areas was pretty much on its own until the "Socialist Transformations Era" in 1955 and 1956 when private businesses were publicized as state-owned or converted to joint state-private ownership.[25] Before the "Socialist Transformation", private enterprises and the medicine houses remained the dominant force in China's pharmaceutical market — for both Western and Chinese drugs. For instance, the owner of the famous *Tong Ren Tang* (同仁堂) in Beijing recalled that "in the early months after liberation, *Tong Ren Tang* was under chaotic management. As a large capitalist, I had no good impression of Chiang Kai-shek but am also afraid of the Communist because of the Nationalist Party's propaganda."[26] In Chengdu, the large medicine house *Xiao Ji Han Tang* (萧集翰堂) remained as private business until 1956 when it was incorporated into a joint state-private company.[27] Generally speaking, before 1956, the commerce of medicinal ingredients in the urban area was undergoing socialist transformation but the circulation of medicines in rural areas was largely untapped by the government.

Things began to change after 1954 as the government shifted its attitudes towards traditional Chinese medicine (TCM). Previous studies argue that the Communist State held an ambivalent attitude towards Chinese medicine in its early years.[28] On one hand, the Communist party, as claimed to be a modernizing regime, had ambivalent attitudes towards TCM. On the other hand, as Scheid and Karchmer observed, "it (TCM) was useful for dealing with wartime shortages and the absence of modern medicine in rural areas."[29] The late 1953 and early 1954 saw the transition of the state's policy towards TCM. Many current studies remarked this as the turning point of the Communist Party of China's policy towards TCM.[30] Particularly in terms of the circulation of medicinal ingredients, the Ministry of Health issued a report on July 3, 1954 to the central government mentioning the previous years' work relating to traditional Chinese pharmacy:

> "In terms of Chinese medicines used by Chinese medicine practitioners, there has been an imbalance between supply and demand due to inappropriate management since liberation. Meanwhile, as the price of new drugs (biomedicine drugs) decreased year after year, an increasing number of people used them, influencing the development of traditional Chinese pharmacy."[31]

To address this problem, several aspects of Chinese medicine work were proposed and could be summarized as: 1) organizing state-own Chinese medicines production, supply and sales agencies; 2) organizing management committees coming from the Ministry of Health, Ministry of Commerce, Ministry of Trade, Ministry of Agriculture, ministry of light industry. 3) advancing the dosage and mixing of Chinese medicine to modernize and scientize Chinese medicine.[31]

The above central government files and documents, while delineating a timeline, demonstrate the central government's increasing awareness in managing Chinese medicine and pharmacy as a response to shortages and as an instrument for their claim to state legitimacy. How localities reacted, and how these changes in the Ministry of Health and the attitudes of the state's party leaders were received by local cadres remained elusive. Thus, it is necessary to look at the localities.

While previous studies focused on 1954 as a watershed moment in which the Chinese central government began to pay more attention to Chinese pharmacy, the provincial governments and state-owned companies actually stayed active at the local level.

Most relevant to the management of medicine trade is the appearance of local-level local products companies. In the September of 1950, a state-owned local products company was established in Guan county (current city of Dujiangyan), the largest distribution center for medicinal ingredients in western China.[32] Guan county was situated at the exit of the Min river. Along the Min river, as the People's Liberation Army marched upwards and established people's governments, state-owned companies were established one by one. For instance, in 1950, a branch of nationality trading company (民族贸易公司) was founded in Wenchuan county (汶川).[33] It was reported that it immediately began to procure medicinal ingredients.[33]

While the state-owned trading companies usually founded headquarters in the urban areas, they also established purchasing agencies in the nearby villages. For instance, as soon as the Guan County Local Products Company was founded, it found a procurement agency in Shiyang Township — the largest *Chuan Xiong* (川芎 Rhizoma Chuanxiong) output of the province.[34] Meanwhile, there were other forms of public-owned organizations that traded medicines. In Mao county in 1951, a cooperative was established in Baishuizhai. In 1954, there was a Supply and Sales Agency Liaison Station (供销社城关联络站) that organized medicine sources for the Supply and Sales Agency at larger market towns. It also provided hostel services for the passing-

by messengers and porters.[35] Until 1955, the state-owned institutions and trading companies went up the Min river and went deep in the west. Meanwhile, to accommodate the pastoralists, and to adapt to the situation in western Sichuan grassland, the county-level ethnicity trade company of Songpan formed mobile trading groups (流动贸易小组) near Songpan.[36] These local-level trading units were the organs that supported the circulation of medicinal ingredients. According to interviews with medicine gatherers in Li county, they remembered selling the ingredients to the nearest stations and stores. The name of the stations changed: might from *Gong Xiao She* (供销社 cooperative agencies) to *Lian She* (联社), but they were actually the same people in the same store in the village (Note 3). For the medicine business, new institutions brought new incentives to the medicine producers in the mid-1950s. In Li county in western Sichuan, several medicine gatherers I interviewed recalled that they began to invest more time in digging medicines after the emergence of cooperative agencies (供销社)(Note 4). A survey done in 1991 reported that the first cooperative station in Taoping was set up in 1955 and the official co-op agency was set up in 1956.[37] For the gatherers, one good thing about being incorporated into the state's hierarchical trading system was that the newly established purchasing agencies saved the gatherer' labor to carry the medicines out of the mountainous region. Before that, medicine gatherers needed to transport the medicines they collected from the wild to Wenchuan, the nearest market town. One gatherer Mr. Chen remembered that when he needed to sell the medicines, he would get up before dawn and needed to rush back before it got dark because he did not have money for staying over at an inn (Note 5). Wenchuan was the largest market town, about 18km from Taoping village. It was also where Mr. Chen could purchase rice and other daily necessities. The establishment of a state purchasing station in township brought convenience to the peasants to sell their agricultural products and to promote the business of local products. Ms. Yu, born in 1942, also recalled the existence of state's purchasing agency and did not remember digging before its emergence. "We dug medicine and sold them to *Gong Xiao She* in Taoping" (Note 6).

Behind these installations of the state's purchasing companies and stores in the rural region was a medicinal ingredient marketing system anchored in the administrative and political hierarchy. The flow of medicinal ingredients, as the most important raw materials for making Chinese drugs, was put into a system as Du Liping, using the case from Guangxi, summarized as follows:

> "During the 1950s-1970s, the trade in traditional medicines was undertaken within an officially established hierarchical system. Essential based on the government's administrative structure, the system manifested diversified networks that combined a vertical 'paper' connection between provincial and regional levels, an interconnected spatial system at the regional level, and a dendritically structured network from the regional level down to the local networks."[38]

In this system, the marketing of medicinal products was embedded in the government's administrative structure. First, the trade in medicinal ingredients was brought into a hierarchical system that was composed of level-by-level government organs and state-run commercial entities such as state-run trade companies. This had a long-term influence on knowledge production initiatives because knowledge production was typically transmitted down as top-down policies, and more crucially, government organs and commercial organizations served as agents and authorities in the knowledge-making process. Another overlapping effect of being included into the administrative system was that marketing of medical substances became part of political duties rather than merely marketing operations, and so was influenced by administrative policies.

In sum, in the years of the PRC, the government tried to manage the supply of medicinal ingredients by instilling commercial and administrative institutions. As the author will show in the next two sections, these institutions were not just the agents of the state's policy of purchasing the ingredients. They were important agents and actors in extracting and collecting the knowledge about medicinal ingredients.

3 Quality: codifying and standardizing the knowledge about medicinal ingredients

In 1947, a writer named Outdated Pharmacy Officer (过时药店官) published two comical stories on the *Monthly of Chinese Pharmacy Workers*. Both stories were triggered by the invisible market standards of Chinese crude drugs. One story went as follows:

> "A manager at a large drug store welcomed a medicine trade agent one day in the 1910s. The agent tried to peddle the manager some peppermint or *Bo He* (薄荷 Herba Menthae). The agent stated that he now has some Er-Dao (二刀 second-cut, meaning harvested for the second time) peppermint from Taicang county in stock, which has green levels and red stems, as well as a good smell and color. The manager, who had little knowledge of medicinal ingredients, mistook the Er-Dao for secondary quality when it actually referred to its second-cut timing when compared to the *Tou Dao* (头刀 first-cut) ones.[39] In fact, the second-cut peppermint from Taicang was the best and most sought after by pharmacies. Those first-cut ones were of poor quality and were used in distillation and oil production."[40]

This story circulated as a joke in the Chinese pharmacy industry in Shanghai. This story emphasized the importance of understanding how certain

ingredients are used, as this determines the value of the ingredients. Meanwhile, as the writer claimed, the manager was "a monk late in life (switch to a job one was not trained for)", this story exemplified the invisible or tacit knowledge within the pharmacy business circle that was neither standardized nor verbalized and could only be learned through immersive long-term practice.[41] While showing the writer's irony towards the inexperienced manager, the above story implied an iceberg of the rich accumulated knowledge that was circulating in the business of Chinese medicinal ingredients but was not standardized or verbalized.[42]

Examining the government files regarding purchasing standards and the gradings of medicinal ingredients, this section demonstrates how the government attempted to standardize and produce knowledge of the ingredients by codifying them into purchasing "qualities." Purchasing standards embodied both knowledge about medicinal ingredients and the skills and experiences required to obtain the ingredients. Codified "quality" was on the way to standardize medicinal ingredients that were mostly natural and collected in the wild. The physiological characteristics of the ingredients, such as shape, color, smell, length, and size, as well as efficacy and authenticity (道地 *Dao Di in Chinese*) information, were typically included in the description of qualities.
For instance, in the piles of archives regarding the procurement of medicinal ingredients in Wenchuan county, Mao county and Guan county, many were concerned with "quality" of the ingredients. The procurement reports usually detailed the shape, color, size, length of the target medicines. For instance, in the procurement plan of Mao county around 1952, it recorded the different types of *Du Huo* (独活 Radix Angelicae Pubescentis) with price and expected quality:

> "have 'nine eyes' and large size, no sands"
> For *Pao Shen* (泡参 Radix Panacis Quinquefolii), they needed to be "sturdy and look white"
> For *Qiang Huo* (羌活 Rhizoma et Radix Notopterygii), they should "have many silkworm-shaped head, sturdy stems, dried body"[43]

These quality and expectation descriptions for the intended medicinal substances can be viewed as formalized and standardized market knowledge: what the customer specifically desired. Meanwhile, it was established that the physical characteristics of the herbs were related to their authenticity and efficacy. Finally, it should be noted that these "standards" can be viewed as codified knowledge of medicine gatherers, who physically gathered the targeted medicines with their hands and preserved the fresh medicinal ingredients using highly sophisticated techniques.

Standards and gradings for certain medicinal ingredients have long been on the market and therefore this was not a novel concept. For example, *Shi Yang Zhen Zhen Zhi* (《石羊镇镇志》*Gazetteer of Shiyang Township*) recorded the different grades of *Chuan Xiong*:

> "There are different levels of *Chuan Xiong*. The largest ones are the *Gong Wang* (贡王); the secondary ones are *Xiong Wang* (芎王); then there is *Tong Xiong* (统芎); Besides, there is *Shan Chuan Xiong* (山川芎) and *Ru Xiong* (乳芎)."[44]

Nonetheless, these were previously non-verbalized and informal market knowledge. The state-owned companies and commerce organs' verbalization, collection, and formalization of knowledge about specific Chinese medicinal ingredients was novel in the 1950s. By codifying purchasing "standards," the state's commercial institutions were actually transcribing the market knowledge as well as the knowledge about the medicinal ingredients.

In this process, the previously established commercial organizations served not only as agencies in the marketing of medicines but also as bureaucratic entities that assisted the central government in standardizing and extracting knowledge from the local market and medicine producers. Take one medicinal ingredient — *Qiang Huo* as an example. In terms of the grading schemes of *Qiang Huo*, there were different levels.[45] In the summer of 1951, the Department of Commerce of Western Sichuan (川西商业局) sent a detailed directive to the county-level state-run trading companies in Guan county, Mao county, Wenchuan and Li county. This directive specified the exact standards on Qiang Huo they should purchase from the gatherers.

(1) quality: total dry, small shape, thin tail, gray, fur busk, strictly clean all the sands.
(2) grading:

   a. first grade: *Qiang Wang*: have a large bulk at the end and have thick stems (有疆羌头子而根条粗壮者择为一等货，名羌王);
   b. second grade: *Tiao Qiang*: do not have a bulk head but have a thick stem; or those that have a bulk head but have a weak body (无羌头子而根条粗壮，或有羌头子而根条较弱者择为二等货，名条羌);

(3) package: use bamboo to wrap, every case 200 catties; should package tightly thus not need to package again when sending to Chongqing.[45]

Qiang Huo was a native medicinal root to northwestern Sichuan. Local people usually harvested wild *Qiang Huo* in the mountains while some also cultivated this plant for domestic use. Its root is the most valuable part that was used to disperse cold and resolve dampness within the human body and is said to be good for joint pain. The above grading of *Qiang Huo* has been mostly used on the market for years. However, it was not until the government tried to

manage the circulation of the ingredients that they were verbalized and collected into texts. From the above case, we see that the quality of medicinal ingredients have been in the markets for years but at this moment, the state tried to manage the production through gathering of the market knowledge. The purchasing quality standards from the administrative organs and state-owned commercial entities could be viewed as methods of standardizing the knowledge about certain medicinal ingredients.

Moreover, the state-owned trading companies incorporated the expertise and knowledge of the gatherers — who produced the raw medicinal ingredients at first stage — into the procurement quality criteria and grading processes. The standards were detailed and always covered the shape, size, level of dryness, length, smell and other physical characters. Taking wild gathering as an example: while the nature determines the wild ingredients' 'quality', to first harvest and then process specific ingredients required the medicine gatherers' specialized knowledge and skills. For the gatherers, these standards caused trouble sometimes and influenced the way they processed the raw ingredients. Specifically, the level of dryness was very demanding. Mr. Chen needed to dry his medicines before he could sell them, while some gatherers stayed at the acquisition stations and requested the staff purchase their medicines that did not meet the standards (Note 7). The drying process is actually highly skilled. As *Collection of Techniques for Production Chinese Medicinal Ingredients*, a collection of technical knowledge regarding medicine production published in 1959, recorded the drying process of *Qiang Huo*:

> "When the roots of *Qiang Huo* grow to the size of a large finger or a small wine glass, they can be dug out in autumn. When digging, pay attention to go deep (into the soil), do not break the root, dig up and fold off the reed stem, shake off the mud and sand. Then put them under the sun or use mild heat to dry their moisture to half dry, take off the pile in a dry place to avoid rain, covered with brown clothes, straw or other fabrics to make them "sweat", until the inside looks red-yellow, and then take them out and put them under the sun or using fire to fully dry."[46]

This drying process, although referred to the cultivated *Qiang Huo*, was also applicable for the wild ones. The above paragraph indicated specific techniques required, including knowing the right place to dry the ingredients (under the sun or using fire), mastering the drying temperature, and observing the right level of dryness. Also, it was intriguing that the ingredients cannot be fully dried at first, the process of "making it sweat" was an important part before producers could fully dry them. Above all, the drying process was highly skilled and required experience and knowledge about the physical properties and usage of certain medicinal ingredients. While the purchasing standards just logged that the ingredients should be dry, behind these were codified knowledge about the production process.

