

A Discussion of Ship Physicians of the Ming Dynasty in China

ZHANG LANXING*

ABSTRACT: Until now, we had not found definite records on ship physicians before the Ming dynasty. However, military physicians had existed for a long history in China, and they had some relationships with ship physicians. In order to guarantee the success of Zheng He's voyages, the Chinese imperial court supported the medical preparations, and especially arranged ship physicians for the fleets. The jobs of Chinese physicians included: curing sailors, preventing diseases, keeping healthcare, gathering herbs, and buying medicines. When navigator Zheng He died, the official mechanism of ship physicians in China had disappeared. After the First Opium War, they just resurfaced again. However, Chinese doctors proved their value in ancient history. They perfected the theory of Chinese medicines, replenished knowledge about overseas medical herbs, explored nautical and tropical diseases, propagated traditional Chinese medical science to the world, and expanded the commercial roads of Chinese medicaments.

KEYWORDS: China; Ship physicians; Ming dynasty; Chinese medical herbs; Traditional Chinese medicine; Maritime Silk Road; Zheng He.

In ancient Greece and Rome, ship doctors already existed, but they did not perform well for the armies during wars. Until the great nautical time, especially when the Dutch and British ships navigated the seas, surgeons or physicians¹ increased significantly; they became more and more helpful for sailing. Before the

Qing dynasty (1644–1912), Chinese had advanced navigation technology, but whether there were ship physicians in Chinese fleets, and how they developed over times are worth being studied.

FROM MILITARY PHYSICIANS TO SHIP PHYSICIANS

Until now, there were no ancient books directly mentioning professional Chinese ship physicians before the Ming dynasty (1368–1644). However, Chinese military physicians had existed for a long time.

Before the Qin dynasty (221–206 B.C.), military physicians who were also called alchemists or magicians had already been in royal armies. In Ancient China, the wizards did some tasks similar to doctors.

* Zhang Lanxing (張蘭星) received his Ph.D. in History from Sichuan University in China. He is currently an associate professor of history at Sichuan Normal University in China and a guest researcher of the Institute for the Study of Japan and Korea at Sichuan Normal University. He has been a visiting scholar at the Center for the Study of Asia at Boston University. He is specialised in the history of communication between East Asia and Western Europe in early modernity as well as maritime history.

Zhang Lanxing (張蘭星) é doutorado em História pela Universidade de Sichuan, China. É professor associado de História na Universidade Normal de Sichuan na China e investigador convidado do Instituto para os Estudos do Japão e da Coreia na mesma Universidade. Tem actuado como professor convidado no Centro para o Estudo da Ásia da Universidade de Boston. Especializou-se em história marítima e em história da comunicação entre a Ásia Oriental e a Europa Ocidental no início da modernidade.

During the Zhou dynasty (1046–771 B.C.), Zhou Taigong (周太公) mentioned, ‘In our army, we had 72 kinds of occupations, including... two physicians, who made use of hundreds of herbs to cure various diseases.’²

In the time of the Three Kingdoms (220–265), the miracle-working doctor Hua Tuo (華佗, c. 145–208) often treated diseases for military officers and their relatives. For example, military officer Li Chengku (李成苦) had heavy coughs, and often spit blood, so he asked Hua Tuo about the reasons for this disease. Hua then mentioned (in *Book of Wei* 《魏書》), ‘The cough had no relationship with your lungs, please do not worry about it, and I will prescribe drugs for you. I promise, you can get up from bed after one month, and can recover within a year.’³

At the time of Emperor Wu of the Jin dynasty (晉武帝, 236–290), the imperial court established the position of royal doctors (Sima). In *Book of Jin* (《晉書》), historians mentioned, ‘A royal doctor Cheng Ju (程據) had always presented beautiful clothes of Nomadic people to Emperor Wu, who felt angry, and he commanded bodyguards to burn it up in front of the palace.’⁴ *Gujin Yishi* (《古今醫史》) once recorded military physicians Liu De (劉德) and Shi Tuo (史脫), ‘Liu De was born in Pengcheng (彭城). During his childhood, he had already mastered superb medical skills. After growing up, he became a famous physician and found a job in the court as a royal doctor. [...] Shi Tuo was an introvert and tenacious man, and was famous for his medical skills, especially good at curing jaundice. He was also a royal doctor in the central authorities.’⁵

During the time of the Five Dynasties (907–960), the imperial court inherited the Sui (隋朝) and Tang (唐朝) dynasties’ medical system, which served the army, the government and the people. There were words in *Wudai Huiyao* (《五代會要》), ‘In March 936, He Ning (和凝, 898–955) who was the secretary of the emperor reported to the throne that central

court should assign physicians and provide herbs for armies to cure typhoid, malaria or other diseases, and ordered military officers to arrange doctors for soldiers. The duties of military physicians not only included the matter in army, but also contained the work for the common people at that place.’⁶ The system of military physicians gradually improved in China at that time.

Till the Northern Song dynasty (960–1127), the royal court had already established special military hospitals: ‘In 14 June 1126, officer Zhao Jiangzhi (趙將之) from Cizhou (磁州) said that there were many patients caused by wars in his controlling areas, so it was necessary to set up a hospital to take in and cure them, the effect was very good in the end. Officer Zhao recommended that other places should establish more similar hospitals for more patients.’⁷

Referring to the appearance of ship doctors, no matter in the East or West, almost all of them came from the system of military medical service. The reasons included: the army controlled enough resources, including personnel, materials and money, which can convene, support and maintain professional ship physicians; in ancient times, it was necessary for Chinese to arrange ship doctors when there had been overseas expansions or military expeditions; before the Ming dynasty, many merchants or fishing ships did not have professional ship physicians on service. It is because even if all sailors died of diseases, it was not a great loss when comparing to the same loss on a big warship or a fleet in modern times.

Chinese ancient navies have a long history dating back to as early as Shang (商朝) and Zhou (周朝) dynasties. It is documented in some records about the wars on the seas. Even so, more water battles were in the river or lakes, professional ship physicians were not necessary. In this way, it was the most possible for the appearance of ship physicians in Sui, Tang, Song and Yuan dynasties, because there were wars on the sea or expedition in those times. However, we could not find any records about ship physicians in those dynasties. The possible reasons were: Although the

HISTORIOGRAFIA

navy of the Sui and Tang dynasties had never attacked Taiwan and Korea, an army of the Yuan dynasty (元朝, 1271–1368) had made an expedition to Japan and Taiwan, the sailing time of their ships were so short that the arrangement of ship physicians was unnecessary. When the army of Yuan attacked Java, they cost much time and energy, and experienced some difficulty and danger, so ship physicians most likely followed the army to these destinations for guaranteeing the health of officers and soldiers. Surprisingly, there was no record about physicians in that expedition until now. Moreover, ancient Chinese captains or officers normally gained some knowledge about medicine, even if no physicians were arranged on ships, these men can also handle some simple and common diseases. Finally, the status of physicians in that era had lower status from the perspective of Confucians, Buddhists, and Taoists. Even if some physicians had served on ships before the Ming dynasty, historians would not record about them.

Till the Ming dynasty, the feudal medical system of China improved significantly. Under this situation, the imperial court of the Ming had an ability to hire and dispatch ship physicians for overseas expeditions, and the preparations included:

Firstly, the official medical system developed maturely. From the central government to local branches, different levels of official physicians existed. The Imperial Hospital (太醫院) was the highest central medical organisation, it managed medical matters across the country. In the hospital, there were 13 departments which dealt with different diseases, including branches of internal medicine, gynecology, dermatology, acupuncture, ophthalmology, stomatology, orthopedics, otorhinolaryngology, massage, and so on. Outside the capital city, 'from 1370, local governments of various levels ordered military physicians to cure diseases for soldiers and civilians.' In addition, the ranking system of official physician was built up, 'In the early time of the Ming dynasty, the highest-ranking physician was equivalent to the fifth-level administrative official, and

the lowest-ranking physician was equivalent to the ninth-level official...⁸'

A military medical system was also developing in the Ming dynasty, and it boosted the appearance of Chinese ship physicians. Troops of the Ming dynasty were composed of central and local units. 'The Imperial Hospital not only arranged the physicians in central troops, but also dispatched doctors to frontier troops.'⁹ Furthermore, Jin Youzi (金幼孜, 1368–1432) of the Ming dynasty said in his *Beizheng Lu* (《北征錄》), 'Except for the regular army for fighting, [...] troops also enlisted other talented persons, including doctors that can treat soldiers' illness.'¹⁰ About ship physicians in Zheng He's fleet, they were all from a military system, and were dispatched by the armies of the Ming dynasty.

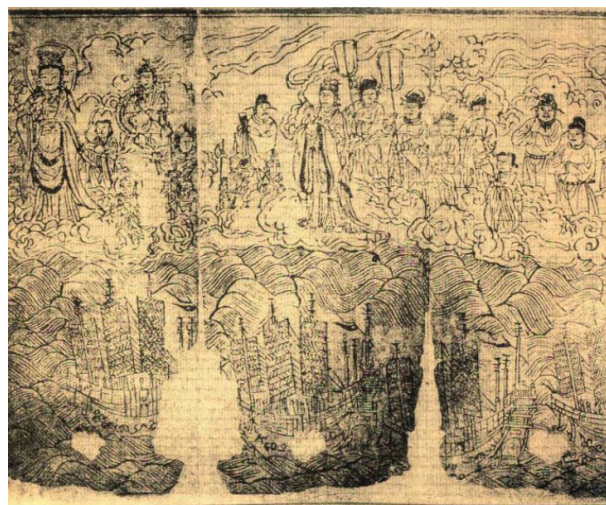
Secondly, Chinese pharmacy developed significantly during the Ming dynasty, and great achievement was made at that time. In 1406, Zhu Su (朱橚, 1361–1425) compiled a pharmacological book called *Jiuhuang Bencao* (《救荒本草》), which collected 414 kinds of plants, and among them, 276 were new species. The disciplines of this book contained pharmacology, botany, agronomy, and medicine, all of which had very high value. About Chinese drugs and prescriptions, Zhu Su, Liu Chun (劉醇) and other physicians compiled the book called *Puji Fang* (《普濟方》), which collected 61,739 drugs, thousands of methods for curing diseases, 239 illustrations. These medical books provided a theoretical basis for the appearance of ship physicians.

Thirdly, Zheng He's fleets had already been to Southeast Asia, South Asia, West Asia and East Africa, so these voyages were all ocean-going navigations, which occurred earlier than the expeditions of European fleets. The necessary medical preparation of long-distance voyages included personnel (physicians), drugs and other things. Therefore, Zheng He's voyage was one of the most important reasons for the appearance of Chinese ship physicians.

PRECIOUS RECORDS ON SHIP PHYSICIANS OF THE MING DYNASTY

We can often find a lot of materials and researches about Zheng He's voyages in the South Sea reaching as far as Africa, including officers, ships, foods, merchandises, wars, and so on. But there were not enough resources about ship physicians in those voyages. It is worthwhile for us to consider the reasons for this. And a few records about the physicians seemed very precious.

Zheng He's fleet had an unprecedented scale as the recording of *Ming Shi* (《明史》) shows, 'In 1405, the Emperor commanded Zheng He (c. 1371–c. 1433) and Wang Jinghong (王景弘, 1368–1398) to go to the western oceans and countries. There were more than 27,800 people in the fleet, and the central court prepared sufficient funds for the voyages.'¹¹ Moreover, *Zhenghe Jiapu* (《鄭和家譜》) recorded, 'The officers in the fleet contained 7 chief envoys, 10 deputy envoys..., 180 officials of physicians and physicians.'¹² The clerk Fei Xin (費信, 1388–?) in the fleet had written, 'The total number of people in the fleet was 27,670, including officers, soldiers, clerks, purchasers, translators, accountants, and so on. Among them, there were 860 officials and officers..., 180 doctors on the ship.'¹³ Undoubtedly, the number of persons in the voyages was huge, and it was rare that there were hundreds of ship physicians comparing to other countries at that time. Some other historical primary sources also recorded these physicians, 'In 1416, several ships of Zheng He's fleet were going back to Jinxiang (金鄉) of Zhejiang Province. When ships sailed in the East China Sea, they had a fight with pirates. The director Zhang Qian (張謙) commanded officers, officials and soldiers to defeat the enemy. This victory satisfied the Chinese emperor, so the winners including soldiers, physicians, craftsmen, cooks, and so on, were rewarded with much money and cotton cloth from the imperial court.'¹⁴



The frontispiece in *Tianfei Jing* (《天妃經》) demonstrating Zhang He's voyages (partial image). Source: Li and Chen, *Zhongguo meishu*, 21:33.

Zheng He's ship physicians were as many as hundreds of personnel, but few historical records about them remained. Materials about them are just limited to several persons, whose names were Chen Yicheng (陳以誠), Chen Chang (陳常), Kuang Yu (匡愚), Peng Zheng (彭正), and Yu Zhen (郁震).

In *Wanli Jiaxing Fuzhi* (《萬曆嘉興府志》), the following words are mentioned: 'Chen Yicheng was born in Jiaxing, and he was good at drawing and medicine. When Emperor Yongle ruled in the Ming dynasty, Chen Yicheng was appointed as a ship physician in Zheng He's fleet for several times.'¹⁵ After returning to China, he was promoted to the rank of Yuan Pan (院判) (sixth-level official in the Ming dynasty), who was equivalent to a surgeon general nowadays. He had already composed a poem about his voyages to the West, 'I had already cured diseases for the Emperor as a royal physician in the royal court, and also worked on ships as a ship physician for a great captain (Zheng He) on the sea, so I had a perfect life.'¹⁶

Songjiang Fuzhi (《松江府志》) had some records about Chen Chang, who was a disciple of doctor Chen Yicheng, and he had followed Zheng He

HISTORIOGRAFIA

to the West for three times.¹⁷ Chen Chang, also known as Chen Yongheng (陳用恆), was born in a family of doctors in Shanghai, and he studied medicine from a young age. In 1416, Chen Chang was chosen as a ship physician in Zheng He's fleet to the Western Ocean. Higher authorities often praised his industrious jobs on the sea. Chang also summarised his voyages, 'We were sailing on the sea for thousands of kilometres, and also were navigating by astrological phenomena and compass. We had even been to the Strait of Hormuz that was very far from China, and reached more than 30 countries in the West, then met many people who had never met, also tasted much food which they had never eaten before.'¹⁸ His last words were that it was fortunate that he had not been eaten by the fish in the oceans. His son named Chen Jing (陳經) followed the occupation of his father as a physician.

Physician Kuang Yu 'was also called Kuang Xiyan (匡希顏). He was called up as a ship doctor in Zheng He's fleets because of his superb medical skills. After finishing the navigation, he returned to private life.'¹⁹ He had written a book called *Huayi Shenglan* (《華夷勝覽》) about the voyages, but it had been lost. Another author Zhang Hong (張洪) in the Ming dynasty mentioned the preface of Kuang Yu's book (*Hua*) in his own work *Gui Tian Gao* (《歸田稿》):

The world was so big that the distance between China and other countries must be very far. In the Ming dynasty, our soldiers were busy for resisting barbarians in the north, so we did not have much energy to conquer overseas. However, this did not affect China being one of the most powerful countries in the world, so other countries in the West came to Beijing to call on our Emperor. In return, the imperial court of the Ming dynasty should send envoys for these countries to bestow rewards. Therefore, there was a story that a doctor called Kuang Xixian (匡希賢, also known as Kuang Yu) accompanied with Zheng He to the Western Ocean. Kuang

*Yu was an offspring of Kuang Heng (匡衡), who was a famous prime minister in the Eastern Han dynasty (東漢, 25–220). Kuang Yu has always lived in Yanzhou (兗州), and accepted good education since childhood. When Kuang Yu was young, his mother died, and began to study medicine following his father. Finally, he became a good doctor and was chosen as a ship physician by the royal court. After finishing his service on ship, he wrote a book called Huayi Shenglan, which introduced many countries in the west, including Vietnam, Malaysia, Indonesia, Singapore, Siam, Ceylon, Brunei, and so on. Having experienced the voyages, Kuang Yu gained more knowledge, and elevated his medical skills. He thought that the world was so great, broad, beautiful and wonderful that China should keep peace with overseas countries. As far as concerned himself, Kuang Yu could cure patients more carefully by making use of his skills, and loved every one in the world. So, the richest man in the world should be the happiest person in one's heart. This was what I wanted to say in the preface.'*²⁰

In the book *Anhui Tongzhi* (《安徽通志》), there were words referred to Peng Zheng, 'His another given name was Sizhi (思直). He was born in Taipingfu (太平府), and joined Zheng He's fleet as a ship physician in the reign of Emperor Yongle.'²¹

The book *Zhongguo Yiji Kao* (《中國醫籍考》) recorded ship physician Yu Zhen, 'He had worked as a doctor in the royal hospital, and had been to Western Ocean with Zheng He for three times. Yu Zhen was industrious for his medicine study, and was a man of the high integrity. So after his returning to Suzhou (蘇州), he got a good official position.'²²

To see the birth places of these physicians, they were from Jiaking (嘉興), Yanzhou (兗州, in Shandong Province), Pingfu (平府, in Anhui Province), and so on, which were coastal areas. The

HISTORIOGRAPHY

Emperor had chosen the city of Nanjing (南京), which locates near the seas, as the capital in the early Ming dynasty. Moreover, the economy of these areas was more prosperous than the northern areas. When rulers of the central government were choosing ship physicians, they emphasised the birth places and working experiences of the candidates. Those who were born near seas and were familiar with maritime disease would easily be selected.