In this respect, the purchasing "quality standards" functioned as the compass that shaping the techniques required for producing medicinal ingredients. As the figure 2 shows, there were interactive relations between bottom line producers, their local knowledge, and the administrations and the knowledge production projects. The government issued directives to guide local administrators to extract local knowledge. Quality standards could be seen as the intermediary — the administrations could use the quality standards to manage production while the quality standards per se could be seen as crystalized local knowledge. To be sure, formalizing and codifying the quality of medicinal ingredients was just one way of the state's collection and production of the local knowledge. As the next section will show, the state could directly extract knowledge from the local medicine gatherers and cultivators via meetings, resources surveys and other methods.

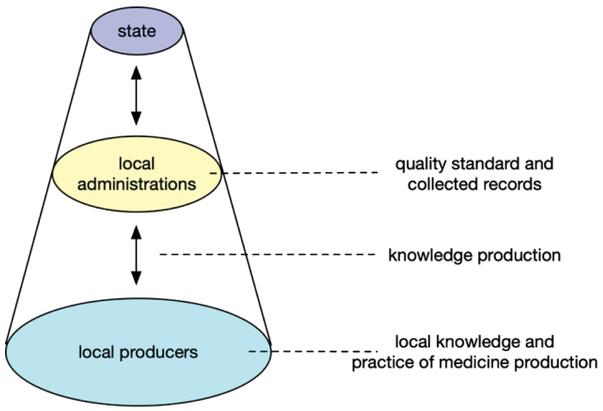

Figure 2 Interactive relations between local producers, local administrations, and the state in the knowledge production projects (designed by the author).

4 Collection and transcription: extracting knowledge about medicine production

Other than the quality control as a way of knowledge extraction, the government extracted and produced knowledge regarding the collection, production and preservation of wild medicinal ingredients by directly transcribing the tacit knowledge of production from the medicine gatherers and cultivators. For instance, in January of 1953, the Southwestern Branch of China's Local Products Company (中国土产公司西南区公司) issued a directive to its fellow branches to collect specimen of wild medicinal ingredients and use them as pedagogical tools:

> As people's lives improved, the demand for medicines increased. However, some medicinal ingredients are in shortage and we should enhance production by organizing

> peasants to increase production. Nevertheless, there are too many wild medicinal ingredients, especially those that are indigenous to ethnic minority regions. For instance, *Bei Mu* (贝母 Fritillaria), *Dong Chong Xia Cao* (冬虫夏草 Cordyceps), *Qin Jiao* (秦艽 Radix Gentianae Macrophyllae), *Qiang Huo* (羌活 Rhizoma et Radix Notopterygii), *Gan Song* (甘松 Radix et Rhizoma Nardostachyos), *Mu Xiang* (木香 Radix Aucklandiae). Only a few specialized medicine gatherers could recognize them. As a result, many medicines have not been utilized yet and left on the ground. For people who were not familiar with these medicines, it took them a long time to recognize the medicines and the income from gathering could not secure a stable life. Therefore, many gatherers seemed to be low-key. In order to intrigue their interests in gathering medicines, our branches should collect the stems, lines, leaves and whole medicines that are promising and profitable such as fritillary, caterpillar fungus, dried and made into specimen. Then, categorize and grade the medicines, display them in the procurement stations. Meanwhile, our branches could make *cards* that could be carried around. There should be basic information of the ingredients on the cards including the growing season, the method to gather and preserve, processing, value and usage. These could be used to educate local people with the knowledge about the medicinal ingredients and made it easier for people to dig and gather those medicines. [47]

Although this directive did not go into detail about how the educational activity was carried out, it could be interpreted as a request to rationalize and standardize not only the quality of medicinal ingredients but also the method of gathering medicinal ingredients in the wild. We can see here that knowledge production firstly began with verbalizing and standardizing the qualities of medicinal ingredients.[48] According to the report, the local products company asked cadres to categorize and grade the raw medicinal ingredients. This was a standardization process: the cadres chose the best ones based on their knowledge, later becoming the standards. Nonetheless, the source of the codified standards was important in this case. While the report assumed that the cadres would do the work, the cadres had to consult with local medicine producers in order to do so. Given that the majority of the medicinal ingredients in this report were collected in the wild, it's not surprising that they were all unique. Standardizing the qualities of wild medicines thus necessitated inductively generated knowledge about the physical properties of specific ingredients in relation to their use and efficacy. *Qiang Huo*, for example, was a medicinal root that was widely collected in Northwestern Sichuan. The top grade ones, as shown in the previous section, should have a bulky head and a thick body. What was important here was where this knowledge came from. The cadres were required to consult with local medicine producers and merchants about the drug's usage and market demand. Thus, this was a process of knowledge production in which experience and knowledge from producers and market participants were transcribed and standardized into different grades of medicines.

Second, this report was intriguing in that it also implied extracting knowledge about the gathering process. To "make it easier for people to dig medicines," the local products company asked its branches to create cards with information about the growing season, locality, and harvesting method of specific plants. This required the card makers, many of whom had little knowledge of medicine gathering, to converse with the gatherers and gather information from them. Although not stated, each step required contributions from people who had experience gathering or cultivating medicines, and the process was essentially a knowledge production process.

More importantly, this directive, which recognized the knowledge and skills of the medicine gatherers, at the same time claimed the authority of knowledge production over the gathering and cultivation of the medicinal ingredients. The assumption was that local residents had been gathering wild medicinal ingredients for years and had accumulated local knowledge about gathering medicines, but that this knowledge had not been verbalized, standardized, or systematized. Now the government stepped in and used texts as tools to verbalize and, at the same time rationalize their local knowledge.[49]

The collection of knowledge in Northwestern Sichuan echoed the situation on the national-level. In 1958 in Beijing, the Crude Drug Department at the Ministry of Health invited "experienced pharmacy workers" to share the knowledge about recognizing, identifying and using medicinal ingredients.[54] In the report, it recorded the knowledge about preserving *Huang Lian* (黄 莲 Chinese Goldthread Rhizome):

> "dig out and sweep off the mud and dry with heat, cannot be washed."[50]

It also recorded knowledge in timely gathering and identification, which came primarily from the gatherers and pharmacy workers. For instance, *Dang Shen* (党参 Radix Codonopsis) should be:

> "collected in spring before germination and in autumn after the return of the pulp" and it should be processed immediately at the sourcing region: "dug them out and dried 80% of their water, then rubbed them with a wooden board to make them solid, because otherwise they would detach from the bone after the drying process." [51]

In the above cases it was the staff at the Crude Drug Department who articulated the experience of the medicine workers' knowledge about the growing season of the medicinal plant, the particular method of gathering, and way of the crucial initial processing for preservations. However, as the true practitioners of the gathering labor, the medicine gatherers actively contributed to the dialectical knowledge production process, as they possessed the necessary knowledge,

whereas public health work staff didn't. Similarly, as Sigrid Schmalzer noticed , "in the scientific farming movement in the 1960s, the state, for both political and practical reasons, could not do without the active cooperation of rural people."[52]

The extraction of knowledge could also be seen in the procurement of medicinal ingredients. Wang Rongjiu, a procurement staff in Liaoning, was assigned to take charge of local medicine procurement; however, he only knew *Fang Feng* (防风 Radix Saposhnikoviae) and *Dong Qing* (冬青 Radix Ilex Pubescens). "Wang initially thought that medicinal ingredients were just tree and barks."[53] However, after learning from "old medicine peasants" (老药农), Wang learned that "medicines had different names in various localities. *Jie Geng* (桔梗 Radix Platycodonis) was called flower of monks' hat (和尚帽子花) in Shizhangzi township (时仗子乡), but was called *Da Wan hua* (打碗花) or monk's head (和尚头) in other places."[53] After learning from the local medicine gatherers, Wang successfully educated himself as an expert in medicinal ingredients. However, although learning from the gatherers, the knowledge production had to be done through the voice of the cadres. It was in this translation process that the state claimed its authority and ownership of the knowledge. The medicine gatherers, while contributing to the foundations of the knowledge, were usually in the background.

Apart from the commercial institutions and cadres, medicine gatherers indeed contributed their knowledge to the continuing scientific study of Chinese crude drugs in the 1950s. Through the mouth of the scientists, the knowledge of the gatherers was "translated" into the sociotechnical ensemble that fit in the state's new agenda. This began to happen especially after 1955, when there was a shortage of medicinal supply across the nation and there was a wave of surveying the local ingredients. In July 1955, Xu Yan and Fu Kezhi, went for a collection trip in Northwestern Sichuan. Their goal was to collect specimens of traditional Chinese medicines to sort out the resources of Chinese medicine (中药资源), as the column of their report titled.[54] Medicine peasants, as they called them, helped with their collection. Particularly, in the case of caterpillar fungus, they recorded the name but lamented that they did not succeed in collecting one. Nevertheless, they recorded the knowledge collected from the gatherers:

> "According to the experienced medicine peasants, during lunar spring February to March, where there is *Dong Chong Xia Cao*, white dew is not covered; with a tiny hoe digging up, there are small seedlings (i.e. mycorrhizal body), and the worm body is still active. In the summer, the snow melts, the grass grows, the Chong Cao seedlings fall off, the worm body is diminished, and it is difficult to spot digging out."[61]

Despite being buried as a background and merely information provider, the gatherers first had a voice about their knowledge and skills in written textual records through the records of the scientists. The scientists who knew the "right" term, such as "mycorrhizal body," verbalized and transcribed their knowledge gained through actual work in nature. According to Sean Lei, science as translation should be grounded in the socio-technical ensemble.[56] Thus, scientists served as agents in the knowledge production process, translating gatherers' local knowledge into a recognized system.

The extraction of medicine gatherers' knowledge in Northwestern Sichuan was not uncommon. On the national level, the shortage in medicinal ingredients after the mid-1950s collectivization drained the production output pushed the government to emphasize knowledge production about the ingredients. Many commentaries regarding the manufacture of wild medicinal ingredients appeared in the most significant TCM magazine, *Zhong Yao Tong Bao* (《中药通报》*China Journal of Chinese Materia Medica*). For instance, in 1956, Lin Zhen wrote an essay titled Gathering of Chinese Medicinal Ingredients. It theorized the gathering process as:

(1) recognize standard plants
(2) identify and make clear the medicinal part
(3) pay attention to the timing of gathering
(4) manage the distribution[57]

The reports in *China Journal of Chinese Materia Medica* indicated the government's efforts to rationalize the gatherers' knowledge about collecting ingredients from the wild.

Local governments also produced knowledge about the harvest and cultivation of medicinal ingredients by organizing peasants to "meetings". In 1958, the Guan County Department of Commerce organized a meeting that invited medicine peasants and village leaders to talk about their experience. While the meeting proceedings recorded three speakers' speech, two of them were village cadres, who talked about organization logistics and one peasant specially talked about his experience in trying to cultivate the wild medicinal ingredients he dug out. Zhao Haizhou, a peasant from Xuankou Township, recalled that:

> "I have been digging for medicines for more than a decade. I always go to dig for medicine after the agricultural season. I also try to cultivate the wild seeds of the medicinal ingredients. For instance, *Mao Ci Gu* (毛茨菰 Pseudobulbus Cremastrae seu Pleiones). A kind of wild medicinal ingredient. There are huge mountainous ones and small hill ones. while those grow in the huge mountains have narrow green leaves about four or five inches long, the smaller ones have single or double leaves about three or four inches long…There is a kind of mother-and-son *Mao Ci Gu*. Beneath the fruit was a stone-shape chunk—called the 'eggs' of the mother *Mao Ci Gu*. Dig it out along the sprout and you can plant it."[58]

Zhao Haizhou then described in detail how to take care of the cultivated ingredients. It could be seen that the colloquium name of the ingredients, the method of digging the appropriate part of the plant for further cultivation, and the way of caring for it were actually local knowledge that the state officials barely knew of but needed. These meetings were thus important for the extraction of local knowledge about medicine production.

One intriguing thing about these meetings was the audience. While most of the participants were cadres, they were not the real actors who produced the medicines. Thus Zhao Haizhou's speech might just be of symbolic importance while the other two cadres' sharing of "organization work" on the mountains might be more instructive for other cadres. Nevertheless, these meetings indicate the local government's effort to transcribe and disseminate the knowledge about the production of medicinal ingredients.

If quality control of the medicinal ingredients contributed indirectly to knowledge production, the efforts covered in this section extracted and collected local production knowledge more directly. Local medicine gatherers had a significant part in providing their expertise to the process in both ways. Meanwhile, in the knowledge production process, the government claimed its authority in producing the knowledge about medicinal ingredients.

5 Conclusion

Scaling up production of Chinese domestic medicinal ingredients was of great significance for China in the 1950s. Under these circumstances, this paper demonstrates first, how, as different levels of governments and state-owned companies became more involved in the distribution and production of medicinal ingredients, transmissible and standardized knowledge of the local ingredients and local production methods became increasingly important for increasing the output of medicine production. The state transcribed and collected local knowledge about medicinal ingredients via formalizing quality standards and extracting local producers' knowledge. Knowledge production functioned as an important tool and necessary pathway to manage the supply of medicinal ingredients. Second, while local producers contributed significantly to the knowledge production process, it was the Chinese state that initiated the collection and standardization process in the 1950s. This laid the foundation for the institutionalization of TCM in later years. Finally, the production of knowledge about medicinal ingredients was significant not only because it assisted in addressing the shortage of traditional Chinese pharmaceuticals, but also because it demonstrates the state's efforts in building a modern pharmaceutical industry in China.

Notes

Note 1: In this article, I use "medicinal ingredients" as the English translation of Chinese term "*Yao Cai* (药材)". I also use this interchangeably with other common terms including "traditional Chinese medicines", "Chinese drugs" or "Chinese medicines".
Note 2: In this article, Northwestern Sichuan mainly refers to the Upper Min region: the areas surrounding the Min River (Min Jiang 岷江)—a tributary of the Yangtze River.
Note 3: Interview with Mr. Chen on Oct 19, 2019 in Li county, Sichuan Province. Interview with Ms. Yu and Ms. Zhou on July 11, 2018 in Li County, Sichuan Province.
Note 4: Interview with Mr. Chen on Oct 19, 2019 in Li county, Sichuan Province. Interview with Ms. Yu and Ms. Zhou on July 11, 2018 in Li County, Sichuan Province.
Note 5: Interview with Mr. Chen on Oct 19, 2019 in Li county, Sichuan Province.
Note 6: Interview with Ms. Yu on July 11, 2018 in Li County, Sichuan Province.
Note 7: Interview with Mr. Chen, Oct 18, 2019 in Li County, Sichuan Province.

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Author contribution

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Conflicts of interest

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Philosophy and Philology: Two Approaches of Commentating the *Shen Nong Ben Cao Jing* (*Shen Nong's Classic of the Materia Medica*) in the Ming and Qing Dynasties

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Abstract

This paper tests the hypothesis that the commentary trend of the *Shen Nong Ben Cao Jing* (*Shen Nong's Classic of the Materia Medica*) arises alongside the fashionable philology of the time, or the aversion against the Jin-Yuan medical philosophy. After surveying 12 major commentaries, it is concluded that the situation is more complicated than a simple assertion. The seemingly opposite philosophy and philology approaches have been used eclectically to innovate the understanding of ancient traditional Chinese medicine texts.