No matter how, it was true that there were few records about ship physicians in Chinese ancient books. For these reasons, we should take the following into consideration: Although ship physicians got official positions, and some physicians even ranked high in the bureaucratic system, they factually did not have relevant social positions and power comparing to other administrative or military officers. It was difficult for them to be recorded by historians at that time; before the Ming dynasty, few historians mentioned the physicians on ships. Even if doctors joined Zheng He's fleet in the 15th century, it had just been a flash in the pan, and it was impossible for scholars to write more about them; on the ships, the status of physicians were just a little higher than sailors, it was not bad that we can find some stories about several physicians; the emperor of the Ming dynasty did not require physicians to write diaries about the voyages or patients, so the records remain few; some politicians of the Ming dynasty opposed, even hated the expeditions of Zheng He after Emperor Yongle passed away, which caused the records about ship physicians on board be scattered and lost.

THE DUTIES OF CHINESE ANCIENT SHIP PHYSICIANS

The duties of ancient Chinese ship physician in Zheng He's fleets included curing patients, preventing diseases, strengthening healthcare, collecting herbs, and purchasing drugs.

1) Disease prevention and treatment of patients

In the first place, in both East and West, the most important task of ship doctors was to prevent diseases and cure patients. In the Ming dynasty, traditional Chinese medicines had great development, and the selected physicians had good medical skills, most of them were even good at treating patients with tropical diseases and infectious diseases. Based on their knowledge, they could learn more quickly on how to deal with maritime or tropical diseases. The herbs and drugs brought by physicians included: agastache, coptis, rhubarb, scutellaria, gentiana, croton powder, ephedra, baiyao (白藥), Zhuge Xingjun San (諸葛行軍散), Kaiguan San (開關散), Wolong Dan (臥龍丹), Huangtu Wan (黃土丸)... These can cure the diseases including heatstroke, plague, cold, fever, trauma, and so on.²³

Before the Ming dynasty, Chinese historical books and pharmacopoeia had recorded herbs and drugs that were imported from foreign countries, and Chinese physicians had vigorously studied the effects of these medicines. Doctors in China found that overseas herbs not only be used for treating tropical diseases, but also can be merged with traditional herbs in Mainland China. In some senses, Chinese ship physicians did good preparation for the expedition for the Western Ocean.

More concretely, as early as the Song dynasty, spices and herbs as tributes were presented by rulers of Southeast Asia or South Asia for the Chinese emperors. The words from *Mengxi Bitan* (《夢溪筆談》) said that, 'In 1077, Chola dynasty (注輦國) of southern India sent 27 envoys to China, and paid precious tributes, such as teeth of rhinoceros, frankincense, rose water, globeflower, banksia rose, ferula, borax, clove, pearls, borneo camphor, and so on, for the emperors in the Song dynasty.'²⁴

In the Ming dynasty, the proportion of crude drugs was large in tribute from overseas, this indicated that: 1) Chinese liked these herbs and drugs; 2) foreign countries were abounded with

HISTORIOGRAFIA

Table 1
Overseas Tributes (Herbs and Drugs) in the Early Ming Dynasty

Species \ Countries	Champa	Cambodia	Java	Srivijaya	Malacca	Burni	Saltanah Sulu	Pahang	Siam	Aru	Sumatra	Ceylon	Bengal	Quilon	Colicut
ferula asafetida (阿魏)			✓						✓						
styrax benzoin (安息香)			✓						✓						
piper longum (萆茛)			✓	✓			✓		✓						✓
piper cubeba (萆澄茄)			✓												
soft-shelled turtle shell (鳖甲)			✓												
eaglewood (沉香)					✓	✓					✓				
chaulmoogra seed (大楓子)			✓		✓				✓						
hawksbill turtle (玳瑁)			✓		✓	✓	✓								
barks of clove (丁皮)			✓						✓						
clove					✓	✓			✓		✓				
nutmeg			✓	✓		✓			✓						
tortoise shell (龜筒)			✓	✓		✓			✓						
pepper (胡椒)		✓	✓	✓			✓	✓			✓	✓	✓	✓	✓
dalbergia (降香)	✓	✓	✓		✓	✓	✓		✓		✓				
sulphur									✓		✓	✓			
borneol	✓		✓			✓									
ambergris (龍涎香)											✓				✓
aloe			✓									✓			
shell of shellfishes (螺殼)						✓									
myrrh (沒藥)			✓						✓			✓			
costus (木香)			✓						✓		✓	✓			✓
borneol oil (腦油)									✓						
rose water (薝蔔露)			✓		✓				✓						
frankincense (乳香)			✓		✓			✓	✓			✓	✓		✓
a drug named suhe oil (蘇合油) ²⁵															✓
hematoxylin (蘇木)		✓	✓		✓		✓		✓		✓		✓		
sandalwood (檀香)	✓		✓			✓		✓	✓			✓			✓
cambogia (藤黃)									✓						
cutch (烏爹泥) ²⁶			✓						✓				✓		
rhinoceros horn (犀角)	✓	✓	✓		✓	✓			✓				✓		
ivory	✓	✓	✓		✓			✓	✓	✓					
dragon's blood (血竭)			✓												
gardenia					✓										✓
lac (紫膠)													✓		
pterocarpus indicus (紫檀香)					✓										

Source: Huang, *Xiyang chaogang*, 4–102.

HISTORIOGRAPHY

medicinal materials; 3) crude drugs were potential for turning into valuable merchandises. Relevant statistics are shown in Table 1.

Most of overseas drugs could be used for curing maritime and tropical diseases, and some of them were absorbed into traditional Chinese medicine by physicians.

For example, borneol can be used for relieving inflammation or internal heat. The book of *Bencao Yanyi* (《本草衍義》) recorded, 'If adults or children got heatstroke, borneol would be a very effective drug. When using borneol, we can mix it into some tea to get better effect. Other fragrant medicines were hard to beat good smelling of borneol.'²⁷

Alpinia katsumadai Hayata or nutmeg (豆蔻) could be used for dealing with diseases such as cholera, emesis, stomachache, etc. According to the records of *Mingyi Bie lu* (《名醫別錄》), 'nutmeg tastes spicy, but it is not poisonous. People use it for curing abdominal pain, emesis, and kakostomia.'²⁸ In *Bencao Tujing* (《本草圖經》), it stated, 'People in the southern China pickle nutmeg with salt and rice wine, and dry them in the sun. If someone gets a cold or cholera, or suffers from poisoning, they can decoct the drugs that were made of nutmeg for drinking.'²⁹ Furthermore, 'Nutmeg is a good drug for curing indigestion.' For the galangal fruit, 'it can be used as an antialcoholic drug. However, be careful not use too much of this drug, which can lead to bad appetite.'³⁰

Frankincense was employed to staunch the blood, or treat cholera and intestinal tract diseases. As mentioned in *Bencao Shiyi* (《本草拾遺》), 'The drug property of frankincense is not strong, and it can be used for treating deafness, apoplexy, gynecopathy and dermatosis.'³¹ In the book of *Guangzhi* (《廣志》) we read the following, 'Physician uses frankincense for curing nephropathy, cholera, chronic infectious disease, or for stanching bleeding, relieving pain, and making plaster. Frankincense is so moist and sticky

that it is hard to be ground. We can use method of wind drying to solve this problem.'³²

Costus was employed to relive pain, tonify spleen, and eliminate indigestion. It is mentioned in *Xuchuang Xinfang* (《續傳信方》), 'A kind of drugs made of costus can enhance immunity. An official who was in charge of horses and chariots in the Han dynasty (漢朝) proved the good effect of this drug after he took this medicine just twice. It was said that the drug was created by Zhang Zhongjing (張仲景) who was a famous physician in the Han dynasty.'³³

The functions of aloe were for curing of skin and dental diseases. Liu Yuxi (劉禹錫, 772–842), a famous poet in the Tang dynasty (618–907), said that the disease of tinea on his body was removed by using drugs made of aloe, which was recommended by medical merchants. Another ancient scholar Cui Yuanliang (崔元亮, 768–833) of the Tang dynasty also proved the extraordinary efficacy of aloe on treating bad teeth.'³⁴

Physicians in China made use of areca catechu for treating damp-heat inside the body. People in Guangdong (廣東) and Guangxi (廣西) of Southern China liked eating the fruit of areca in order to boost the body's defences.'³⁵

Myrrh could be employed to treat rheumatism and traumatic injury. 'If someone catches serious rheumatism, they can take medicines which were made of tiger bones and myrrh for three days.'³⁶

Epilepsy, lung diseases, suppurative infection, haemorrhoids and trauma could be cured by medicines that were made of ivory, 'If something sharp were penetrated in anybody's mouth, he can use the powder of ivory to make the thing out.'³⁷

It was not hard to see that the Chinese had started to study and utilise overseas herbs from a very early time. Until the Ming dynasty, physicians had already done some preparations to deal with some tropical and maritime diseases.

HISTORIOGRAFIA

2) Strengthening of healthcare

In the second place, a more important thing for Chinese physicians might be the strengthening of healthcare. Comparing to Western medicine, traditional Chinese medicine had some advantages on preventing scurvy, diarrhoea, and other diseases. With a long history, the food therapies of China may be helpful for long-distance navigation at sea.

At the beginning of the 5th century, Faxian (法顯, 334–420), an eminent monk, was going back to China by ship after a pilgrimage for Buddhist scriptures in India. According to relevant materials, nobody died of scurvy on the voyage. Therefore, some scholars considered Asian ships could be supplied with enough fresh water and food, so it was not easy for them to suffer from scurvy. Moreover, even if sailors got scurvy on sea, they would have opportunities to stop at harbours on the way. Faxian's ship had already anchored at Java for five months to wait for the proper monsoon to return to China. Relevant records were as follows:

The captain planned to set sail on 16 April, and reached Guangzhou in no more than 50 days. Unfortunately, something unexpected (bad weather and mistakes on navigation) happened on voyages, and it led to the delay of schedule. After 70 days, they exhausted all the preparations, and no more water and food remained. Then, they steered towards the northwest in search of lands. After 12 days they reached the southern shore of Mountain Lao (牢山), bordering the county of Changguang (長廣郡). Subsequently, they obtained fresh water and vegetables.³⁸

The above quote explains that even if the ships on the Silk Road encountered difficulties at sea, they would have greater probability to avoid it by stopping at any ports. In fact, they were always sailing along coasts. Moreover, the distance between

departure and destination usually was not too far from each other, so it reduced the risk of getting sick.

When coming to the Song dynasty, scholar Wang Dang (王讜) mentioned the habit of eating vegetables on ships by Chinese in Volume 8 of his book *Tang Yulin* (《唐語林》), 'In the years of Dali (大曆) and Zhenyuan (貞元) of the Tang dynasty (766–805), some Chinese lived on big ships which weighed hundreds of tonnes. They even grew vegetables on these big ships.³⁹'

About the above materials, we do not know how these Chinese grew vegetables on ships. However, it was undoubtedly that Chinese who lived on ships, like any other people in China, were used to eating vegetables which are rich in vitamin C.

Moroccan traveller Ibn Battuta had already been to China, and he mentioned that some Chinese fishermen planted ginger in wooden boxes.⁴⁰ Moreover, he said that sailors in Southeast Asia prepared many foods for their expeditions, such as rice, beef, mutton, jam, ginger, pepper, lemon, mango, and some pickled vegetables. Therefore, people in Southeast Asia had already known how to preserve foods by techniques of pickling, which had been also well known by the Chinese for a long time.

So far, it was hard to know how physicians or sailors prevented scurvy on Zheng He's expeditions because of a lack of first-hand materials. We can just speculate about their methods which were based on some other historic materials.

Firstly, they kept a good stock of nutritious foods available, and purchased supply at any possible ports. Ma Huan (馬歡), who was a translator in Zheng He's fleet, wrote down the products of foreign countries, such as domestic animals, vegetables, and minerals, in order to provide information for directors, captain, purchasers, physicians of the fleet at any time. Relevant statistics about these countries are shown in Tables 2 and 3.

Table 2

Vegetables of Foreign Countries on Zheng He's Voyages

Countries Species	Champa	Java	Palembang	Siam	Malacca	Sumatra	Ceylon	Qulon	Zufal	Aden	Bengal	Ormuz	Mecca
onion	✓			✓	✓	✓					✓	✓	
wax gourd	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	
beans									✓	✓	✓		
bottle gourd	✓			✓									
cucumber	✓	✓	✓	✓			✓		✓		✓	✓	
ginger	✓			✓	✓	✓					✓		
Indian mustard	✓			✓	✓	✓					✓		
leek												✓	
radish												✓	✓
eggplant		✓	✓				✓		✓		✓		
garlic					✓	✓					✓	✓	
Chinese onion													
others		✓	✓				✓	✓		✓		✓	

Source: Ma, *Yingya shenglan*, 10–89.

Thus it can be seen that Zheng He and his sailors could keep nutrition balanced probably because their diets were consisted of many vegetables and fruits. Furthermore, some scholars also thought traditional Chinese herbs or drugs contained vitamin C can prevent scurvy effectively.⁴¹

Secondly, Chinese liked drinking tea, which must be loaded much on Zheng He's ships. Gong Zhen (鞏珍), who was an official in Zheng He's fleet, mentioned on his work *Xiyang Fanguo Zhi* (《西洋番國志》), 'Salt, tea, wine and candle which were monopolised by Chinese

HISTORIOGRAFIA

Table 3
Fruits of Foreign Countries on Zheng He's Voyages

Countries Species	Champa	Java	Palembang	Siam	Malacca	Sumatra	Ceylon	Qulon	Kalicut	Aden	Bengal	Hormuz	Mecca
plantain	✓	✓	✓	✓	✓	✓	✓		✓				
jackfruit	✓			✓	✓	✓	✓		✓		✓		
durian						✓							
sugarcane	✓	✓	✓	✓	✓	✓	✓				✓		
raisin										✓		✓	
walnut										✓		✓	
malus asiatica										✓		✓	
orange	✓			✓		✓							
langcha ⁴²		✓	✓										
pear													✓
lotus seedpod		✓	✓										
mangosteen		✓	✓			✓							
plum	✓			✓									
pomegranate		✓	✓							✓	✓	✓	✓
pine nut										✓		✓	
peach										✓		✓	✓
date										✓		✓	✓
watermelon	✓	✓	✓	✓									
apricot										✓			
coconut	✓	✓	✓	✓									
litchi chinensis					✓								
others								✓		✓			

Source: Ma, *Yingya shenglan*, 10–89.

HISTORIOGRAPHY

royal court must be well provided for the Zheng He's fleet.⁴³ Tested by modern instruments, tea contains vitamin C that is helpful for strengthening the health of sailors. However, we could not say that less Chinese sailors got scurvy than western sailors as a result of drinking tea. Some other scholars thought that eating garlic was also beneficial to the health of sailors.⁴⁴

Thirdly, before the Ming dynasty, Chinese had a habit of growing and eating vegetables on ships, as what Wang Dang and Ibn Battuta had recorded. In 1973, a Chinese shipwreck in the Song dynasty was brought up from water, and archaeologists found many remains of vegetables, fruits and meat, which proved that Chinese had known how important of eating vegetables and fruits on sea voyages. Likewise, habitants of Southeast Asia were used to pickling vegetables and fruits, and this method of preserving food might have been studied, absorbed or upgraded by Chinese physicians or sailors.