Keywords: Chinese materia medica; *Shen Nong Ben Cao Jing* (*Shen Nong's Classic of the Materia Medica*); Jin-Yuan school; Philology

1 Introduction

The struggle between the Neo-Confucianism and the "Hanxue tradition" (汉学), or "Han Learning" is a major issue of the intellectual history of late Imperial China. Around the Ming-Qing transition, scholars reflected that extreme individualism and empty arguments were side effects of the Neo-Confucianism, which could have brought about the decline of the Ming dynasty.[1] There emerged an idea of re-examining the original texts before the Han dynasty. Although the two standpoints both claimed that they venerated the ancient sages, Neo-Confucianists interpreted the texts based on the theories developed after the 12th century, whereas the Han school scholars rejected them by scrutinizing what were exactly said in the ancient texts. Benjamin Elman identifies these two approaches as "philosophy" and "philology."[2] This phenomenon also appears in Chinese medicine. In the case of pharmacy, *Shen Nong Ben Cao Jing* (《神农本草经》 *Shen Nong's Classic of the Materia Medica*, hereafter "the Classic") is considered as the earliest and only ancient materia medica monograph in China before the Jin dynasty. People attributed its authorship to the Sage Lord Shen Nong (神农) and thus it enjoyed a privileged status. However, the argument that the Classic has been neglected was repeatedly raised in history. It is true that the Classic almost disappeared, but Tao Hongjing (陶弘景) rescued the texts, reorganized and expanded the book with his own commentaries into *Ben Cao Jing Ji Zhu* (《本草经集注》 *Collective Commentaries on the Classic of Materia Medica*). He preserved the Classic via separated colors of ink. Since then, all the official materia medica published in various dynasties would arrange the Classic's texts at the beginning of the descriptions of each substance in order to honor the book. The famous *Ben Cao Gang Mu* (《本草纲目》 *The Grand Compendium of Materia Medica*) by Li Shenzhen (李时珍) also follows this custom. Nevertheless, the issue of commentating and reinventing the Classic was continuously raised. A scholar of the Qing dynasty even accused that "since Li Shizhen's *Ben Cao Gang Mu* became popular, the *Shen Nong Ben Cao Jing* declined."[3]

In today's pharmacopoeia standard, Li Shizhen is a nearly perfect master. He had almost all kinds of merits. He valued positivism and was willing to inquire the opinions of the laboring class; he was thoughtful enough to first incorporate the philology of medicinal substances' name into the materia medica literature. However, to Li himself, he was mostly proud of its contributions in enlightening the Neo-Confucianism philosophy. The design of his book was greatly influenced by the orthodox ideology crystalized by Zhu Xi (朱熹).[4] Coincidently, Li highly showed respects to the book *Zhen Zhu Nang* (《珍珠囊》 *Pouch of Pearls*) and raised

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its author Zhang Yuansu (张元素) to the top person in the history of Chinese medicine. Zhang, his student Li Gao (李杲), and Li Gao's student Wang Haogu (王好古) continued constructing new ideas in materia medica. These masters were figures of the new medical theories. The new medical theories took shape during the Jin and Yuan dynasties; hence they are sometimes called Jin-Yuan theories. Another master Zhu Zhenheng (朱震亨) further incorporated the new medical theories with the Neo-Confucianism of Zhu Xi.[5] Their doctrines continued dominating the medical field in the Ming dynasty. Li Shizhen's *Ben Cao Gang Mu* simply reflected the paradigm of his time. Under the influence of such new medical theories, he would quote texts of the Classic when needed to solidify his viewpoints, but those texts were not his emphasis.

Up until the time of Li Shizhen, it was true that very few physicians had highlighted the texts of the Classic in their writings, although they often claimed that they respected it. However, this situation gradually changed in the Qing dynasty. Modern scholars have suggested that a new trend against the Neo-Confucianism emerged since the late Ming dynasty. This trend started with the rise of philology and the fashion of venerating the ancient sages. This anti–Neo-Confucianism trend relooked at how original the prevailing edition of the ancient medical texts was, and how to rebuild the "true version" of the original text. The debates first started around the *Shang Han Lun* (《伤寒论》 *Treatise on Cold Damage*) enthusiastically in the early Qing period.[6] Later the attention was further expanded to Chinese materia medica. Paul Unschuld uses "the Hanxue tradition" to describe this trend launched by Lu Fu (卢复) and Miu Xiyong (缪希雍). Lu was the first person to restore the texts and Miu was first who wrote commentaries of the Classic in late Imperial China. Their efforts could be explained as part of a greater trend.[5] This paper aims at testing these hypotheses, by examining the philosophical or philological tendencies of 12 of the most important commentaries of the Classic in the Ming and Qing dynasties, as well as explaining their meanings.

2 Free interpretation in the name of ancient sage

Miu Xiyong, along with Lu Fu, were the most renowned physicians and the earliest figures who emphasized on the returning to the original text in the lower Yangzi delta in the late Ming dynasty. With his knowledge and medical expertise, Miu was respected by the gentry class and had deep relations with several privileged spheres, including politics and publishing industry. Miu was said to be the first person to write commentaries for the Classic. Although his attribution is controversial, it is doubtless that Miu's work *Shen Nong Ben Cao Jing Shu* (《神农本草经疏》 *Commentary on "Shen Nong's Classic of the Materia Medica"*) won much more readerships and attentions than any similar works before. Since Tao Hongjing rescued the Classic and restored it as part of his collective commentaries compilation, medical authors had not treated the Classic as seriously as Confucian scholars treating *Lun Yu* (《论语》 *The Analects*). Miu uses the word *shu* (疏 exegesis), a genre of Confucian texts, to elucidate the meanings of original commentary of the Classic and to show respects to Tao Hongjing's contributions. By using this character, Miu established a milestone, claiming that his objective is to excavate the secrets in the ancient texts hidden for a long time.

There are several possible approaches for commentating ancient medical texts, and Miu's *Shen Nong Ben Cao Jing Shu* is by no means philological. The main body of his commentaries consists of three parts: *shu* (exegesis), *zhu zhi can hu* (主治参互 indications for cross reference), and *jian wu* (简误 distinguishing errors). These sections show no interests in linguistic issues. He concentrated his efforts on the essential nature of the medical substances. Unlike the previous materia medica literature, the references given are few and they were quoted to support his understanding. He does not always agree with the Jin-Yuan masters, but he retains certain respects to their contributions.[7] When he found the Classic contradicted with his understanding, he would not hesitate to reject the texts. For example, in his comments for Hua Shi (滑石 *Talcum*), he mentioned that "there is definitely no such reason."[8] He broke the fundamental rule that a commentator should always obey the original texts. At such times, he was not a commentator by definition. Instead, the Classic served as Miu's footnotes supporting his arguments. This feature coincided with the fashion of the late Ming philosophy.

Miu had a couple of friends sharing the interests in Chinese materia medica. The most distinguished among them is Lu Fu, a leading medical figure in Hangzhou. Lu spent over a decade separating and salvaging quotations derived from the original Classic scattered across multiple sources and constructing them into a single book. Although the quality of this edition is not highly regarded, he is remembered as the first medical scholar who attempted to restore the original texts of the Classic in late Imperial China. Lu Fu wrote a book titled *Zhi Yuan Yi Cao Ti Yao* (《芷园臆草题药》 *On Speculation and Discussion of Remedies in the Angelica Garden*), which reveals that, as a successful healer, his focus is on the practical aspects of the medical substances. Unfortunately, he did not elaborate much of his practical interpretation of the Classic in this brief book.[9]

Later he found that his son Lu Zhiyi (卢之颐) also had a good understanding of Chinese medicine. He asked Lu Zhiyi to compile a more extensive work on materia medica, and thus *Ben Cao Sheng Ya Ban Ji* (《本草乘雅半偈》 *Four Beautiful Aspects of Materia Medica in Semi-hymn*) was published in 1647. The organization of this book suggested that it is a commentary of the Classic. Every remedy started with the original texts identified

by his father, followed by *he* (核 investigation), *can* (参 cross-referencing), *yan* (衍 expansion), and *duan* (断 conclusion). The most important part is cross-referencing, which is the part that Lu Zhiyi examines his opinions. The reason he chose the term "cross-referencing" with an underlying meditating meaning is because both he and his father were fascinated by Buddhist philosophy and wanted to incorporate it in their understanding of materia medica. The title consists of another Buddhist term "*ji* (偈 hymn)" too. Other than adopting the terms "cross-referencing" and "hymn" from Zen Buddhism, Buddhist thoughts and analogy were infused in his writings and became a characteristic of his book. The rich metaphor found in the title and content of the book suggested that it was originally written for readers with certain literary attainment. The Classic itself could not have any substantial linkage with Buddhist philosophy, but it was Lu Zhiyi's freedom to interpret the texts in this way.

In addition to Buddhist philosophy, the Neo-Confucianism philosophy is also highlighted in Lu Zhiyi's book. Both Lu Fu and Lu Zhiyi highly appreciated Li Shizhen's contributions to the development of Chinese materia medica. They also admired Li Gao's theories. The book echoed Li Shizhen to honor him as the outstanding theorist in history. Besides, Miu Xiyong gave this book direct help. Lu Zhiyi revealed that the completion of this book benefitted from Miu's guidance. Sometimes he would quote a full paragraph from Miu before giving his own understanding.[10]

Zhang Lu (张璐) is another representative figure in the history of commentating the Classic. Contemporary historians count him as one of the "three masters in the early Qing dynasty." He was well-known at his time because when the Emperor Kangxi of the Qing dynasty traveled to the Lower Yangtze river area in 1705, his son Zhang Yirou (张以柔) was arranged to have an audience with the emperor to present his father's works as a gift. Zhang Lu established his authority in the study of ancient classic *Shang Han Lun*. In 1662, he claimed that he found the right order of *Shang Han Lun*, which had been messed up by previous experts for over 13 centuries. For this reason, he was misunderstood as a loyal fan of Zhang Zhongjing (张仲景), the author of *Shang Han Lun*.[6] In fact, his clinical approach is quite different from that of the so-called *Jing Fang* (经方 classical prescription) school, which opposes the therapies suggested by masters of the Jin-Yuan new medical theories. Instead, Zhang Lu picked up whatever sounded reasonable to him. His academic interests cover various areas in medicine, including materia medica. According to himself, his interest in writing his own materia medica was triggered once he had a glance of a commentary of the Classic at a friend's house. Zhang Lu published an impressive book titled *Ben Jing Feng Yuan* (《本经逢原》 *Encountering the Sources of the "Classic of Materia Medica"*). In the preface, he explained that this book would help readers to skillfully interpret the Classic.[11] This objective is similar to Miu's proposal. Their aimed readers were physicians of advanced level instead of laymen or beginners.

Given that the title focuses on the Classic, Li Shizhen's influence is more visible in the book. Zhang Lu discussed more than 700 medical substances. Over half of them are from *Ben Cao Gang Mu* but not the Classic. Its arrangement of chapters and structure also follows that of Li Shizhen. For example, he includes the item "fires," which was first introduced to the materia medica literature by Li Shizhen. He praises Li's book as a complete set for all kinds of *fa* (法 rules as well as methods). On the other hand, he lamented that Li lacked flexibility, thus failed to reach the level of intelligence and dexterity. It was a mistake of Li to merely list the few texts of the Classic at the beginning of each medical substance without elucidating their essential meanings. Therefore, he chose to contribute in this context.[11]

However, Zhang Lu did not achieve the same level of attainment as Li either. There is no clear order when the texts of the Classic would appear in his writings. He was enthusiastic in providing more information about the medical substances or sharing his own clinical experience. He quoted extensively in his writings. From those quotations, we could see that he does embrace the Neo-Confucian traditions. Sometimes, he would remark how thoughtful and subtle the Classic texts were. This was how he fulfilled his theme to elucidate the essence. On the other hand, similar to Miu, his opinions are not always in concord with the Classic. When such cases happened, he would just say that "it was wrong," or "it was a mistake caused by transcription."[11]

Zhang's personal philosophical tendency is not as clear as Miu or the father and son of Lu. He is more a generalist, still accepting the official Neo-Confucianism theory. Nevertheless, these three commentators shared the same idea to demonstrate their own understandings rather than sticking to the texts of the Classic.

3 Formation of the materia medica study against Jin-Yuan theories

Zhang Zhicong (张志聪) lived in the same era as Zhang Lu. Modern scholars categorized them as the *Zun Gu Pai* (尊古派 group of classicism), but their therapeutic styles and academic understanding toward the Classic were quite different. While Zhang Lu was based in Suzhou, Zhang Zhicong's activities were in Hangzhou surrounding. Zhang Zhicong's tendency of adoring the ancient medical classics could be better explained by his education. He first learned medicine with Zhang Suichen (张遂辰), an expert on *Shang Han Lun*. Later he studied with Lu Zhiyi. Compared to Zhang Lu, he was more concerned with the textual meanings of the ancient medical texts, including *Shang Han Lun* and *Huang Di Nei Jing* (《黄帝内经》 *The Yellow Emperor's Inner Classic*). He was particularly fond of the *wu yun liu qi* (五运六气 five circulatory phrases and six seasonal influences)

theory, which was incorporated as part of the *Huang Di Nei Jing* during the Tang dynasty. Although this theory was neither used by Zhang Zhongjing nor embraced by masters of the Jin-Yuan theories, it was generally agreed that the theory had an immemorial origin. Therefore, utilizing them would not shake one's standpoint as a follower of *Jing Fang* school. When he extended his studies to materia medica, he extensively adopted that theory as his analytical foundation. The title he gave to his commentaries of the Classic was *Ben Cao Chong Yuan* (《本草崇原》 *Reverence for the Origin of the Materia Medica*), reminding his readers that those who want to study materia medica must take its origin, namely the Classic, seriously. He even organized a medical school to closely study the ancient medical texts with his pupils. The commentaries of those ancient texts were the result of his collaboration with his medical pupils. They were written for experts but not for laymen. This can be confirmed as some of the descriptions derived not only from textual reading but also his clinical experience.

The inclusion of Zhang Zhicong's own clinical experience became clear especially when he tried to attack the masters of Jin-Yuan theories. In the commentary on *Niu Huang* (牛黄 *Calculus Bovis*), he refuted Li Gao's interpretation and accused him of "liking to make speculations." "I am afraid that Li's theory would bring disaster to thousands of generations"[12] In the case of *Shao Yao* (芍药 *Radix Paeoniae*), he criticized that most physicians simply follow masters of the Yuan or Ming dynasties. They "do not examine the *Huang Di Nei Jing*, do not examine the nature of things, but instead spread falsehood and foolishly abide by it. All of them are bungled in the name of customs. Isn't it sad?"[12] Zhang Zhicong is the first commentator to oppose the Neo-Confucianism philosophy in the study of materia medica. He portrayed himself as a loyal follower of the Classic. He was not as famous as Zhang Lu during his lifetime, but after his death, he won more followers.

Other than Zhang Lu, Xu Dachun (徐大椿) is another physician who received personal recognition from the emperor. The Emperor Qianlong of the Qing dynasty even proposed to recruit him into the Imperial Academy. Xu is a great figure of the *Jing Fang* school. His maxim for Chinese medicine studies is to always trace the origin. With this presumption, it is natural that he prefers ancient classical Chinese medicine theories over the contemporary theories. One of his famous books is to denounce a prevailing medical philosophy invented by Zhao Xianke (赵献可) to be groundless and ridiculous. Similar to Zhang Zhicong, Xu also disagreed with masters and philosophers of the Jin-Yuan theories such as Zhang Yuansu or Li Gao. He criticized their interpretations of medical substances as strained and farfetched arguments. In the preface of his commentaries of the Classic, Xu condemned the Jin-Yuan philosophers as a group "overconfident in themselves," and thus "repeated the mistakes." "Even when they used medical substances mentioned in the Classic, they mostly missed the subtle features of the drugs." All of the problems took place indeed "because the Classic is not elaborately studied."[13]

The book he wrote to deal with these problems is *Shen Nong Ben Cao Jing Bai Zhong Lu* (《神农本草经百种录》 *A Hundred Records on "Shen Nong's Classic of the Materia Medica"*). Xu's writing strategy was to select only 100 medical substances from the Classic that he is familiar with, and to provide brief commentaries to its texts sentence by sentence. Although he did not extensively explain all medical substances, readers could grasp how to use other herbs by means of inference. As he put it, he "selected a total of one hundred [medical substances] in number that could be verified by eyes and ears without suspicions, for which the reasoning would be testable, then traced the origins of the relevant discussions, and elucidated the reasons why they were used in such ways, so as to make the ancient sages' ideas behind the prescriptions for healing illness to become obviously visible."[13] There are no philological remarks in this book. Xu did not bother to explain word by word literally. Xu expressed his insights and experiences with the texts. For him, using the appearance and flavor without involving the theory of meridian tropism is sufficient to grasp the nature of medical substances. Xu's straightforward rhetoric rejected the ground for Jin-Yuan philosophies and theories.