Guaranteeing the cleanness of drinking water was another task of Chinese ship physicians. As said by navigator Xu Jing (徐兢), who had already been to the Koreas in the Song dynasty, 'Sea water is not drinkable, so we must put buckets on ships for providing fresh water to sailors. When we got near to harbours, Koreans immediately delivered to us fresh food and water that we were urgent in need.'⁴⁵ Gong Zhen also mentioned that 'There were special ships for storing fresh water in Zheng He's fleet. When the fleet dropped anchors in harbours, these ships would be filled with water.'⁴⁶ Moreover, to replenish fresh water, Chinese sailors dug a lot of Sanbaojing (三寶井), wells named after Zheng He, who was also called Sanbao, along the coast of Southeast Asia.⁴⁷ Nowadays, local people still believe the water in the remained wells can cure various diseases. No matter how, Chinese ship physicians had already understood that the method of preventing diseases was based on drinking fresh and clean water.

3) Collection and trade of herbs

In the third place, Chinese ship physicians not only cured patients, but also collected herbs and bargained herbs with purchasers. About the physicians' task of collecting herbs, Fei Xin recorded:

*Mountains on islands of Jiuzhou (九州山): they locate close to Malacca, where the special local product is a kind of eaglewood. In 1409, Zheng He ordered his officers, physicians and sailors for collecting eaglewood on the mountains.*⁴⁸

*The country of Battak in Sumatra (花面國): its local special products are lotus flowers and sulphurs on mountains of Bunaguer. Zheng He dispatched soldiers for exploiting the sulphurs, and had used Chinese merchandises for exchanging their goods after making agreement with local chief.*⁴⁹

Moreover, Huang Xingzeng also mentioned:

*The country of Malacca: the local specialties are excellent fragrant medicines from the mountains around Malacca. Zheng He previously ordered his sailors or soldiers to collect the herbs when they were going through the channel.*⁵⁰

It was definitely possible for ship physicians to participate in the activities of collecting herbs with sailors, soldiers or local people. This experience was very helpful for physicians to learn, study, taste, and make use of the herbs. They also got the first-hand medical, botanical and zoological materials, which helped them to understand the tropical and maritime diseases better.

The purchasing of overseas herbs was a necessary job of Zheng He and his physicians. Relevant records were as follows:

*Malacca: The translator Ma Huan in the fleet of Zheng He had recorded, 'When the fleet of Zheng He reached Malacca, many local merchants brought hundreds of goods (including herbs) for trading with the Chinese.'*⁵¹

HISTORIOGRAFIA

*Zufal: Frankincense made of resin was a kind of special product in the country of Zufal. When ships of Zheng He's fleet arrived on its ports, local merchants took out local goods, such as frankincense, dragon's blood, aloe, myrrh, benzoin, storesin, etc., for exchanging raw silk and porcelains which were brought by Chinese.*⁵²

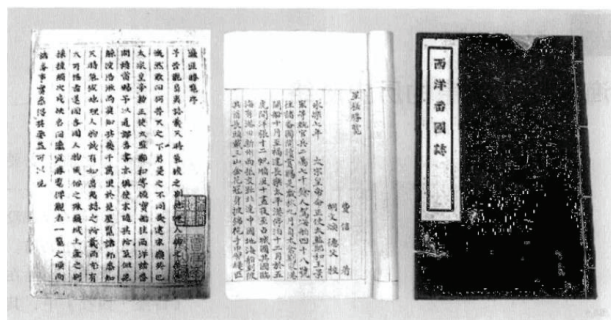
*Ceylon: Merchants in Ceylon used their diamonds and pearls for trading against Chinese musk, raw silk, silk cloth, porcelain, plates, copper cash, capbor, and so on.*⁵³

*Maldives: Zheng He had before ordered his purchasing agents to buy ambergris and coconut in Maldives.*⁵⁴

We can see from the above historical materials that the ship physicians in Zheng He's fleet had played as officials, scholars (physicians), and merchants through the voyages. These were very important and unusual tasks of Chinese ship doctors.

CHINESE SHIP PHYSICIANS AND THE MARITIME SILK ROAD

The participation by Chinese ship physicians on Zheng He's voyages in the Ming dynasty had special effects and meanings in the history of Chinese medicine, history of the Maritime Silk Roads, and the history of communication between the East and the West.



(Left to right) Images of Yingya Shenglan, Xingcha Shenglan and Xiyang Fangguozhi. Source: Liang, Shuizai shijie, 213.

At first, the practice at sea by ship physicians contributed to the development of the theory of traditional Chinese medicine, and contributed useful and relevant materials. Chinese physicians studied the original places, characteristics, functions of some herbs and drugs outside of China which were based on their precious experience overseas. Unfortunately, just a few materials about the physicians and overseas herbs had remained until now, for example:

In some historical data, herbs in Champa were mentioned, 'Many Asian elephants and rhinoceros lived in Champa, so ivories and rhinoceros horns as crude drugs were traded by their merchants. Moreover, people in Champa indulged in eating betel nut at any time.'⁵⁵ 'A kind of precious eaglewood which was called Qi'nanxiang (奇楠香) was also made in Champa. Other plants which were viewed as herbs by Chinese grew and could be seen everywhere in this country.'⁵⁶

Fei Xin also mentioned the legend and trade of ambergris from an island in the area of Sumatra, 'If one travelled by ship to the west of Sumatra during spring days, it was possible for him to see that many dragons were playing on sea, and also to find ambergris which came from saliva of dragons on the coasts or inside the body of big fish. Once the ambergris was burning, aroma would be released from it. In the markets of Sumatra, 1 tael of ambergris was worth 12 Sumatra's golden coins, which were equivalent to 9,000 Chinese copper coins.'⁵⁷

Eaglewood of Kmir could be classified into three levels: 'The first level was called Lüyang (綠洋), the second level was named Sanpo (三灤), and the name of the third level was Boluo (勃羅).'⁵⁸

Piper longum (萆撥) grew prosperously in Java, and 'Physicians of Chinese medicine thought this kind of herb can cure abdominal pain.'⁵⁹

Borneol was a special product in Pahang, 'Borneol was made of the resin of dryobalanops aromatica, and its seeds looked like nutmegs. Borneol can be used for treating haemorrhoids.'⁶⁰

Table 4

Herbs and Drugs on Historical Materials in the Ming Dynasty after Zheng He's Voyages

Countries Species	Champ	Cochin	Aden	Knir	Java	Bumi	Pahang	Siam	Ceylon	Cambodia	Parane	Palembang	Malacca	Aijeh	Johor	Indragiri	Sukadana	Banjarmasin	Salanah Sulu
ferula asafetida								✓				✓							
styrax benzoin		✓										✓		✓					
symplocos paniculate (白檀)					✓														
piper longum		✓															✓	✓	
areca nut (檳榔)	✓	✓					✓		✓	✓	✓		✓		✓	✓	✓		
eaglewood		✓		✓			✓	✓		✓		✓					✓		
chaulmoogra seed								✓		✓									
hawksbill turtle		✓				✓	✓				✓		✓		✓		✓		✓
clove	✓													✓					
nutmeg	✓	✓			✓			✓		✓							✓	✓	✓
tortoise shells (龜筒)					✓														
pepper	✓	✓			✓		✓			✓				✓					
fennel (茴香)	✓																		
dalbergia odorifera	✓					✓		✓		✓	✓	✓					✓	✓	✓
antelope horn (羚羊角)		✓																	
sulphur													✓						
borneol						✓	✓				✓	✓	✓	✓	✓				✓
ambergris			✓											✓					
bete pepper (蔓葉)									✓										
aloe												✓							
antler (鹿角)		✓																	
myrrh								✓				✓	✓	✓	✓	✓			
costus												✓		✓					
oil of borneol (腦油)											✓								
rose water	✓																		

HISTORIOGRAFIA

Countries Species	Champ	Cochin	Aden	Kmir	Java	Burni	Pahang	Siam	Ceylon	Cambodia	Patane	Palenbang	Malacca	Arifh	Johor	Indragiri	Sukadana	Banjarmasin	Salanah Sulu
frankincense	✓											✓	✓	✓					
musk (麝香)	✓																		
crystal sugar (石蜜)														✓					
hematoxylin	✓	✓			✓			✓									✓		✓
sandalwood	✓										✓						✓		
cambogia (藤黃)										✓									
cutch								✓						✓					
rhinoceros horn	✓	✓					✓			✓	✓	✓	✓		✓	✓	✓		
ivory	✓						✓	✓		✓		✓	✓		✓	✓	✓		
dragon's blood (血竭/麒麟竭)								✓				✓		✓	✓	✓	✓	✓	
nests of swallows (燕窩)	✓	✓					✓				✓		✓	✓					
semen coicis (薏苡仁)		✓																	
butea gum (紫梗)										✓									
others	✓		✓																

Sources: Fei, *Xingcha shenglan*, 1–22; Huang, *Xiyang chaogong*, 44, 48; Zhang Xie, *Dongxiyang*, 13–97.