Zhang Zhicong and Xu Dachun denounced the legitimacy of the Neo-Confucianist theory from different perspectives. Chen Nianzu (陈念祖), who holds an even stronger animosity against the Jin-Yuan theories, considered that uniting their forces to form an alliance to gain a domineering position for the classical Chinese medicine theories is a good idea. Chen is better known for the name Chen Xiuyuan (陈修园). He had the opportunity to serve as local magistrates at several places, but he was better known as a medical writer during his career as a government officer throughout the entire country. He was productive and was good at expressing complicated ideas in simple languages. Thus, he was quite a celebrity in the publishing industry.[6]

Just like Zhang Zhicong and Xu Dachun, Chen was enthusiastic about reviving classical Chinese medicine. He believed in classical teaching because it has been proven to be more effective than those physicians who adopted the Jin-Yuan theories. Xu Dachun has the same understanding but he was not as eminent as Chen did. Chen also devoted himself in commentating for the Classic. His book named *Shen Nong Ben Cao Jing Du* (《神农本草经读》 *Readings of the "Shen Nong's Classic of the Materia Medica"*) was published in 1803. This book demonstrated hostility against the Jin-Yuan masters, including their followers such as Li Shizhen. He claimed that a pupil must burn the Jing-Yuan masters' books before discussing medicine with him. In another occasion, he said that "since Li Shizhen's *Ben Cao Gang Mu* became popular, the

Classic has declined."[3] In the preface of the book, his friend quoted an even more radical objection: "Is there anyone who has successfully healed patients using the theories from Zhu Zhenheng, Zhang Yuansu, Wang Haogu and Li Gao?"[3]

In the book *Shen Nong Ben Cao Jing Du,* Chen arranged his commentaries by quoting the original texts of the Classic first under each medical substance, followed by his general comments with the prefix "Chen Xiuyuan says." Chen's style was used to feature long quotation from Zhang Zhicong and Xu Dachun, occasionally adding *Ben Cao Jing Jie* (《本草经解》 *Explanations of the Materia Medica Classic*) attributed to Ye Gui (叶桂), a renowned Suzhou physician in the Qing dynasty. In the "General Notice" of his commentaries, Chen explained that he was not completely satisfied with those authors, but he gave them merits and thus would append their words.[3]

In the epilogue of Chen Xiuyuan's medical book, a friend of Chen said that he worried that the theories of Zhang Yuansu and Li Gao were over-prevailing, therefore, he collected early writings of Zhang Zhicong, Ye Gui, and Chen Xiuyuan to make a book. He was pleased to see that Chen Xiuyuan had done so, thus he could "drop his original plan for a while."[3] By collecting these commentaries together, Chen garnered a group of readers and followers who were interested in learning classical Chinese medicine and applying the classical theories to their practices.

At that time, there seemed to be a demand for such a book. Chen's targeted audience was more popular, much less scholarly than Xu Dachun's book. However, since he considerably incorporated quotations from Xu's works into his own book, he has broadened Xu's readership with his own work.

The desire for such commentaries on the Classic in the late Qing dynasty continues to grow following Chen's publication. About one century later, Zhong Xuelu (仲学辂) made a similar compilation titled *Ben Cao Chong Yuan Ji Shuo* (《本草崇原集说》 *Collected Essays on Venerating the Origins of Materia Medica*) and published it in 1909. This volume highlighted Chen Xiuyuan's contribution in promoting Zhang Zhongjing's scholarship, and particularly picked up some of Chen's essays as its appendices.[14] Zhong is known as a master of classical Chinese medicine. His students, for example, Zhang Taiyan (章太炎) continued promoting the use of classical Chinese medicine. Such classical Chinese medicine-focused materia medica books were indeed useful to physicians. Although classical Chinese medicine was not the only mainstream of medical thoughts in the Qing dynasty as some scholars assumed, by uniting authors of similar opinions against the Jin-Yuan philosophers, Chen Xiuyuan shaped a corpus of *Jing Fang* school's publications that crystalized the position to compete with the Jin-Yuan theories on equal terms.

4 Input of pure philologists and their compromise

The most crucial contribution to the studies of the Classic in the Qing dynasty is the restoration of the original text. Although the earliest pioneer is Lu Fu in the late Ming dynasty, his work is no more than picking sentences out of the earlier materia medica monographs. Scholars do not regard highly of Lu Fu's work, but give more attention to Sun Xingyan (孙星衍), Huang Shi (黄奭), Gu Guanguang (顾观光), and Jiang Guoyi (姜国伊). Sun and Huang were pure philologists without medical background, but that was not the case of the other two philologists. Gu and Jiang practiced medicine and provided their own medical opinions in their commentaries for the Classic they reconstructed.[15]

Gu wrote *Shen Nong Ben Cao Jing Jiao Zhu* (《神农本草经校注》 *The Proofread "Shen Nong's Classic of the Materia Medica" with Commentaries*). It is noteworthy that Gu did not involve in the debates against the Jin-Yuan theories. Gu managed his commentaries differently from Chen. Under the commentary of each medical substance, Gu complemented it with other ancient Chinese medicine books in order to reveal other aspects of its nature or usages. Sometimes he would complement the medical substance with how classical Chinese dictionaries interpret certain characters, such as *Shuo Wen Jie Zi* (《说文解字》 *Elucidations of Script and Explications of Characters*) or *Shi Ming* (《释名》 *Explanation of Names*). Gu was an expert of philology. In his other works on geology and mathematics, he basically followed the same style. Gu's input of linguistic information mainly served to present a more comprehensive picture of the medical term. He did not try to make any clear argument or criticize other authors in his commentaries.[16]

Jiang's reconstructed the Classic titled *Ben Jing Jing Shi* (《本经经释》 *Interpretations of the "Shen Nong's Classic of the Materia Medica"*). His philological style is somehow different from Gu's. He claimed that his editorial principle was to "interpret the classics with (other) classics," a methodology often adopted by Confucian scholars in the Han dynasty. He transplanted this method to the annotations of medical classics. Under each medical substance, he quoted relevant texts from the *Huang Di Nei Jing* or *Shang Han Lun* to identify how authors of other ancient Chinese medicine classics assess the substance, or how they applied it to practice. His assumption was that authors from the era of the Classic should have an understanding closer to the original meaning of the text. He might disagree with the Jin-Yuan theories.[17]

The representative figure who annotated the Classic with therapeutic thinking is Zou Shu (邹澍). He produced three books on materia medica in total, namely *Ben Jing Shu Zheng* (《本经疏证》 *Exegesis and Verification on the "Classic of Materia Medica"*), *Ben Jing Xu Shu* (《本经续疏》 *Continued Verification to the "Classic of Materia Medica"*), and *Ben Jing Xu Shu Yao*

(《本经序疏要》 *Continued Exegesis on Essentials in the "Classic of Materia Medica"*). The three books all aimed at interpreting the ideas of the Classic.

Zou was born in a scholarly family and he himself was versed in several fields, but he was mostly fond of Chinese medicine. Among his known 14 works, nine of them were about medical texts including the *Huang Di Nei Jing* and *Shang Han Lun*. The bibliography showed his passion and tendency in reviving ancient classics. His works on materia medica followed this same principle. Zou adopted texts from the Classic, *Shang Han Lun,* as well as *Huang Di Nei Jing* in his book *Ben Jing Shu Zheng*. The descriptions of each medical substance start with a section drawn from the Classic or Tao Hongjing's elaboration, followed by his philological analysis as well as various references, including historical, religious, and even Western sources. Certainly, opinions about therapies formed an essential part in his commentaries. Usually, he placed *Shang Han Lun* or other classical prescriptions as guides. At the same time, he also incorporated many medical authors after the Jin dynasty to discuss their merits and shortcomings.

In the preface, Zou stated that his commentating on the Classic using philosophical approach was inspired by Liu Ruojin's (刘若金) work, the *Ben Cao Shu* (《本草述》 *Description of the Materia Medica*).[18] His friend Yang Shitai (杨时泰) recommended this book to him. Yang admired Liu and compiled Liu's work as an abridged version titled *Ben Cao Shu Gou Yuan* (《本草述钩元》 *A Study on the Origins of* the *Description of the Materia Medica*). Zou recognized the book's value, but regretted that it mainly relied on Jin-Yuan philosophical theories. Zou believed that classical works such as *Shang Han Lun* should not be overlooked. This encounter shapes the writing of *Ben Jing Shu Zheng*.[19] For this reason, other than Zhang Zhongjing, Liu was the most frequently quoted author in Zou's commentaries. Other than Liu, Lu Fu and his son Lu Zhiyi also received intensive attention in his commentary.

His research tools were not limited to textual studies. In the commentary, Zou occasionally revealed the facet of a positivist. For example, he recorded that he had dug a hole in order to observe the roots of Xuan Fu Hua (旋覆花 *Flos Inulae*), confirming that Li Shizhen was wrong. In another event, he mentioned that the spider's belly contained no silk.[18] None of the materia medica monograph provided such information, thus this description could be the result of his own dissection. He was not a blind worshiper of the ancient Chinese medical classics. He once claimed that, contrary to the orthodox belief, the legend that Shen Nong tasted herbs to write up the Classic could not be true.[20] As a philologist, etymology is Zou's main method to solve puzzles in medical debates. He explained that since the Jin-Yuan masters interpreted wrongly some characters in the *Shang Han Lun*, their reasonings failed to explain the true meaning of the original text.[18]

Thus, etymology and therapeutic practices became his major tools to carry out dialogs with medical philosophers such as Liu Ruojin. For example, he would praise Liu's comments on Bai Qian (白前 *Rhizoma et Radix Cynanchi Stauntonii*) as "surely as so," but he would further remark that "as for why it is so, he was still unclear."[18] The key to find the answer is philology. Zou did not always find fault in Liu and other philosophers. Sometimes he would even recognize that Liu's interpretations "could compensate what is missing in the Classic."[18] As a qualified philologist, he could appreciate the merits of philosophical thinking. He also recognized the charm of exploring the philological reason. Based on his understanding of the two approaches, he said that "we would find that there are countless facts sharing the same underlying truth."[18] Zou shows that philosophy and philology were not necessarily opposite approaches confronting each other. A balanced approach using both philosophical and philological approaches could lead to mastery of medicine closer to perfection.

Before the fall of the Qing dynasty, the last important philological annotator of the Classic is Mo Meishi (莫枚士). After two failures in the imperial examinations, he devoted himself to medicine. When he was young, he acquired solid training in linguistic research methods, which he extensively applied in his studies of several medical texts. He published *Yan Jing Yan* (《研经言》 *Essays on Studying Classics*), *Jing Fang Shi Li* (《经方释例》 *Commentating the Classical Prescriptions with Examples*), and *Shen Nong Ben Cao Jing Jiao Zhu* (《神农本草经校注》 *Proofread Commentaries of the "Shen Nong's Classic of the Materia Medica"*). This list showed that he was a loyal follower of the classical approach. To compose those books, he applied not only the linguistic tools that he learned but also the methods of "interpreting the classics with (other) ancient classical texts." Unlike Gu Guanguang or Jiang Guoyi, he tried to clarify more facts in the texts, usually in the form of identifying the exact medical substances according to the original contexts. His achievements gained wider recognition from his contemporaries than Gu or Jiang. Although his explanations were somehow too erudite for the general readers, philological scholars recognized his contributions. For example, Lu Maoxiu (陆懋修), a leading physician in the lower Yangtze river delta and also a *Jing Fang* master, highly praised him and wrote forewords for his first two books.[21] It is clear that Mo's standpoint is to promote ancient classical Chinese medicine. However, he never tries to attack the Jin-Yuan theories. Sometimes he would point out Li Shizhen's mistakes. The criticisms are always limited to the understanding of a certain medical substance, and his criticism was never personal.[22]

5 Conclusion

This article examines 12 important commentaries of the Classic in the Ming and Qing dynasties. It tries to reveal that the authors' approaches and outcomes

diversify in great scale even though they all claimed that they are venerating ancient sages. It is convenient to use the dual framework of the philosophical and philological approaches to grasp the larger picture of happening in this period, but not every author had chosen to side a unilateral approach. In fact, among the "Hanxue tradition" annotators identified by modern scholars, we could at least classify them into three groups: (1) those who had stronger philosophical approach, such as Miu Xiyong, Lu Fu, Lu Zhiyi, and Zhang Lu; (2) those who opposed the Jin-Yuan theories and adored the classics especially *Shang Han Lun*, such as Zhang Zhicong, Xu Dachun, Chen Nianzu, and Zhong Xuelu; and (3) those who were strict philologists, such as Gu Guanguang, Jiang Guoyi, Zou Shu, and Mo Meishi. When scholars talk about the Qing dynasty's orthodox school, they usually refer to scholars who are versed in linguistic trainings. Modern historians would place them at the side opposite to the Jin-Yuan approach. However, these philologists turned out to be eclectic. They either refrain from attacking the philosophers, or appreciate the Neo-Confucianism and believe that it is possible to incorporate the two approaches. In short, there is a spectrum in the so-called philological scholars. To generalize them as one single group is over-simplified or even misleading.

In view of the brevity of ancient medical classics, the Jin-Yuan theories adopted philosophical speculation to find out the truths that have not been clearly stated, and developed some wonderful theories. At the intellectual level, the Jin-Yuan medical scholars have attracted many outstanding people, such as Li Shizhen, to join their side. But sometimes they would get too immersed in speculations and go beyond reality. On the other hand, the "Hanxue tradition" attaches great importance to finding evidence, and carefully considers every word and sentence of ancient books. When it is taken too far, it may become rigid and trivial. Similar contradictions exist in both China and Japan. However, Japan has clear barriers between the two sides, while the Chinese are more tolerant to allow the two sides to complement each other. At the very least, the four philologists discussed above treated the philosophers gently. It must also be noted that the scholars discussed above are grouped by their lifetime instead of by the two approaches. Before the linguistic methods matured in the Qing dynasty, it is natural that no philological commentators in strict definition were involved. However, throughout the Qing dynasty, physicians from both sides were active in the medical fields. In the latter part of late Imperial China, these three groups of physicians co-existed, and commonly formed a foundation for today's traditional Chinese medicine.

These examples also show that although those approaches are different, each of these medical figures strived to convince readers on their own claims in the name of the Classic. Therefore, venerating the Classic should not be understood as a sign of pedantic or obstinate attitude, but rather it is very often adopted as a convenient method to inspire innovations in Chinese medicine.

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Research article

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Chinese Medicine in the United States: Historical Development and Growth

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Abstract

Chinese medicine is growing rapidly in the United States both as a field of research and in the daily treatment of illnesses. The popularity of Chinese medicine, particularly acupuncture, as a healing mechanism demonstrates American people's positive experience with Chinese medicine and their embracing it as an alternative to the mainstream Western biomedicine. Chinese medicine is an important part of the Alternative and Complementary Medicine or Integrated Medicine in the United States health system. It is increasingly used and covered by health insurance. Although Chinese medicine has been in the United States since colonial times, it was discriminated against by local authorities. However, things began to change in the 1970s when individual states gradually passed laws to legalize the practice of acupuncture as a healing mechanism. American public interest in Chinese medicine, particularly acupuncture, was aroused by the media's report of the "magic" power of acupuncture during President Nixon's visit to China. Non-Asians studied acupuncture in the following decades, which contributed to the establishment of acupuncture as a profession in the American health system. The history of Chinese medicine in the United States illustrates that Chinese and Asian immigrants promoted Chinese medicine in the communities, while Chinese American medical scientists who were trained in biomedicine played an important role in shaping the biomedical method of acupuncture research. This article investigates the changes of Chinese medicine in the United States, with a focus on acupuncture. Situating the discussion in a larger context of social and cultural changes, this study examines the contributions of Chinese immigrants and the popularity of acupuncture in the United States. It analyzes the development of acupuncture practice and research, the professional training in Chinese medicine, and American people's interest in using Chinese medicine as a reliable healing mechanism to many health problems, including chronic pain, cancer, and drug addictions.

Keywords: Acupuncture and herbal medicine schools and colleges; Acupuncture and research; Alternative and Complementary Medicine; Chinese medicine

1 Introduction

Chinese medicine is a dynamic field in the United States, particularly the use of acupuncture and herbal medicine. The latest publications of research show that the United States had 37,886 actively licensed acupuncturists as of January 1, 2018.[1] That was an increase of 257% from 1998. For every 100,000 Americans there are 12 licensed acupuncturists. Herbal medicine, which American laws define as a dietary supplement, is also very popular with American consumers.

Chinese medicine is taught at accredited institutions that have been called Acupuncture and Oriental Medicine (AOM) or Acupuncture and Eastern Medicine colleges and schools. The Accreditation Commission for Acupuncture and Herbal Medicine decided in 2022 to remove the term "oriental" as part of accreditation standard requirements.[2] They are now being changed to Acupuncture and Herbal Medicine colleges and schools. The term "oriental" has historical implications of Western imperialism in reference to China and Asia, which is not suitable for the promotion of cultural appreciation of different societies. In 2018, the United States had about 60 accredited AOM schools and colleges and more than 100 different AOM programs. The latest data from the Accreditation Commission for Acupuncture and Herbal Medicine indicate that the United States has 52 schools of Acupuncture and Herbal Medicine in 2022. They include Masters and doctoral degree programs on acupuncture or such degrees in acupuncture with Chinese herbal medicine specialization. The majority of those accredited acupuncture and herbal medicine schools are located on the east and west coast. Half of the schools are located in the three states of California, Florida, and New York.[1] The profession of acupuncture is growing steadily, as acupuncture has become a popular treatment of many ailments for Americans. Almost every state in the United States has established laws to regulate acupuncture practice.

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Chinese medicine has a long history in the United States. Chinese immigrants spread and sustained Chinese medicine in Chinese American communities. Acupuncture gained the attention of the American public during President Nixon's visit to China in 1972. When Henry Kissinger led an advance team to China in 1971 to prepare for Nixion's visit, a large group of news media journalists came to report and re-introduce China to the American people. In the media group was James Reston, Vice President and a columnist of *The New York Times*. Reston suffered an acute attack of appendicitis one week after his arrival in China. He was hospitalized at Beijing Union Medical College Hospital (Beijing Anti-Imperialist Hospital at the time), where Chinese doctors removed his appendix in an emergency procedure. Chinese doctors treated his postsurgical pain with acupuncture. After he recovered, Reston wrote about his experience with Chinese medicine and acupuncture treatment in Beijing and published his report in the *New York Times*.[3] In his article, Reston praised China's medical achievement in combining "the very old and the very new" of Chinese medicine and Western biomedicine, and Chinese doctors' dedication to improving the healthcare and quality of life for the people.

Reston's report on acupuncture created a great sensation in America and caused lots of curiosity about acupuncture and Chinese medicine. Reston helped open the doors to the exploration of Chinese medicine by non-Asian Americans.[4] After President Nixon's visit to China, his personal physician, Tkach, commented that acupuncture was superior to the anesthetics used in American hospitals. Tkach was a Major General of the US Air Force. He published an article in the July 1972 issue of *Readers Digest*, with the title "I watched acupuncture work."[5] His article and comments further stimulated American interest in Chinese acupuncture. The United States witnessed a craze for acupuncture and everything about China after Nixon's visit, as the two countries resumed friendly relations following a quarter of a century's isolation in the Cold War.

American society underwent significant social and cultural changes after World War II. The changing social landscape provided a larger context for the understanding of Chinese medicine in American society. First, increasing numbers of Chinese and Asian immigrants came to the United States due to new immigration and refugee laws. Many of them were highly educated professionals who contributed to the American brain gain after the war. Second, the change of Asian component of the American population, especially the increase of Chinese and Asians who had knowledge of Chinese medicine from East and Southeast Asia, led to a broader spread of Chinese medicine in America's Asian communities. The diverse Asian communities interacted with the increasing interest of the American public in acupuncture and contributed to making Chinese medicine an important part of the Alternative and Complementary Medicine in the Western medicine dominated America.

Chinese medicine is sometimes called traditional Chinese medicine (TCM). This article uses the term Chinese medicine throughout the discussion. The study traces the history of Chinese medicine in the United States, with Chinese immigrants promoting and sustaining its development and growth. It discusses the growth of acupuncture as a field of study and a profession in the context of social and cultural changes that shaped the increased interest of American people in Chinese medicine since the 1970s. Although Chinese medicine is considered an "alternative" medical knowledge and practice to the mainstream Western biomedicine, it is increasingly used and integrated into the daily treatment of many ailments. It is now embraced by non-Asian Americans as an effective healing mechanism.

2 Historical background and immigrants' contributions

American ginseng and Chinese tea and herbs were traded for medicinal use between the two countries since the colonial time of America. After Chinese acupuncture was introduced to Europe during the 16th to 18th centuries, it has been studied and practiced by European and American doctors since. They used acupuncture to treat arthritis, paralysis and spinal injuries on the battlefields.[6] In the 19th century America, William Osler (1849–1919), who was regarded as the "father of modern medicine," studied and used acupuncture in his own medical practice and wrote about acupuncture.[7,8] Osler made the statement in his classical medical textbook, *The Principles and Practices of Medicine* (1892), that lumbar acupuncture was the most efficient treatment for acute pain.[9]

Chinese immigrants brought the knowledge and practice of Chinese medicine to the United States in the 19th century when tens of thousands immigrated to the United States. They first Chinese immigrants came during the gold rush and then as free labor for American industrialization after the US government signed the *Burlingame-Seward Treaty* to recruit Chinese workers for the building of American transcontinental railroads.[10] Those immigrants carried Chinese medical books with them and learned all the healing knowledge and practice while living in America. Their practice of Chinese medicine covered a wide range of services, including diagnosis by pulsing, prescription of herbal medicine for ailments, setting broken bones, delivering babies, and providing abortions. Despite the discrimination in the United States, Chinese doctors and herbalists practiced Chinese medicine in their own communities, with the majority concentrated in California and states on the west coast. They offered treatment for both Chinese and non-Chinese patients, with natural and herbal medicine. They explained health and illness with the yin-yang and

wu-xing doctrine of Chinese medical knowledge. As these concepts were novel to conventional Western medicine, Chinese medicine was attacked by the American medical profession as quackery. No license was allowed for the practice of Chinese medicine and local authorities arrested and persecuted Chinese doctors for practicing Chinese medicine without a license.[11]

Chinese medicine was able to continue and survive the attacks because Chinese Americans relied on it for their health in Chinatowns. Chinese doctors promoted and advertised Chinese medicine as natural medicine for natural healing in contrast to the mainstream biomedicine. In addition to Chinese patients, non-Chinese Americans also sought the treatment of Chinese medicine because they believed in natural healing and found Chinese medicine effective and affordable in comparison to Western biomedicine. Chinese doctors were usually community leaders and merchants. They served as bankers, shopkeepers, postmaster, translators, labor brokers and contractors, and legal consultants and defenders. When natural healing and homeopathy enjoyed a revival in the United States in the late 19th and early 20th centuries, Chinese medicine had a period of popularity among Americans as natural medicine. Chinese Americans, who were discriminated against and isolated in Chinatowns, could deal with all kinds of ailments, thanks to the availability of Chinese medicine. Other Americans and immigrants used Chinese herbal medicine for natural healing because they did not trust biomedicine. The demands by Chinese and non-Chinese patients helped the continuation of Chinese medicine in the United States. However, Chinese medicine declined in the 1930s–1960s.[11]

The change of American immigration laws during and after World War II significantly impacted the lives of Chinese and Asians in the United States. In 1943 when China was an important ally in World War II, Congress repealed the 1882 *Chinese Exclusion Act* and made Chinese eligible for American citizenship. In 1952 when the United States was deeply involved in the Korean War, Congress passed the *McCarran–Walter Act* which made all Asians eligible for American citizenship. Although the law was a calculated political ploy to improve relations with Asian nations and to boost American democratic credentials during the Cold War, the *McCarran–Walter Act* was a turning point for Asians to become citizens in America. When students were allowed to stay and become American citizens, their talent and educational credentials meant a vital brain gain for the United States. The highly educated professionals of Chinese and Asian origins subsequently formed a significant part of the middle-class of Asian American population.[12,13] The 1965 immigration law, which Congress passed during the high time of the Civil Rights Movement, further opened up the United States to non-European immigrants. It ended the restrictive national quota system and gave preference to immigration of scientists and educated professionals. The preference for professional immigration significantly increased the brain power of the United States, including many Chinese and Asian professional immigrants.

Interestingly, the post-World War II growth of Chinese population in the United States did not lead to the revival but a further decline of Chinese medicine in American society, according to Tamara Shelton. The reason for this development had much to do with the predominance of the biomedical profession and the extraordinary achievements of biomedical research buttressed by the military-industrial complex of America. Chinese students and U.S.-born Chinese Americans chose to study biomedicine for their professional career in medicine. Hence, the "golden age" of American biomedicine and Chinese youth's pursuit of career in the medical practice of biomedicine simultaneously led to the decline of "the practice of Chinese medicine and the close of many Chinese herbal companies" in the 1950s to 1960s.[11] The large numbers of refugees and immigrants from East and Southeast Asia after the Korean War and the Vietnam War brought significant changes to Asian population in the United States. Those new immigrants brought their traditions with them, including their traditional medicine that was influenced by Chinese medicine. In Asian immigrant communities, various forms of Chinese medicine were practiced and spread into the larger American society.

3 Studies of acupuncture by non-Asians

In the late 1960s, a new movement of counterculture emerged in America from the anti-Vietnam War demonstrations that challenged American authorities in many forms. Many young Americans sought Eastern traditional wisdom in their search for new answers, new approaches and beliefs for world peace in the tumultuous years of war and social upheaval. Medical students began to question the monopoly of biomedicine and sought new venues to seek knowledge and wisdom from the East. Non-Asian graduate students at the University of California Los Angeles founded the Institute for Taoist Studies in 1969. They learned to practice Tai-chi from local Chinese American Tai-chi teachers and took Tai-chi studies very seriously with dedicated daily practice. From Tai-chi, the students started learning Chinese medicine and acupuncture. Ten of them formed the first class to learn acupuncture from a Chinese medicine doctor, Ju Gim Shek, in Los Angeles. They studied acupuncture in the traditional way by studying and staying at their teacher's studio like apprentices.[14]

This group of American students, who were studying Chinese medicine and acupuncture in Los Angeles, found themselves famous when Americans became fascinated with Chinese acupuncture during Nixon's visit to China. They were "discovered" by local news media and interviewed on television about their studies. Riding on their fame, the students seized the opportunity and formed a National Acupuncture Association.[14] This association

was the first professional organization of acupuncture in the United States, even though the practice of acupuncture was still banned by local laws in California. At the time, people who practiced acupuncture faced the danger of being arrested and put in jail. For example, in 1974, Miriam Lee, the "Mother of Acupuncture in California," was arrested when her success in using acupuncture to treat patients caught the attention of local authorities. She was charged for practicing medicine without a license. When she was put on trial for treating patients with acupuncture without a license, her patients—both Chinese and non-Chinese—came to the courtroom to defend her right to practice and to testify the effectiveness of acupuncture.[11]

In order to win the legal right to practice acupuncture, the students who formed the National Acupuncture Association, worked with the California legislature to have bills passed for the practice of acupuncture from 1970 to 1975. Ronald Reagan, who was governor of California during this time, vetoed the bills every year. Finally, in 1975, the bill of California legislation was signed into law to allow the practice of acupuncture by non-physician professionals. The students, who lobbied and succeeded in getting the law established for the practice of acupuncture in California, became the first generation of non-Asian acupuncture professionals. They started educational programs of acupuncture at major university campuses across America from 1972 to 1975, after they completed their own training and became teachers of acupuncture. In the 1970s, they conducted acupuncture training across North America from the United States to Canada and Mexico. They set up several licensed colleges of acupuncture studies, including New England School of Acupuncture, California Acupuncture College (one of the branches is Pacific College of Oriental Medicine, now renamed as Pacific College of Health and Science), and Oregon College of AOM, and invited renowned acupuncturists from Hong Kong to teach. Studies at those schools usually lasted for three years before graduation. The students of these schools then became the next generation of American acupuncture professionals who promoted and multiplied the study centers of acupuncture and Chinese medicine across the United States.[14]

Some Americans went to study Chinese medicine and acupuncture in Hong Kong and Macau. In 1975, Ted J. Kaptchuk and Dan Bensky completed their training in acupuncture and Chinese medicine in Macau and returned to the United States to promote the study and practice of traditional therapies of Chinese medicine that had been reinvented and developed in China in the 1950s to 1970s. In the 1980s, working with the New England School of Acupuncture, Kaptchuk published his book, *The Web That Has No Weaver: Understanding Chinese Medicine*, and Bensky with Andrew Gamble and Kaptchuk published their book, *Chinese Herbal Medicine: Materia Medica*. Those books became essential English-language textbooks of Chinese medicine for American students and practitioners.[11]

The rise of acupuncture as a field of study and a health profession happened in the larger context of promoting better relations between the United States and China, and the changing perceptions of Chinese medicine in the United States after President Nixon's visit to China, in addition to the impact made by Chinese and Asian immigrants.

4 Research and professional development: the role of Chinese American medical scientists

Following President Nixon's footsteps, many groups of Americans went to visit China. They were eager to see what China was like with their own eyes. Delegations of physicians, educators, scientists, businessmen, and other professionals came one after another. Among American delegations of medical scientists and physicians were public health experts, Chinese American doctors, and African American doctors. They witnessed Chinese medical development and the healthcare system with first-hand observations. Many of them wrote about medicine and healthcare in China after they returned to the United States. The renowned American physician and public health advocate, Victor Sidel, first visited China in the autumn of 1971. Impressed with China's cost-effective achievements in public health, he made several visits to China in the following years and published several books on China's healthcare.[15–17] Moreover, a delegation of the Black Panther Party came and visited China in 1972, with a few physicians on the delegation. They observed and learned Chinese acupuncture during their visit. Upon returning to the United States, they began to integrate acupuncture in their medical practice. They formed the Black Acupuncture Association, which played an important role in popularizing acupuncture among African Americans.[18]

Chinese American doctors who were trained in biomedicine suddenly became a new force to introduce Chinese medicine to the American biomedical professionals when the American public became interested in acupuncture. They updated their knowledge of Chinese medicine with the latest development in China and observed acupuncture anesthesia in Chinese hospitals. Some Chinese American doctors even tried acupuncture anesthesia with success in a few American hospitals that generated more publicity for acupuncture.[19] Chinese American medical scientists translated Chinese medicine and explained it in biomedical terms to their colleagues in acupuncture research. The fact that they were trained in biomedicine but grew up with Chinese medicine gave them a unique advantage of being able to speak the language of biomedicine in the explanation of Chinese medicine and acupuncture. A few names stood out from the generation of Chinese and Chinese American medical

doctors who built the bridge of understanding between Western and Chinese medical knowledge systems since the 1970s.