Siam had a special product, which was called dragon's blood (麒麟竭), and 'it was made of resin that came from a kind of tropical trees, the leaves of which looked like the cherry trees' leaves.⁶¹

It was said that Zheng He and his teammates found edible bird's nests when stopping at Borneo. It surprised the Chinese sailors that local people ate sea swallow's nestles as a kind of food and medicine. According to the researches of ship physicians in the fleet, the nests were actually the vomitus of sea swallows which had an aphrodisiac function, and they became popular among the rich men in China soon afterwards.

In addition, Chinese ship physicians deepened their knowledge of tropical environments and diseases. Ma Huan mentioned that 'The temperature of Malacca differs significantly from dawn to dusk, which means hot by day, cold at night. The weather in May is unstable and bad and can easily lead to outbreak of diseases. Around Malacca, there is much sulphur in mountains, where trees and grass cannot grow...⁶² In China, physicians thought that the bad environment like areas of Malacca easily caused the outbreak of infectious diseases such as plague.

Secondly, the travelling of ship physicians boosted the spread of traditional Chinese medicine

Table 5

The Tax Reduction on Herb Tradings in Wanli Era of the Ming Dynasty (1573–1620)

Varieties of herbs	Tax in 1589 (17 th year of Wanli Era)	Tax in 1615 (43 rd year of Wanli Era)
ferula asafoetida	2 qian ⁶³ (錢) / 100 jin (斤)	1 qian 7 fen (分) 3 li (厘) / 100 jin
styrax benzoin	1 qian 2 fen / 100 jin	1 qian 4 li / 100 jin
calamus tetradactylus Hance	1 fen 6 li / 100 jin	1 fen 4 li / 100 jin
borneol	top grade: 3 liang (兩) 2 qian / 10 jin; middle grade: 1 liang 6 qian / 10 jin; low grade: 8 qian / 10 jin	top grade: 2 liang 7 qian 6 fen 5 li / 10 jin; middle grade: 1 liang 3 qian 8 fen 2 li / 10 jin; low grade: 6 qian 9 fen 1 li / 10 jin
eaglewood	1 qian 6 fen / 10 jin	1 qian 3 fen 8 li / 10 jin
chaulmoogra seed	2 fen / 100 jin	1 fen 7 li / 100 jin
hawksbill turtle	6 qian / 100 jin	5 qian 1 fen 8 li / 100 jin
clove	1 qian 8 fen / 100 jin	1 qian 5 fen 5 li / 100 jin
branches and leaves of clove	2 fen / 100 jin	1 fen 7 li / 100 jin
cutch	1 qian 8 fen / 100 jin	1 qian 5 fen 5 li / 100 jin
peppers	2 qian 5 fen / 100 jin	2 qian 1 fen 6 li / 100 jin
aloe	2 qian / 100 jin	1 qian 7 fen 3 li / 100 jin
antler	1 fen 4 li / 100 jin	1 fen 2 li / 100 jin
vomiting nut (馬錢)	1 fen 6 li / 100 jin	1 fen 4 li / 100 jin
aleppo gall (沒石子)	2 qian / 100 jin	1 qian 7 fen 3 li / 100 jin
myrrh	3 qian 2 fen / 100 jin	2 qian 7 fen 6 li / 100 jin
mingjiao ⁶⁴	4 fen / 100 jin	3 fen 4 li / 100 jin
costus	1 qian 8 fen / 100 jin	1 qian 5 fen 5 li / 100 jin
lysimachia sikokiana	2 qian / 100 jin	1 qian 7 fen 3 li / 100 jin
nutmeg	5 fen / 100 jin	4 fen 3 li / 100 jin
frankincense	2 qian / 100 jin	1 qian 7 fen 3 li / 100 jin
calamus formosanus (水藤)	1 fen / 100 jin	9 li / 100 jin
a drug named suhe oil (蘇合油)	1 qian / 10 jin	8 fen 8 li / 10 jin
hematoxylin	hematoxylin from the East: 2 fen / 100 jin; hematoxylin from the West: 5 fen / 100 jin	hematoxylin from the East: 2 fen 1 li / 100 jin; hematoxylin from the West: 4 fen 3 li / 100 jin
sandalwood	superior grade: 5 qian / 100 jin; inferior grade: 2 qian 4 fen / 100 jin	superior grade: 4 qian 3 fen 2 li / 100 jin; inferior grade: 2 qian 7 li / 100 jin
cambogia	1 qian 6 fen / 100 jin	1 qian 3 fen 8 li / 100 jin
rhinoceros horn	3 qian 4 fen / 10 jin	2 qian 9 fen 4 li / 10 jin
dragon's blood	4 qian / 100 jin	3 qian 4 fen 6 li / 100 jin
nestles of swallows	superior grade: 1 liang / 100 jin; middle grade: 7 qian / 100 jin; inferior grade: 2 qian / 100 jin	superior grade: 8 qian 6 fen 4 li / 100 jin; middle grade: 6 qian 5 li / 100 jin; inferior grade: 1 qian 7 fen 3 li / 100 jin
sesame (油麻)	1 fen 2 li / 1 dan	1 fen / 1 dan

Source: Zhang Xie, *Dongxiyang*, 1–3:96–98.

HISTORIOGRAFIA

overseas. In the Ming dynasty, the medicine of Southeast Asian countries was lagging behind China. Fei Xin had recorded the medical level of (West) Timor: 'Timor is not a rich country, and the only export commodity is sandalwood. Because of the very hot climate, local people put on few clothes. When merchant ships stop in the ports of Timor, only women exchange goods on board. Moreover, the medical situation is very bad there, once infectious diseases which are caused by the climate and environment broke out, the death rate was as high as 90%.⁶⁵

So, wherever Zheng He's fleet had passed or the ship physicians had stayed, traditional Chinese medicine was promoted. When the ships anchored the coast of Taiwan, 'Zheng He found that the local medical knowledge and methods were very poor, so ordered physicians to teach them to throw the useful herbs into their wells once contagious diseases break out.⁶⁶ The records in *Nanyang Ji* (《南洋記》) said, 'In Siam, local patients had always sought help from Zheng He's physicians, who told them to put the right medicine into their brook, so that habitants could have a bath for treating the ills. Until now, this method is still in use.⁶⁷

Thirdly, the participation of ship physicians in voyages also boosted maritime herb markets. Zheng He and his teammates not only bought herbs from foreign countries, but also sold medicines to these countries. Even if the voyages were prohibited by the Ming court after the death of Zheng He, herb trade was still going on. Based on some speculating, ship physicians not only had brought back a few precious overseas herbs to the inland of China, but also spread traditional Chinese medicine to Southeast Asia, South Asia or other countries. At that time, some Chinese merchants even took a risk in smuggling overseas herbs across the South China Sea.

In *Xiyang Chaogong Dianlu* (《西洋朝貢典錄》) in the Ming dynasty, there were records about the selling

of Chinese mainland herbs abroad, 'Chinese merchants exchange musk, silk products, porcelain, copper, camphor for Ceylon's local productions, such as gold coins, diamonds, pearls, rice, beef, mutttons, chicken, duck, and so on.⁶⁸

The trade of herbs in Atjeh was mentioned in *Xingcha Shenglan*, 'About the pepper,⁶⁹ the unit of local weight 1 *bohe* (播荷) is equal to 320 *jin* (斤) in China, and was worth of 20 Chinese silver coins (6 taels each). Every 20 local golden coins are equivalent to 5.2 taels of gold. 1 tael of ambergris is worth 12 local golden coins, which is expensive.⁷⁰ Moreover, the trade of drugs in Kalicut was mentioned '1 *bohe* of local pepper is equal to 250 *jin* in China, and is worth 200 local golden coins. And 1 *bohe* of local fragrant medicines is equivalent to 200 Chinese *jin*.⁷¹

In the Wanli era of the Ming dynasty, the imperial court even reduced tax for the markets of overseas herbs, and the related records are shown in Table 5.