Frederick F. Kao (1919–1992), who studied Western Medicine but grew up with Chinese medicine in China, founded and served as editor of *The American Journal of Chinese Medicine* in 1973 when he was on the faculty of State University of New York Downstate Medical Center. As an editor of the journal in the following years, Kao shaped the American research of Chinese medicine with biomedical framework in the exploration and explanation of the effectiveness of acupuncture, herbs, and other traditional Chinese medical therapies. *The American Journal of Chinese Medicine* has published articles and research reports on Chinese medicine that were conducted in clinics and laboratories from all over the world, reaching readers in more than 60 nations. Kao also founded and directed the Institute for Advanced Research in Asian Science and Medicine, which became a collaborative center within the World Health Organization.[20]

James Y.P. Chen (1914–2012) was a Tianjin native with a medical degree from Beijing Union Medical College.[21] He and Frederick Kao were members of the first delegation of Chinese American physicians to visit China in 1973, where they observed the latest development of acupuncture and Chinese medicine. Chen had been keeping track of acupuncture development and changes in China before his visit.[22] He joined the acupuncture research program at the National Institutes of Health in 1972. The National Institutes of Health research program used biomedical models to explain the theory and clinical therapies of Chinese acupuncture. Chen translated traditional formulas and practices of Chinese medicine in the biomedical language that his colleagues and scientists were familiar with.[23] In their different capacities as researcher and journal editor, Chen and Kao became the two prominent Chinese Americans who made significant contributions to the biomedical explanation of acupuncture and Chinese medicine in the United States.

The biomedicalization of "scientific" explanation and clinical tests of acupuncture raise questions as to the methodological appropriateness. Medical historian Vivienne Lo points out the fundamental incompatibility between the randomized controlled trials of Western medicine and Chinese medicine.[24] She explains that there are many different forms of therapies and styles of acupuncture in practice, and those variables undermine any trials of acupuncture as a unitary phenomenon. Scholars of Chinese medicine in China continue to explore how ancient Chinese came to understand the invisible or unseen tracks and points. Sensory and physiological experiences within and about the human body during Qigong and Tai-chi exercises may hint at a possible venue from which ancient Chinese medical sages figured out the tracts and points of acupuncture.[25] They used the human body as a living lab to understand the unseen mechanism of and within the human body. The inner logic of Chinese acupuncture theories and practices remains to be unlocked for fuller understanding.

Ka-Kit Hui at the University of California Los Angeles is another Chinese American doctor of biomedicine who has made important contributions to the research of Chinese medicine in the United States.[26] Hui was studying at the Medical School of UCLA when the publication of James Reston's report of Chinese acupuncture swept across America. Hui was intrigued by Reston's report and determined to learn more about acupuncture, as he had known Chinese medicine growing up in Hong Kong. When he was back to Hong Kong during school break in 1973, he took lessons with a master teacher in acupuncture and Chinese medicine. Hui had the ambition to combine scientific biomedicine with Chinese medicine in his work. After he became a professor of medicine at UCLA, Hui gradually integrated Chinese herbal medicine and acupuncture into clinical pharmacology and drug development for the treatment of hypertension and heart failure.[11] In 1994, he founded the UCLA Center for East-West Medicine, which is now a major institution that offers clinical care, education, and research in integrating biomedicine with Chinese medicine.[26]

Research of acupuncture has generated a significant increase of publications in the 20 years from 1995 to 2014 when compared to the publications on biomedicine. According to a study published in 2016, publications on acupuncture had 10.7% annual growth rate while biomedicine had an average of 4.5% annual growth rate.[27] Publications on clinical trials of acupuncture surged from 7.4% in 1995 to 20.3% in 2014. The most common focus of acupuncture research was on pain, comprising 37.9% of publications. Other major focuses of acupuncture research include arthritis, neoplasms/cancer, pregnancy or labor, mood disorders, stroke, nausea/vomiting, sleep, and paralysis/palsy. More than 60 countries in the world conducted acupuncture research, with China (47.4%), the United States (17.5%), and the United Kingdom (8.2%) as the top contributors.[27] The publications of acupuncture research mostly appear in journals on complementary and alternative medicine and in specialized journals on neuroscience, pain, anesthesia/analgesia, and international medicine, although publications also appear in major medical journals such as *New England Medical Journal* and *Journal of American Medical Association*.

Acupuncture has become an important health and healing alternative to mainstream biomedicine, as the daily use of acupuncture to treat diverse ailments is gaining increasing popularity among Americans. For this reason, acupuncture, together with herbal medicine, is called Alternative and Complementary Medicine or Integrative Medicine. With the increasing use of alternative and complementary medicine, American medical colleges have adjusted to public demands by offering studies of

integrative medicine, including Chinese acupuncture and herbal medicine. People often use acupuncture and herbal medicine in combination with biomedicine in the daily practice of healing. Many prominent American hospitals, medical centers, research institutes and medical colleges have incorporated acupuncture and Chinese herbal formula into the treatment of chronic pain and in the integrative medical care programs. They include the Mayo Clinic, the Cleveland Clinic, the Massachusetts General Hospital in Boston, Mount Sinai in New York, and University of California San Francisco. As acupuncture gains more popularity among patients and in medical training of doctors, major health insurance companies are expanding their coverage of acupuncture in medical treatments.

In the United States, acupuncture and Chinese herbal medicine are two separate disciplines and professional fields, although they are integrated in China.[6] This separation was primarily caused by American laws that define acupuncture and herbal medicine as two completely different categories. The regulations, therefore, are different in these two fields. The US government passed the *Dietary Supplement Health and Education Act* in 1994, which defined Chinese herbal remedies as dietary supplements and therefore exempted from the regulatory examination of the approval process for pharmaceuticals. This law substantially boosted the herbal medicine market, making the United States the biggest non-Asian importer of Chinese herbal medicine. Currently, Chinese herbal medicine is a thriving business in the United States.

5 Information on the use of acupuncture and Chinese herbal medicine

Acupuncture and Chinese herbal medicine have become an important part of Alternative Medicine in the United States. Studies show that acupuncture is a major practice of Complementary and Alternative medical treatment. In 2017 alone, over 14 million Americans used acupuncture, according to a study conducted by the Acupuncture and Massage College in Florida. The majority of those who use acupuncture tend to be people of 45 years and older, and well-educated with college degrees.

There are many sources that offer information on Chinese medicine, including websites of government health institutions, university medical schools, major hospitals, organizations and foundations of Chinese medicine. For example, the National Center for Complementary and Integrative Health under the US Department of Health and Human Services provides comprehensive online information about Chinese medicine (which it defines as TCM), including the definition, effectiveness, and major components of acupuncture, herbal products, and Tai-chi. It also offers information on how and where to find licensed practitioners of Chinese medicine.[28] The Mount Sinai Health System, located in New York City, provides detailed information on what Chinese medicine is good for and what patients should expect on their first visit. It explains the theoretical concepts of Chinese medicine in terms of understanding the human body's internal organs not only as individual structures but also as complex networks and systems. Such understanding of the connected systems and networks of human internal organs is lacking in Western biomedicine.[29]

6 Conclusion

Chinese medicine has a long history in the United States, but its rapid growth and development began in the 1970s after President Nixon's visit to China. Friendly relations between the two countries helped create a social and cultural context in which Chinese medicine was studied and appreciated by American people. In addition to the contributions that Chinese and Asian immigrants made to the development of Chinese medicine in the United States, many non-Asian Americans have been trained in acupuncture and Chinese herbal medicine since the 1970s. They helped spread the study of Chinese medicine in different parts of the United States. In the research of acupuncture, Chinese American doctors who were trained in biomedicine have played an important role in framing up the biomedical research approach to acupuncture and herbal medicine. Publications of acupuncture research have increased enormously in recent decades, despite lingering skepticism of acupuncture in the society. The use of Chinese medicine as a healing mechanism is gaining popularity among the American population. Chinese medicine, particularly acupuncture, has proved to be effective in treating many illnesses, especially in dealing with chronic pains and drug addictions that Western biomedicine has few solutions.

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Review

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Publishing and Medicine: A Potentially Integrated Field?

MANG Fan[1,✉]

Abstract

This article focuses on the intersection of English-language scholarship between the history of publishing and the history of medicine in Imperial China. As an important part of cultural and social history, both topics have attracted attention from a number of historians. This article contains three sections. The first section introduces the evolution of Chinese book and publishing history in recent years and examines what book historians have done in relation to traditional Chinese medicine. The second section explores how medical historians have considered the role of printing in the history of Chinese medicine and the ways in which medical publications were used as primary sources or subjects of research. The third section explores scholarship on medical epistemic genres, a subfield of medical history, in Chinese medicine, specifically focusing on medical case histories and recipes from the comparative and cross-cultural perspectives. Finally, the conclusion explores potential future directions from the integration of Chinese publishing history and medical history.

Keywords: History of publishing; Imperial China; Medical history

1 Medical history and Chinese society in the printed world

As Tobie Meyer-Fong pointed out in her 2007 article on publishing history, from the 1990s onward, an increasing number of social and cultural historians use Chinese books as a source and subject to develop a field to rethink intellectual, social, political, and cultural trends through the examination of the production, circulation, and consumption of books in historical contexts.[1] In its formative stages, this field borrows associated terminology and methodology from its European counterpart, including the terms "book history," "print culture," "publishing history/publishing culture," and the concept of "communication circuit."[1] Scholars then adapted these borrowed terms and methods to Chinese primary sources. Scholars have made great achievements through long-term studies of Chinese publishing history and micro studies. In her survey of publishing history in late Imperial China, Tobie Meyer-Fong mainly examined American and Japanese scholarship between 1990 and 2006 in terms of five themes: the periodization of Chinese publishing history, local publishing practices, the intended audience, gender and literati identities, and the relationship between political authority and print.

Chinese publishing history has always been faced with debates over methodology and risks about temporal and geographical imbalance. On the methodological level, scholars in the field of Chinese publishing culture, to a large extent, follow their European counterparts instead of promoting or challenging the Western-dominated methodology. The application of the concept of "communication circuit" encourages scholars to focus on commercial publishing and interactions among authors, editors, booksellers, and readers behind it. These topics were overlooked in the previously technology-dominated scholarship of Chinese publishing history and now become the center based on the popularity of Western methodology of publishing history. However, the focus on commercial publishing causes unevenness in the scholarship spatially and temporally. Scholars interested in commercial publishing focus on periods and places in which commerce thrived and political authority declined. The highlighted periods include the Southern Song dynasty, the late Ming dynasty and local or national commercial publishing centers such as Jianyang in Fujian province and the Jiangnan region along the lower reaches of the Yangzi River. By contrast, other periods such as the Qing dynasty and most northern and the far southern publishing and book markets were neglected. However, Cynthia Brokaw,[2] Florence Bretelle-Establet,[3,4] and other scholars have gradually filled the gap in recent years. This temporal and geographic imbalance not only impedes the creation of a

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balanced and comprehensive image of Chinese publishing history, but also limits the potential of comparative studies of Chinese and European publishing culture in the early modern period, especially the 18th and 19th centuries. In addition, Meyer-Fong states that overemphasizing commercial publishing might result in ignoring two important modes of publishing in China: official and house-hold production. This trend in the scholarship tends to neglect noncommercial transactions such as gift giving, and official and individual sponsors.[1] This will result in the oversimplification of the complex interactions among politics, literati culture, and publishing. With regard to specific studies, she argues that scholars writing the history of Chinese books and printing make efforts to address a core question: "was the book an instrument through which historical change was realized or an indicator of how the times had changed?"[1] This question is so complex that its answer seems inaccessible based on the limited primary sources and case studies. However, the examination of how the printed book "influenced conceptions of literati identity and gender roles," and the exploration of the social status of the producers and consumers of books, more or less, reveal how printed books trigger the changes.[1] Scholarship to date has considered works of fiction, encyclopedias, Confucian classics, and books related to civil examinations as sources and subjects for research. Most recently, scholars like Emily Mokros[5] and Zhang Ting (张婷)[6] have focused on the publication of court news and the realm of legal publishing. Their studies link publishing history to political and legal fields, and provide fresh sources and insights. Medical printing flourished in the early modern period, in spite of several notable exceptions. Medical publishing thus provides a fresh opportunity to explore the role of the printed book in Chinese history and thus stimulates questions drawn from the broader field of print history, such as: How were medical works produced through commercial, official, and private publishing? How did they circulate? Who were the intended readers? How did readers get books? How much could we know about their reading practices? To what extent did medical publications that were produced, circulated, and consumed affect the spread of medical knowledge in Chinese society and shape the pluralism of the medical market? Answers to these questions will help to add details and deeper understanding of the role played by published medical materials in the transmission of medical knowledge, and their impact on Chinese culture and society.

A few book historians have taken medical publications as a source and subject for their studies, although the medical aspect in these studies is usually a secondary concern. In her noted 1986 article "The Huanduzhai of Hangzhou and Suzhou: A study in seventeenth-century publishing," Ellen Widmer paid attention to medical publishing practices from two publishers Wang Qi (汪淇) and Wang Ang (汪昂) who successively operated a family printing house called Huanduzhai (还读斋) first in Hangzhou and then in Suzhou in the 17th century.[7] According to Widmer, both Wang Qi and Wang Ang were interested in medicine and published a number of medical books through their Huanduzhai publishing business. However, Wang Qi published different kinds of books primarily for money, including literary books, travel guides, and medical works, while Wang Ang concentrated on medical publishing for charity. Through the analysis of prefaces, title pages, layouts of medical works published by them, Widmer illustrates the differences between Wang Qi and Wang Ang in terms of publishing aim, strategy, and choice. She further examines the changes of print culture from the more open late Ming dynasty to the more restrictive early Qing dynasty behind their publishing practices. This mainly involves transforming from the flamboyant commercial culture of the late Ming dynasty focusing on "salability, sociability, and celebrity" to the culture of the early Qing dynasty having a strong interest in utility and being apolitical. In summary, Widmer's study of Huanduzhai during the Ming-Qing transition is a great case study revealing changes of print culture during this period through analysis of different publishing practices (some of which were related to medicine) over time in a publishing house. Unfortunately, while she uses medical publications as primary sources, at least to some extent, Widmer provides a few details of the contents of the printed medical books she focuses on, and she does not attempt to situate her analysis of the two Wangs' medical publishing practices within the broader context of medical practice or medical knowledge during this period. The questions she tries to solve and the method she uses in this article are typical in the field of Chinese publishing history. What she is interested in is the changing publishing strategies of a publishing house in relation to changes of political regime. Therefore, this is an exemplary study of book history in China rather than an exploration of an integration of publishing and medicine.