Some scholars thought that it was helpful for satisfying the requirement of Chinese for herbs to reduce the tax on these merchandises. To speculate in reverse, before 1615 (the 43rd year of Wanli era), the Ming court collected more tax on herbs than in 1589. It proved that the trade of overseas herbs in China could make profits, sometimes even highly lucrative. Therefore, ship physicians had their important duty and value on this kind of business.

CONCLUSIONS

The royal court in the Ming dynasty forbade any long-distance voyage after the end of Zheng He's voyages, ship physicians were no longer required, and the records of ship physicians almost disappeared. In early Qing dynasty, the policy of 'closing the border and locking the country' was slightly loosened, yet no more ocean-going voyages were recorded on historical documents. Compared to China, western countries developed the system of

HISTORIOGRAPHY

ship surgeons step by step, especially in Britain and the Netherlands where the governments assigned ship doctors to most of the big ships. But in China, it was likely that ship physicians were gradually vanishing in early modern time.

Qi Jiguang (戚繼光, 1528–1588), a famous patriotic military officer who resisted pirates during the Ming dynasty, had mentioned physicians of his troops in the book of *Lianbing Shiji* (《練兵實紀》), ‘In each battalion, there were 6 flag bearers..., 1 physician, 1 servant...’⁷² It was reasonable to think that ship physicians had existed in the troops of Qi Jiguang, because they must fight with pirates on seas. However, it was hard to say whether the positions of these ship physicians remained after the expulsion of pirates.

According to the records of Japanese historical materials, staff of a Chinese smuggling trade ship included: ‘Captain, chief mate, accountant,

manager, passenger, navigator, rudder, cook...’⁷³ Among them, no one physician existed. But in 1753, a smuggling merchant ship from Nanjing to Japan sunk on the way, the salvaged item showed that a ship physician whose name was Wang Daixian (王代顯) had survived fortunately.⁷⁴ This indicated that Chinese ship doctors never disappeared.⁷⁵

It is obvious that Chinese navigation activities had been declining gradually since the middle and late Ming dynasty. That led to the slow development of a system of ship doctors and the stagnation of Chinese maritime medicine. After the First Opium War, the royal court of the Qing dynasty had just begun to arrange ship doctors for fleets again. No matter how, even though the records about Chinese ancient ship physicians were few, their activities had a great influence on the trading along the Maritime Silk Road and also on the exchange of medicine between the East and the West. **RC**

NOTES

- 1 Most of ship doctors in Europe were surgeons, but in ancient China, they were all physicians.
- 2 Xu and Wang, *Liu tao*, 3:87.
- 3 Chen Shou, *Sanguo zhi*, 29:803.
- 4 Fang Xuanling et al., *Jin shu*, 3:69.
- 5 Wang Honghan, *Gujin yishi*, 2:183.
- 6 Wang Pu, *Wudai huiyao*, 12:213.
- 7 Liu Lin et al., *Song huiyao jigao*, 59:7385.
- 8 Zhang Tingyu, *Ming shi*, 74:1812–1813.
- 9 Zhang Tingyu, *Ming shi*, 74:1812–1813.
- 10 Qianlong, coord., *Xu Tongdian*, 1695–1696.
- 11 Zhang Tingyu, *Ming shi*, 304:7766–7767.
- 12 Li Shihou, *Yingyin yuangben*, 5.
- 13 Fei, *Xingcha shenglan*, 1.
- 14 Wang Shizhen, *Yanshan tang*, 1517.
- 15 It was said that he had ever been to the Western Ocean as a ship physician in Zheng He’s fleet for five times. See Zheng and Xia, *Zheng He xia xiyang*, 34.
- 16 Xu Xiangmei, *Liangzhe*, 49:1264.
- 17 The first voyage to the Western Ocean by Chen Chang was the fifth voyage of Zheng He’s fleet.
- 18 Chen Menglei, *Gujin tushu*, 12:266.
- 19 Qian Lucan et al., *Zhongguo Difang*, 523.
- 20 Zhang, “Yize yu Zhenghe,” 84.
- 21 He Shaoji et al., *Anhui tongzhi*, 263:2699.
- 22 Tamba, *Zhongguo yiji kao*, 56:949.
- 23 Zhang Hongying, Zhang Baowen, and Zhou Jie, *Zhongyi*, 155.
- 24 Shen, *Mengxi bitan*, 776.
- 25 This oil was made of resin of *Liquidambar orientalis* Mill. It can expel insects, reduce phlegm, and diminish inflammation.
- 26 The manufacturing method of this medicine was as follows: People cut *Acacia catechu* into small pieces, then sealed them into bamboo tubes, and buried them in the earth for several days. After taking them out, maker pounded them as pulp, finally decocted them as production.
- 27 Kou, *Bencao yanji*, 14:91.
- 28 Tao, *Mingyi biele*, 87.
- 29 Su, *Bencao tujing*, 529.
- 30 Lu Duoxun et al., *Kaibao bencao*, 216.
- 31 Chen Cangqi, *Bencao shiyi*, 377.
- 32 Su, *Bencao tujing*, 342–344.
- 33 Su, *Bencao tujing*, 110–111.
- 34 Su, *Bencao tujing*, 227.
- 35 Su, *Bencao tujing*, 373–374.

HISTORIOGRAFIA

- 36 Su, *Bencao tuijing*, 388–389.
- 37 Su, *Bencao tuijing*, 437.
- 38 Faxian, *Foguo ji*, 21–22.
- 39 Wang Dang, *Tang yulin*, 226.
- 40 Torck, “Maritime Travel,” 64.
- 41 Han, Glenn, and Deville, *Ancient Herbs*, 125.
- 42 A fruit looks like a loquat.
- 43 Gong Zhen, *Xiyang fanguo*, 10.
- 44 Cherry, *Garlic*, 1.
- 45 Xu Jing, *Xuanhe fengshi*, 114.
- 46 Gong Zhen, *Xiyang fanguo*, 6.
- 47 Gong Jinhan, “Zheng He yuanyang,” 195.
- 48 Fei, *Xingcha shenglan*, 11.
- 49 Fei, *Xingcha shenglan*, 13–14.
- 50 Huang, *Xiyang chaogong*, 41.
- 51 Huang, *Xiyang chaogong*, 43.
- 52 Ma, *Yingya shenglan*, 69.
- 53 Ma, *Yingya shenglan*, 50.
- 54 Gong Zhen, *Xiyang fanguo*, 33.
- 55 Fei, *Xingcha shenglan*, 1.
- 56 Huang, *Xiyang chaogong*, 7.
- 57 Fei, *Xingcha shenglan*, 14.
- 58 Huang, *Xiyang chaogong*, 15–16.
- 59 Huang, *Xiyang chaogong*, 26.
- 60 Huang, *Xiyang chaogong*, 48.
- 61 Huang, *Xiyang chaogong*, 59.
- 62 Ma Huan, *Yingya shenglan*, 40.
- 63 1 liang (tael) of silver = 10 qian of silver = 100 fen of silver = 1000 li of silver
- 64 Drugs made of white horns from animals.
- 65 Fei, *Xingcha shenglan*, 7.
- 66 Jiang, *Taiwan fuzhi*, 5.
- 67 Li Changfu, *Haiguo wenjianlu*, 53.
- 68 Huang, *Xiyang chaogong*, 82–83.
- 69 In China, peppers were also made for medicines.
- 70 Zhang Xie, *Dongxiyang kao*, 77.
- 71 Huang, *Xiyang chaogong*, 99.
- 72 Qi, *Lianbing shiji*, 1:2–3.
- 73 Sumida, *Kazyou yawa*, 165.
- 74 There may be another guess that Wang had been just a physician in route to Japan rather than a ship doctor.
- 75 Li and Li, *Haiyang yu dongya*, 182.

BIBLIOGRAPHY

- Chen Cangqi 陳藏器. *Bencao shiyi* 本草拾遺 (Notes on the Materia Medica). Hefei: Anhui kexue chubanshe, 2002.
- Chen Menglei 陳夢雷. *Gujin tushu jicheng yibu quanlu* 古今圖書集成醫部全錄 (Collection of Ancient and Modern Books — Complete Part of Medicine). Beijing: Renmin weisheng chubanshe, 1991.
- Chen Shou 陳壽. *Sanguo zhi* 三國志 (Records of the Three Kingdoms). Beijing: Zhonghua shuju, 1973.
- Cherry, Robin. *Garlic, an Edible Biography: The History, Politics, and Mythology behind the World's Most Pungent Food — with over 100 Recipes*. Boston: Roost Books, 2014.
- Fang Xuanling 房玄齡 et al. *Jin shu* 晉書 (Book of Jin). Beijing: Zhonghua shuju, 1974.
- Faxian 法顯. *Foguo ji* 佛國記 (A Record of Buddhist Kingdoms). Beijing: Shangwu chubanshe, 1937.
- Fei Xin 費信. *Xingcha shenglan* 星槎勝覽 (Overall Survey of the Starry Raft). Beijing: Zhonghua shuju, 1954.
- Qianlong 乾隆. *Xu tongdian* 續通典 (Comprehensive Institution: Continuous Part). Shanghai: Shangwu yinshuguan, 1935.
- Gong Jinhan 龔錦涵. “Zheng He yuanyang chuandui de yixue baozhang 鄭和遠洋船隊的醫學保障 (Medical Services onboard Zheng He's Ocean-going Fleet).” *Haijun yixue zazhi* 海軍醫學雜誌 (Journal of Navy Medicine), no. 3 (2000): 193–196.
- Gong Zhen 鞏珍. *Xiyang fanguo zhi* 西洋番國誌 (The Annals of Foreign Nations in the Western Ocean). Beijing: Zhonghua shuju, 1961.
- Han, Henry, Glenn Miller, and Nancy Deville. *Ancient Herbs, Modern Medicine: Improving Your Health by Combining Chinese Herbal Medicine and Western Medicine*. New York: Bantam Dell, 2003.
- He Shaoji 何紹基 et al. *Anhui tongzhi* 安徽通志 (Comprehensive Records of Anhui). Taiwan: Huawen chubanshe, 1967.
- Huang Xingzeng 黃省曾. *Xiyang chaogong dianlu* 西洋朝貢典錄 (Records of Tributes from Western Ocean). Beijing: Zhonghua shuju, 1982.
- Jiang Yuying 蔣毓英. *Taiwan fuzhi sanzong* 臺灣府志三種 (Taiwan Provincial Records — Three Parts). Beijing: Zhonghua shuju, 1985.
- Kou Zongshi 寇宗奭. *Bencao yanyi* 本草衍義 (Extension of the Materia Medica). Beijing: Renmin weisheng chubanshe, 1990.
- Li Changfu 李長傳. *Haiguo wenjianlu jiaozhu* 海國聞見錄校注 (Notes on the Chronicles of Lands on the Sea). Zhengzhou: Zhongzhou guji chubanshe, 1984.
- Li Haiying 李海英, and Li Xiangyu 李翔宇. *Haiyang yu Dongya wenhua jiaoliu* 海洋與東亞文化交流 (Ocean and Cultural Exchange of East Asia). Qingdao: Zhongguo haiyang daxue chubanshe, 2014.

HISTORIOGRAPHY

- Li Liping 李麗萍, and Chen Songlin 陳松林. *Zhongguo meishu fenlei quanji: Zhongguo huihua quanji* 中國美術分類全集：中國繪畫全集 (Collections of Chinese Art Categories: Collects of Chinese Prints). Vol. 21. Beijing: Wenwu chubanshe, 2015.
- Li Shihou 李士厚. *Yingyin yuanben Zheng He jiapu jiaozhu* 影印原本鄭和家譜校注 (Notes on Replica of the Genealogy Book of Zheng He). Kunming: Chenguang chubanshe, 2005.
- Liang Erping 梁二平. *Shuizai shijie de zhongyang: gudai Zhongguo de tianxiaguan* 誰在世界的中央：古代中國的天下觀 (Who was in the centre of the world: the worldview of ancient Chinese). Guangzhou: Huacheng chubanshe, 2010.
- Liu Lin 劉琳 et al. *Song huiyao jigao* 宋會要輯稿 (Song Government Manuscript Compendium). Shanghai: Shanghai guji chubanshe, 2014.
- Lu Duoxun 盧多遜 et al. *Kaibao bencao* 開寶本草 (Kaibao Materia Medica). Hefei: Anhui kexue chubanshe, 1998.
- Ma Huan 馬歡. *Yingya shenglan* 瀛涯勝覽 (Overall Survey of the Ocean's Shores). Beijing: Zhonghua shuju, 1985.
- Qi Jiguang 戚繼光. *Lianbing shiji* 練兵實紀 (Record of Military Training). Beijing: Zhonghua shuju, 1985.
- Qian Lucan 錢陸燦 et al. *Zhongguo difang zhi jichen* 中國地方志集成 (Collection of Regional Comprehensive Records of China). Nanjing: Jiangsu guji chubanshe, 1991.
- Shen Kuo 沈括. *Mengxi bitan* 夢溪筆談 (Dream Pool Essays). Shanghai: Gudian wenxue chubanshe, 1957.
- Su Song 蘇頌. *Bencao tujing* 本草圖經 (Illustration Collection of the Materia Medica). Hefei: Anhui kexue chubanshe, 1994.
- Sumida Shoichi 住田正一. *Kazyō yawa* 海上夜話 (Marine Night Talk). Tokyo: Kōtō keizai shya, 1932.
- Tamba Genso 丹波元胤. *Zhongguo yiji kao* 中國醫籍考 (Chinese Medical Index). Beijing: Renmin weisheng chubanshe, 1956.
- Tao Hongjing 陶弘景, ed. *Mingyi bielu* 名醫別錄 (Records Collection of Famous Doctors). Beijing: Renmin weisheng chubanshe, 1986.
- Torck, Mathieu. "Maritime Travel and the Question of Provisions and Scurvy in a Chinese Context." *East Asian Science, Technology, and Medicine*, no. 23 (2005): 54–78.
- Wang Dang 王謙. *Tang yulin* 唐語林 (Collection of Tales in the Tang dynasty). Beijing: Zhonghua shuju, 1985.
- Wang Honghan 王宏翰. *Gujin yishi* 古今醫史 (Medical History of Antiquity and Modernity). Changsha: Hunan kexuejishu chubanshe, 2014.
- Wang Pu 王溥. *Wudai huiyao* 五代會要 (Institutions of the Five Dynasties Period). Shanghai: Shanghai guji chubanshe, 1978.
- Wang Shizhen 王世貞. *Yanshan tang bieji* 弇山堂別集 (Records of Yanshan Tang). Beijing: Zhonghua shuju, 1985.
- Xu Jing 徐競. *Xuanhe fengshi gaoli tujing* 宣和奉使高麗圖經 (Comprehension Institution of Goryeo under the Order of Emperor Huizhong of Song). Beijing: Zhonghua shuju, 1985.
- Xu Xiangmei 徐象梅. *Liang Zhe mingxian lu* 兩浙名賢錄 (Records of Virtuous Celebrities of Zhejiang). Hangzhou: Zhejiang guji chubanshe, 2012.
- Xu Yuqing 徐玉清, and Wang Guomin 王國民, eds. *Liu tao* 六韜 (Six Secrets Teachings). Zhengzhou: Zhongzhou guji chubanshe, 2008.
- Zhang Hongying 章紅英, Zhang Baowen 張寶文, and Zhou Jie 周傑, eds. *Zhongyi yu Zhongguo wenhua* 中醫與中國文化 (Traditional Chinese Medicine and Chinese Culture). Beijing: Yuanzhen chubanshe, 2009.
- Zhang Tingyu 張廷玉. *Ming shi* 明史 (History of Ming). Beijing: Zhonghua shuju, 1974.
- Zhang Xie 張燮. *Dongxiyang kao* 東西洋考 (Comprehensive Institutions of the Eastern and Western Oceans). Beijing: Zhonghua shuju, 1981.
- Zhang Yaozong 張耀宗. "Yize yu Zhenghe Xia Xiyang youguan de xin shiliao 一則與鄭和下西洋有關的新史料 (A New Historical Material relating to Ming Treasure Voyages)." *Wenwu* 文物 (Cultural Relics), no. 6 (1985): 84–85.
- Zheng Run 鄭閏, and Xia Yong 夏詠. "Zheng He xia Xiyang de yiguan Chen Chang 鄭和下西洋的醫官陳常 (Physician on the Fleet of Ming Treasure Voyages — Chen Chang)." *Zheng He yanjiu* 鄭和研究 (Studies on Zheng He), no. 4 (2005): 34–37.