Similarly, both Lucille Chia and Cynthia J. Brokaw noted the presence of medical publications in the Fujian book trade from the Song dynasty to the Qing dynasty and Republican periods. In *Printing for Profit: The Commercial Publishers of Jianyang, Fujian (11th-17th Centuries)*, Chia outlines the continuities and changes of medical publications in Jianyang from the Song dynasty to the Ming dynasty on the level of scale, content, and characteristic. Commercial publishers in Jianyang in the Song and Yuan dynasties mainly published "collections of prescriptions, pharmaceutical works, and discussions on cold damage disorders." The Ming dynasty, especially the late Ming, witnessed an increased diversity of medical works, both scholarly and popular, from "critiques and revisions by medical scholars of earlier works"[8] to publications with different trends in medical ideas and practice, from medical classics to medical

treatments such as surgery and acupuncture, from gynecology, obstetrics to pediatrics and smallpox treatment. Furthermore, Chia emphasizes that commercial publishers who published medical works in Jianyang were not physicians, although they had interest in medicine. Their taste in medicine, to some extent, shaped textual forms of medical publications, and decided what kind of medical resources could be more accessible to readers.[8]

In Chapter 11 "Guides to Good Manners, Good Health, and Good Fortune" of her masterwork, *Commerce in Culture: The Sibao Book Trade in the Qing and Republican Periods*, Brokaw examines the medical publishing output of publishing houses in Sibao, including "medical compendia, materia medica, prescription collections, specialized texts for women, children, and specific types of diseases, and medical casebooks."[2] Through textual and material analyses of the extant medical texts published in Sibao, Brokaw argues that most medical publications in Sibao were well-known works providing practical medical knowledge and effective remedies for a range of diseases, being directed to medical beginners, partially trained country doctors, folk practitioners, and households, instead of highly trained and knowledgeable physicians. In contrast to Widmer's study of Huanduzhai in the 17th century, Brokaw situates her exploration of Sibao's medical texts in the broader context of medical practice during the Qing dynasty and Republican Period, which bridges publishing and medical practice. Her work corresponds well with Angela Leung's study of medical learning and popularization of medical knowledge in the Ming and Qing dynasties. I will discuss this in the next section.

Recently, in the field of Chinese book history, a new trend focusing on studies of readers and their reading practices has promoted an integration of publishing history and medical history from an innovative perspective. In the article "Science for the Chinese common reader? Myriad treasures and new knowledge at the turn of the twentieth century,"[9] Joan Judge analyzes how common readers in the late Qing dynasty (1890–1911) and early Republic of China (1912–1930) had exposure to knowledge and information on health through reading relatively cheap, "traditional," and daily-use published books such as *Wan Bao Quan Shu* (《万宝全书》 *Comprehensive Compendia of Myriad Treasures*) instead of consuming new-style textbooks, newspapers, periodicals, and other forms of new media that attempted to disseminate scientific knowledge from the West. Based on the existing scholarship on encyclopedia, Judge illustrates characteristics of *Wan Bao Quan Shu* as a genre in publishing history of late Imperial China, explores its changes in printing technology, edition and content in the late Qing dynasty and early Republic of China, and draws a picture of consumers of this kind of encyclopedia. Such comprehensive examination of production, publication, circulation, and consumption of *Wan Bao Quan Shu* helps to bring medical information in the book into social and cultural context. In this way, Judge creates a more detailed and compelling image of the production, dissemination, and acceptance of practical medical knowledge.

2 Role of printing in the medical world

Like the previously mentioned scholars writing Chinese publishing history, a number of medical historians also pay attention to the role of printing in the history of Chinese medicine.

Almost at the same time that Widmer's article "The Huanduzhai of Hangzhou and Suzhou: A study in seventeenth-century publishing" appeared in the *Harvard Journal of Asiatic Studies*, Marta Hanson published her book chapter "Merchants of medicine: Huizhou mercantile consciousness, morality, and medical patronage in seventeenth-century China."[10] In this article, Hanson examines different motivations behind five medical texts published by Huizhou book merchants (three texts relating to Wu Mianxue [吴勉学], two of which were published by Huan Du Zhai) to show the social context of a new genre of medical literature in the mid-16th and 17th centuries, namely, self-sufficient handbooks and comprehensive textbooks. Specifically, Wu Mianxue's career of publishing medical texts reveals that medical publishing was considered as a way of respecting orthodoxy and accumulating spiritual merit for literati and scholars.[10] Hanson further argues that although the medical publishing projects of Wang Qi and Wang Ang were based on different motivations that resulted in different contents and intended readers, these medical publishing projects reveal that medical publishing provided social, economic, and moral opportunities for merchant families who failed to achieve political power and social prestige through the Imperial examination system. Both Widmer and Hanson focus on medical texts including *Ji Yin Gang Mu* (《济阴纲目》 *A Compendium of Female Disorders*) and *Ben Cao Bei Yao* (《本草备要》 *Essentials of Materia Medica*) published by Wang Qi and Wang Ang, respectively. However, Widmer uses them to illuminate the changing choices of one publishing house during a dramatic political transformation, whereas Hanson considers the medical publications as part of the changing medical culture of the period and relates them to the social aspirations of educated men without examination degrees.

Following Hanson's study of commercial printed medical handbooks and textbooks in 17th-century Huizhou, Angela Ki-che Leung (梁其姿) chose to focus on medical primers of the Ming and Qing dynasties. In her 2011 article "Medical instruction and popularization in Ming-Qing China," Leung examines a number of Ming-Qing medical primers to show the development of medicine from the Ming dynasty to the Qing dynasty.[11] She pays attention to the flourishing of easy verses and rhymes of medical publications including individual texts and

introductory medical textbooks and popular family encyclopedias or almanacs. The verses and rhymes were used to describe the nature and use of drugs, recipes, channels and pulse, and common illnesses, for the purpose of instructing beginners, self-taught readers, and those who had different interests in medicine. In this way, Leung illustrates the new characteristics of Ming-Qing medical publications, namely, further simplification on the level of language style and content, and a more pragmatic and clinical trend.[11] These changes further reveal the transformation of the medical market from honoring ideal and moralistic "Confucian doctors" during the Song and Yuan dynasties to pursuing a more pragmatic and realistic career as "professional" medical practitioners of the late Imperial period.[11] In general, Leung's argument about changes of medical publications in late Imperial China, which include a more pragmatic and clinical trend, and an increasing number of printed medical texts in the market, corresponds to and supplements studies on publishing history during the same period. In addition, there are two main innovations of Leung's research. First, her analysis is based in an innovative perspective on medical texts. Leung analyzes the language style of the popular medical publications, especially verses and rhymes, to examine their intended readers and the effects of reading. Another innovation is that Leung develops her understanding of Ming-Qing medical publications to think comparatively about Chinese and European medicine in practice. This comparison reveals the key role of medical publications in the shaping of the medical market. It also inspires scholars to do research on comparison between Chinese and European medical publishing in the future.

In the same year, Leung also published an article on the role of printing in medical learning in the Song, Yuan, and Ming dynasties. In her chapter "Medical learning from the Song to the Ming" published in the volume *The Song-Yuan-Ming Transition in Chinese History* (2003), Angela Ki-che Leung considers "the popularization of printing" as one of the three new elements during the Song dynasty that resulted in the transformation of the scholarly and the popular medical traditions during the long Song-Yuan-Ming transition, and in the final split between the two medical traditions.[12] Specifically, the increasingly flourishing medical publication business promoted by both official printing projects and by private printing houses broke the monopoly of medical teaching formerly held by masters or lineages and increased the number of self-taught doctors. At the same time, printing also helped to set new trends in medical thought and practice, constructed medical communities, and created medical stars. However, compared with her examination of Ming-Qing popular medical publications through analysis of verses and rhymes, Leung's arguments about the role of medical publications during the Song-Yuan-Ming transition largely depend on *Zhong Guo Yi Ji Kao* (《中国医籍考》*Studies of China's Medical Books*), reprint of an original edition compiled by Tamba no Mototane in 1831. This book collects information about Chinese medical books in different times, including title, author, editor, preface, and edition. However, a lack of details about the printed medical books including the number of copies, the format, the intended readership and the strategy of medical publication makes Leung's more nuanced examination of the role of the printed book in the history of the transmission of medical knowledge in this crucial period limited.[12]

In 2020, Hanson published her research article "From under the elbow to pointing to the palm: Chinese metaphors for learning medicine by the book (4th - 14th centuries)."[13] This article, to some extent, fills a gap in the analysis of medical texts before the late Ming dynasty. Through the examination of a range of genre distinctions, descriptors, and more importantly, metaphors in the titles of Chinese medical manuscripts and printed texts from antiquity through the late medieval period, Hanson shows how editors organized medical knowledge and presented it to potential readers. Hanson, in this article, analyzes a large number of title metaphors mainly from the fourth century to the fourteenth century, referring to "summarizing the essentials (*yao* 要), mirroring reality (*jing jian* 镜鉴), versifying prose (*jue* 诀, *fu* 赋, *ge* 歌) and bodily metaphors, such as behind the elbows (*zhou hou* 肘后), handheld mirrors (*shou jian* 手鉴, *shou jing* 手镜), the heart-mind (*xin* 心), pointing south (*zhi nan* 指南) and pointing to the palm (*zhi zhang* 指掌)."[13] Among, "pointing south" (*zhi nan*) and "pointing to the palm" (*zhi zhang*) as new bodily metaphors appeared in the medical publishing realm since the 13th century guided readers through a specific medical subject and potential mastery of medical knowledge. The expanding application of "pointing south" and "pointing to the palm" in the Ming and Qing dynasties in titles of medical publications, as Hanson observes, further reveals the transformation of medical learning during this period. The increasingly complex medical knowledge was formulated, managed, and popularized through medical publications with new genres and innovative titles. On the other hand, such phrases utilized in titles showed the intellectual context of fingers and palms for medical learning through correlating fingers and palms with Heaven and Earth and further considering hands as a microcosm of the world that should and could be learned, and memorizing medical knowledge through hands. In fact, as early as 2008, Hanson started to explore the ways in which hand metaphors reshaped medical knowledge through medical learning and publications since the Song Dynasty.[14] In this way, Hanson correlates the survey of bodily metaphors in the titles of medical publications with medical learning through the book, thereby supplementing and broadening Leung's studies of medical learning from the Song, Yuan, and Ming dynasties and popular medical publications in the Ming and Qing dynasties. Similar to Leung's article

"Medical instruction and popularization in Ming-Qing China," Hanson's study is exemplary in comparative reach. In this article, Hanson compares the use of metaphors in titles in Chinese and European publishing. Hand metaphors in the history of European publishing referred to three main textual genre terms: "enchiridion, handbook and manual," conveying accessibility and portability of texts.[13] In comparison, Chinese counterparts utilized hand metaphors to signify the mastery of knowledge instead of designating any separate genre comparable to enchiridion, handbooks, or manuals in Europe. This comparative perspective helps Hanson to bring title metaphors, especially bodily metaphors, into studies of Chinese publications, increasing a new viewpoint of text analysis, and compensating for the relative lack of publishing details for medical texts from the medieval period.

In addition to the studies of commercial medical publishing from the Song dynasty forward, some medical historians also pay attention to the role of official publishing in the history of Chinese medicine. In her 2011 article "Governance through medical texts and the role of print," TJ Hinrichs focuses on the key but limited role of printing in the developments of medicine in the Song dynasty.[15] She considers official publishing as "a critical component in the expanding medical repertoire of Northern Song statecraft," but she locates the origins of this dramatic shift with the use and dissemination of medical texts as a tool of governance instead of the technology of print. Hinrichs emphasizes that medical texts engraved on stone or on wooden blocks and posted in public places rather than printed medical publications played a key role in the local spread of official medical knowledge and in the transformation of "noxious" southern customs. Hinrichs further reveals the tension between printing technology and authority. On the one hand, medical publications sponsored by the central government and emperors were issued to local governments, which promoted the Song government's involvement with producing and disseminating official medical knowledge and further contributed to a unified and uniform empire from a medical standpoint. In this way, printing technology expanded political authority. On the other hand, both emperors' and scholar-officials' interests in medicine and their ambitions of creating a standard medical knowledge system were limited within the print culture of the Song dynasty. Both on the local and central levels, based on emphasis on correcting errors and pursuit of a purified edition, an excess of editions of official medical books were produced through printing, although these books had similar contents. This led to the destabilization of textual authority, and accordingly contributed to a decentralized medical culture.

In her recent monograph *Know Your Remedies: Pharmacy and Culture in Early Modern China*,[16] Bian He (边和) outlines correlations between the official and the commercial, the central and the local, Confucian scholars and professional physicians in publishing *ben cao* monographs from the 7th century to the 19th century, and the political, cultural, and intellectual transformations behind the medical publishing history. Specifically, Bian describes the discontinuity of state-centered tradition of *ben cao* from the 16th century forward and the demise of a unified pharmaceutical objecthood, which was caused by the separation between Confucian natural history and pharmacy in the 18th century.[16] Unlike most medical historians focusing on the textual analysis of classic and *ben cao* pharmacopeias, Bian keeps a perfect balance between classics and popular *ben cao* publications, the textual analysis and the examination of the production, circulation, and consumption of *ben cao* publications. In this way, Bian's study of *ben cao* publications produces a new understanding of science, knowledge, and culture in premodern and early modern China from the perspective of medical history. The success of *Know Your Remedies* is based on the author's successful combination of publishing and medical history.

Florence Bretelle-Establet provides another model of the integration of publishing and medical history. In her two articles "Is the lower Yangzi River region the only seat of medical knowledge in late Imperial China? A glance at the Far South region and at its medical documents"[3] and "Human mobility and books: modes of circulation of medical ideas and doctrines in the Far South of China, 18th and 19th centuries,"[4] she pays attention to the Far South of China, which has been neglected by both book and medical historians, including Yunnan, Guangxi, and Guangdong provinces.

In the first article, Bretelle-Establet analyzes how the medical culture of the Lower Yangzi (Jiangnan) region has played a dominant role in shaping the historiography of medicine since the late 1970s in Western academic field. Specifically, the viewpoint that academics of Chinese medical history centered on Jiangnan was formed because of the following reason. Scholars paid attention to the late Imperial period, and they emphasized the complexity and diversity of Chinese medicine, which made Jiangnan region important in the study of Chinese social and cultural history in the late Imperial period. Furthermore, the greatest number of surviving medical books were published in the Jiangnan area or by doctors who lived in this area. However, Bretelle-Establet reminds readers of caring about the limitations of the Jiangnan priority and confirms the value of outside Jiangnan area in creating a more comprehensive and balanced image of Chinese medicine. In her second article "Human mobility and books," she further shows the potential to use methodologies of book history to study medical culture in the Far South. After pointing out the inadequacy of biographies and extant medical writings in Guangdong and Guangxi, Bretelle-Establet tries to sketch medical culture in the two provinces through the investigation of quotations and citations in the surviving published medical texts written by four medical experts

who practiced medicine in the Far South in 18th and 19th centuries. She reveals that these medical experts in the Far South could access medical resources including ancient and classical medical texts, medical writings by more recent authors and their contemporaries from provinces of Guangdong and Guangxi, and from outside the two provinces in the Jiangnan area. Bretelle-Establet further examines the ways in which the medical resources were disseminated and were available to He Mengyao (何梦瑶) and the other medical experts in the Far South. In her analysis of the two modes of dissemination of medical knowledge, she focuses on the interaction between books and people. Mobility of books depended on the local book market while human mobility between peripheral areas (Guangdong and Guangxi) and cultural centers (Jiangnan and the capital) promoted the long-distance circulation of books. Bretelle-Establet first traces which kind of medical resources were available to medical experts in the Far South by using the methodology of reading history. This means investigating reading practices of authors of medical writings in the Far South. In the process, citations and quotations He Mengyao and his contemporaries mentioned in their medical publications played the key role. Bretelle-Establet further examines the ways in which these medical experts in the Far South could access these medical resources from the perspective of book history through the analysis of local book markets and the long-distance circulation of books depending on human mobility to illustrate the dissemination of medical ideas and doctrines. Therefore, Bretelle-Establet uses methodologies of book history to delve into the medical culture in peripheral areas where few book historians and medical historians have paid attention, and extant biographies and medical writings are insufficient to support comprehensive and deep studies.

Scholarship on medical history from the perspective of medical publications has achieved great contributions. In terms of content, relevant studies refer to commercial and official medical publishing, medical culture in both central and peripheral areas, and medical learning through the printed book. In terms of methodology, scholars mainly apply close reading of texts and paratexts through analysis of prefaces, body content, verse and rhyme, metaphor of title, citations and quotations. Comparative methods to interpret medical texts were also used, revealing a complex and diverse medical world of China. Furthermore, Bian He's study of pharmacy and culture, and Florence Bretelle-Establet's exploration of medical culture in the Far South of China reveal the great potential of the combination of publishing and medical history. In addition, as Hanson's article "From under the elbow to pointing to the palm" shows, a few scholars gradually have begun to examine medical genres and have produced good academic work. In the next section, there are several representative studies that discuss the existing scholarship on genres in Chinese medical history, mainly focusing on medical case histories.

3 Scholarship on epistemic medical genres in Chinese medical history

As for the history of genres in Chinese medicine, as Hanson mentions in her article "From under the elbow to pointing to the palm," the excavated texts and bibliographic references in late antiquity (3rd century BCE–3rd century CE) reveal that there were eight genre terms used to describe medical texts. These include *fang* (方 formulary), *shu* (书 writing), *lun* (论 discourse/treatise), *zhen ji* (诊籍 consultation record), *fa* (法 method), *jin* (禁 interdiction), *dao* (道 way/teaching), and *jing* (经 canon). Ancient and later medical authors continued and developed the application of these eight genre terms. For example, as a recognized medical genre, *fang* existed in Chinese medical traditions from antiquity to the modern period.[17] By contrast, case narrative, as one of the oldest surviving medical records in China, had many different terms used to differentiate it from other narrative forms but was not considered as a full-fledged medical genre until the 16th century.[18]

Scholarship on medical case histories showed the potential to consider the medical genre as a research object. Christopher Cullen's chapter "*Yi'an* (case statements): the Origins of a Genre of Chinese Medical Literature" in the 2001 book *Innovation in Chinese Medicine* edited by Elizabeth Hsu, could be considered the most comprehensive study of medical case history as a genre in China.[18] In this chapter, Cullen illustrates the evolution of medical case narratives from antiquity to the Ming and Qing dynasties, and clarifies that *yi an* (医案 medical case statements) came into being as "a special printed genre" in the 16th century in the specific social and intellectual context of the late Ming dynasty. This includes the increasingly expanding commercial publishing market, the model of legal case statements, the bureaucratic tradition of Chinese culture, and both physicians' and patients' increasing demand for medical publications. Another chapter in the same volume, "From Case Records to Case Histories: the Modernisation of a Chinese Medical Genre, 1912-49" by Bridie Andrews expands the survey of case histories in Chinese medicine from the 16th century to the first half of the 20th century.[19] By comparing the two case reports from a single case by Ding Ganren (丁甘仁) and He Lianchen (何廉臣), Andrews examines the process through which medical case histories adopted and adapted "the rubrics of western case histories."[19] While the "modernization" of this Chinese medical genre prompted the creation of standardized prescriptions, it also provided a path for Chinese medicine to survive into the "modern" world through defining Chinese medicine within the theoretical framework of Western medicine. Both Cullen and Andrews contextualize the history of Chinese medical

cases in specific social and cultural conditions and trace the evolution of medical texts from an emic perspective. Cullen's article seems to have historicized the genre *yi an* by demonstrating how it fit into the context of the late Ming dynasty, while Andrews emphasizes internal motives rather than external causes for the restructuring of medical case records in the Republican period. Andrews' description of the transformation of Chinese medicine during this period is vivid and complicated, but she follows the dichotomy of tradition and modernity, which weakens the historicization of the medical genre.

In 2007, Charlotte Furth, Judith T. Zeitlin, and Ping-chen Hsiung co-edited and published *Thinking with Cases: Specialist Knowledge in Chinese Cultural History*, including eight case studies of knowledge production in Chinese law, medicine, religion, and philosophy. The collection includes three chapters dealing with the Chinese medical case histories by Furth, Hsiung, and Zeitlin, respectively.[20–22] Based on Cullen's and Andrews' research on medical case histories in late Imperial China and early modern China, this book expands the examination of medical case histories into the subfield of pediatrics. In terms of methodology, both Furth and Zeitlin focus on the rhetorical styles of specific medical case collections, which is a deep and close reading of terminology and texts like Hanson's study, and explore the interactions among publications of medicine, law, classics, and literature. *Thinking with Cases* is the first attempt to systematically think about the role of the case as a mechanism in the knowledge production and organization in Imperial Chinese culture. It was inspired by the "case thinking" model of science historian John Forrest, a specific method of producing valid knowledge "style of reasoning."[20–22] Furthermore, *Thinking with Cases* has provided more space to reconsider the relation between medicine and publishing in late Imperial China. Specifically, the Song dynasty witnessed the maturity of the legal case, the medical case matured in the Ming dynasty, and the learned case was a product of the late Ming dynasty. The late Ming dynasty witnessed the combination of all major types of case collections and the flourishing of publishing. A printed world where knowledge and practices of law, medicine, philosophy, religion and literature interacted with each other was further created for both authors and readers during this period. Therefore, there is potential for scholars to examine Chinese medicine through a case study of a specific genre beyond the medical field. Recently, Andrew Schonebaum, in his monograph, explores how the literary genres intersected with medical knowledge in early modern China. Through the analysis of fictional and "vernacular" medical texts (the former includes novels, oral tales, biographies, performance literature; the latter includes published medical case collections, collections of medical recipes, and pharmacopeia), he examines how "fictional texts were used or imagined as medical texts, but medical texts increasingly looked like fiction and drama."[23] This correlation between literature and medicine in early modern period dominated the production and transmission of vernacular knowledge of medicine and the body, and shaped how people understand diseases, the body, medicine, and even popular culture.[23] In this way, Chinese medical history goes beyond a subfield of cultural and social history and gradually develops as a perspective and methodology to understand Chinese culture and society.

In her 2014 article "The medical case narrative: Distant reading of an epistemic genre," Gianna Pomata further defines medical case histories by using the term "epistemic genre." The term refers to the "specific kind of genre whose function is fundamentally cognitive," and in this way Pomata differentiates epistemic genre from literary genre, namely, the kind of genre whose primary goal is "aesthetic or expressive."[24] Even though studies on the history of such genres as medical case history, materia medica, and recipe already exist, this is the first time a standard name is given to indicate genres that are "deliberately cognitive in purpose." Furthermore, Pomata's examination of the medical case as an epistemic genre relying on the strategy "distant reading"[24] instead of close reading provides an innovative perspective of understanding the production and transmission of medical knowledge in different cultures. She also published a comparative study of medical case narratives in premodern Europe and China.[17] In this study, Pomata examines both similarities and differences of premodern European and Chinese medical case narratives, and discusses the possible exchange of cases between East and West in late Imperial China. If *Thinking with Cases* emphasizes that China created and followed a different scientific tradition from Europe through the exploration of history of the case in Chinese medicine, law, religion, and philosophy, Pomata's chapter focuses on more similarities than differences. This includes the similar overall pattern, format, origins, genre awareness, epistemic goals, and the context of individualized medicine. Furthermore, Pomata argues that the case has a twofold epistemic function. Cases can lead to generalizations while "the cognitive arrow of the case" points toward "particularization and individualization," that have received much less attention. She further defines the case as "a tool for the cognitive purpose of individualization" that is different from that of Forrester.[17]

Pomata's concept of "epistemic genre," to some extent, enlightens Liu Yan (刘焱)'s reexamination of Sun Simiao (孙思邈)'s medical works from the perspective of medical genres. Through the analysis of *Bei Ji Qian Jin Yao Fang* (《备急千金药方》 *Important Formulas Worth a Thousand Gold Pieces for Emergency*) written by Sun Simiao in the 7th century, Liu argues that Sun's *Bei Ji Qian Jin Yao Fang* could be considered as the first formula book in Chinese history with medical cases, which, to some extent, combined two medical genres: *fang shu* (formula books) and *yi an* (medical cases). Borrowing

from Pomata's definition of cases as an "epistemic genre," Liu distinguishes medical texts from formula books, valuing Sun's priority on medical practices and therapeutic effects. In this way, Liu demonstrates that Sun initiates "a new mode of knowledge production that is rooted in personal experience."[25] In general, Pomata's concept of "epistemic genre" could be considered as a powerful analytical tool to examine individual medical works and specific medical genres.

In addition, Pomata and Hanson collaborated on a research article "Medicinal formulas and experiential knowledge in the 17th-century epistemic exchange between China and Europe" in 2017.[26] This article focuses on the role of the medical recipe in the cross-cultural transmission of medical knowledge. After a brief introduction of the general history of two recipe forms in China and Europe from antiquity to the 16th century, they examine the process of how Chinese pharmacological knowledge spread to Europe with the aid of the translation of Chinese recipes into Latin and the commercial publication of the translated texts. Unlike Pomata's study of medical case histories in both cultures from a comparative perspective, this article uses a cross-cultural method of analysis. Pomata and Hanson explore the procedures and mechanism of translating recipes from Chinese into Latin which is a combination of translation and transcription, and the application of "typographical devices" including "a vertical structure and an italic font."[26] This process and the modular character of both Chinese and European formulas accordingly reveal how the recipe could become a bridge across cultures. Pomata and Hanson continue to examine the transmission of Chinese pulse texts through translation. In this study, they change from the synchronic method that focuses on the transmission of Chinese recipes into Europe in the 17th century, to a diachronic method that examines different translation choices of Chinese pulse texts from early 14th century to early 18th century related to these distinctions: primary text/commentary, verse/pose and original illustration/newly created image.[27]

Hanson, in her recent article "Epistemic genres as a conceptual tool in the history of Chinese medicine,"[28] also confirms the value of epistemic medical genres in studies of Chinese medical history, through the analysis of Pomata's research and her collaboration with Pomata on research about medical exchanges between China and Europe. Using the medical case as an epistemic genre is a powerful means to re-periodize the long history of medical cases both in China and Europe. It is also useful for scholars to explore transformations of medical doctrines and tension among different genres behind the periodization. Epistemic genre as an analytical tool further provides an innovative perspective to think about cross-cultural medical history just as Pomata's and Hanson's analysis of different translation choices related to distinct textual forms.

The above-mentioned studies of medical case histories and recipes have contributed to the emergence of a new subfield focusing on medical genres in the study of Chinese history. Scholars moreover have identified some genres as possessing an epistemic function that differentiates them from literary genres. As Pomata argues, epistemic medical genres are the vehicles of a cognitive project and also shaped by the cognitive project. Therefore, studies of epistemic medical genres respond to a central question in the history of medicine, namely, how do people create and validate medical knowledge through texts in specific genres? Because epistemic medical genres from the Song dynasty on circulated at least partly in printed form, scholars of the later imperial period further asked how people created and validated medical knowledge through medical publications. They consider a central question for the history of medicine in China, and also address a general question of scholarship on the history of Chinese books and printing from the perspective of medicine, mainly answering the question of "was the book an instrument through which historical change was realized?"[1] In other words, studies of epistemic medical genres in the printed world help to clarify the role of printed texts in the production and validation of medical knowledge, while research on medical publishing will also provide answers to the role of medical publications in the spread and understanding of medical knowledge in Chinese society. This indicates the feasibility and desirability of the integration of publishing and medicine in scholarship on Chinese history. In addition, Pomata's and Hanson's studies of medical case histories and recipes provide in-depth analysis of medical genres from China and Europe. They reveal the potential of studies of book history in a global context. Research on medical publishing will also contribute to the participation of Chinese book history in broader and transnational studies of the history of book publishing, and in the study of the transmission of medical knowledge within and outside specific languages and regions.

4 Conclusion

Both Chinese publishing history and medical history have emerged as important fields within the broader study of China's social and cultural history. Book historians and medical historians consider medical publications as sources and subjects for research, although their studies differ in goals, questions, and methodologies. However, recent scholarship from both book historians and medical historians shows a new trend of the integration of Chinese publishing history and medical history. Joan Judge's study of *Wan Bao Quan Shu* demonstrates the value of methodology of publishing history (and reading history) in analysis of the production, dissemination, and acceptance of practical medical knowledge. Both Florence Bretelle-Establet and Bian He as representative medical historians provide

excellent models for research projects that combine the history of publishing and of medicine. Bretelle-Establet innovatively uses citations and quotations to trace circulation of medical publications in the Far South and shows the ways in which accessible medical resources shaped local medical culture. Bian combines text and genre analysis of classic and popular publications of *ben cao*, and the examination of the production, circulation, and consumption of this kind of medical publications to produce a new understanding of science, knowledge, and culture in early modern China. Gianna Pomata and Marta Hanson apply epistemic genres as a conceptual tool to examine medical exchanges between China and Europe and rethink the periodization of distinct medical genres and what their changes reveal about broader historical transformation. All of them show the potential for this newly developing integrated field.

Both book historians and medical historians will discover new questions and directions of research in this integrated field in the future. One of the possible directions is to broaden and deepen studies of medical genres and medical information collected in different kinds of publications. The existing scholarship on genres in Chinese medical history is largely concentrated on cases, recipe and formulary and *ben cao*. It would be helpful to explore other medical genres such as canon, discourse, treatise, method, and teaching to not only create a more comprehensive image of the plural medical world, but also to develop new insights into transformations in publishing history and the history of knowledge in China more broadly. Some scholars have focused on medical knowledge and ideas in novels, textbooks, and encyclopedias, and have achieved great contributions to interactions between physicians and patients, and image construction of scholars and common readers. At the same time, systematic studies of other kinds of popular publications such as gazetteer and poem which also include valuable medical information, promise great potential for exploration. In addition, it would be fruitful to explore the fluidity, acceptance, and reconstruction of medical knowledge among different genres, such as Joan Judge's examination of the prescription of He Shutian (何书田) and Lin Zexu (林则徐) about a cure for opium addiction, which was mentioned and rewritten in various literature including Lin's memorial, *Wan Bao Quan Shu*, articles, fictions and advertisements by commercial periodical press, and in quasi-official journals.

This integrated publishing-medical field will provide a comprehensive image of the production, circulation, consumption, and understanding of medical knowledge in Chinese society through the text-based and epistemic genre analysis of medical texts and the examination of cultural history of medical publishing. This field will also help integrate studies of medical publishing of China into a broader comparative and transnational conversation about the exchange of knowledge in global history. Progress in this unified project in the future is worthy of further exploration.

Notes

Note 1: This literature review only refers to a selection of the existing researches on medical history and publishing history in Imperial China. Although the author tries to select representative works as much as possible, omissions are inevitable. The author will be responsible for any error and omission.

Note 2: In this article, I use both "late Imperial China" and "early modern China." I acknowledge that they are not self-explanatory terms but bear very different implications concerning the periodization of China in the Ming and Qing dynasties. I usually decide which term to use based on scholars' own priorities.

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This study does not contain any studies with human or animal subjects performed by the author.

Author contributions

MANG Fan wrote and revised this article.

Conflicts of interest

The author declares no financial or other conflicts of interest.

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