Wu Lien-teh: Pioneer of Modern Medicine in China

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Figure 1: Wu Lien-teh: Pioneer of Modern Medicine in China

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Wu Lien-teh was born in 1879 on the island of Penang in Malaya (four days before Einstein). He hailed from Taishan, Guangdong. In 1896, at the age of 17, Dr. Wu excelled and was awarded the Queen's Scholarship by Queen Victoria to study at the University of Cambridge in London. During his research, he successively studied at St. Mary's Hospital in the UK, the Liverpool School of Tropical Medicine, the Hygiene Institute at the University of Halle in Germany, and the Pasteur Institute in France. He was mentored by Nobel laureates Professor Elie Metchnikoff and Professor Frederick Gowland Hopkins. Dr. Wu pursued his studies abroad for seven years, earning a total of five degrees from the University of Cambridge: Bachelor of Medicine, Bachelor of Arts, Master of Surgery, Master of Arts, and Doctor of Medicine. He obtained his doctorate at the young age of 24. He was also the first Chinese person in the world to be awarded a doctorate from the University of Cambridge.

In 1907, Dr. Wu was invited by Yuan Shikai to return to China and serve as the Vice President of the Tianjin Military Medical School.

In 1910, after the outbreak of the Great Manchurian Plague, Dr. Wu was appointed to the critical position of Chief Medical Officer. In less than four months, he managed to bring this deadly infectious disease, which had left both the Russians and Japanese helpless and claimed over 60,000 lives, to a complete halt. This extraordinary feat, a century-defining epidemic, astounded the world and saved millions of lives. Dr. Wu Lien-teh, who led this epidemic prevention effort, became renowned worldwide.

Dr. Wu immediately confirmed that the plague was bubonic plague, and the culprit was the muskrat. Additionally, he boldly speculated that this plague was not transmitted from rats to humans in the usual way, but rather from person to person. This was because it spread through the respiratory tract and presented symptoms such as fever, coughing, and pulmonary infection. He first introduced the concept of pneumonic plague. At that time, although there was some understanding of bubonic plague, it was believed that it was transmitted from rats to humans, and those who contracted it would not further spread it to others. In other words, human-to-human transmission was not considered possible. Therefore, when Kitasato Shibasaburo, a Japanese scientist known as the "Oriental Pasteur," who first discovered the plague bacillus in the world, sent people to dissect thousands of rats in Harbin, they did not find the plague bacillus and denied that it was bubonic plague. On the other hand, Gérald Mesny, a well-known French doctor with experience in combating the plague, believed that it was spread by rats and that human-to-human transmission was not possible. This is what we now know as glandular plague. He even claimed that he was more qualified than Dr. Wu Lien-teh and demanded that Dr. Wu relinquish full authority over epidemic prevention in Northeast China and let him take sole command. However, Gérald Mesny did not take proper precautions, directly contacted patients, and succumbed to the plague in less than three days. The final outcome told us that Dr. Wu Lien-teh's speculation and measures for pulmonary plague were correct. Because of his astounding achievements, an International Plague Conference, attended by representatives from Japan, the United Kingdom, the United States, Russia, Germany, France, Italy, the Netherlands, Austria, Mexico, and China, was held in Shenyang. Dr. Wu Lien-teh served as the chairman of the conference, and the Japanese scientist Kitasato Shibasaburo, who discovered the plague bacillus, humbly took the position of vice chairman. This conference was the first international academic conference ever held in Chinese history. Dr. Wu took full charge, and it had a profound impact on the development of modern medicine and life sciences in China.

During the first major outbreak of pulmonary plague in the Three Eastern Provinces (1910-1911), Dr. Wu Lien-teh harbored the idea of conducting in-depth research on this highly infectious disease and writing a dedicated treatise. However, the conditions were not ripe for it that year. In April 1911, at the International Plague Conference held in Fengtian, Dr. Wu Lien-teh first proposed the "pulmonary plague" theory, which was recognized by experts from various countries in attendance. In July 1911, Dr. Wu Lien-teh led assistants Chen Sibang and Dr. Cang, along with Russian experts including Professor Saburov, to form a Sino-Russian joint inspection team to investigate the prevalence of plague among tarabagans on the Sino-Russian border. The results of this investigation were compiled by Dr. Wu Lien-teh into a report titled "Investigation into the Relationship of Tarabagan (Mongolia Marmot) to Plague," which was published in the internationally renowned journal "The Lancet" (Lancet, 1913, 185, 529).

Dr. Wu Lien-teh remained stationed at the border, successfully preventing the Shanxi plague of 1918 (which claimed around 16,000 lives) and the second major outbreak of plague in Northeast China (resulting in around 9,300 deaths). During his second campaign against the plague, he did not hold an official position, and therefore, lacked the authority to mobilize manpower or resources. He wasn't a high-ranking official and didn't have access to funds. What he relied on was his unparalleled medical skills honed over a decade.

Due to his astonishing achievements, Dr. Wu Lien-teh gained global renown. The Northeast Anti-epidemic Bureau, established by Dr. Wu, became the world's premier institution for researching epidemics. It not only held an international leading position in disease prevention but also achieved a world-leading level in scientific research. The collection of samples from pulmonary plague patients and specimens of wild rodents was exceptionally comprehensive, making it unique in the world at that time. The epidemiological data gathered on the prevalence of plague was unmatched by any other research institution. Therefore, the Northeast Anti-epidemic Bureau consistently held a leading position in the world in various aspects of plague, including its prevalence, monitoring, diagnosis, and animal experiments. Additionally, it made outstanding contributions to the prevention, control, and treatment of cholera, also holding a world-leading position in this field. At that time, many renowned scholars from abroad sought to further their studies and work under his guidance, including Yonghan Chen from the University of Cambridge, an Austrian from the University of Vienna named Borlase, Sibong Chen from the University of Cambridge, Ronald, a Briton from the University of Edinburgh, Ruiheng Liu, a graduate of Harvard University, and later the first Chinese dean of Peking Union Medical College, among others.

While at the Northeast Anti-epidemic Bureau, Dr. Wu Lien-teh conducted groundbreaking research in the field of bacteriology by designing and successfully conducting "Tarabagan Plague Inhalation Experiments". These experiments confirmed that the Tarabagan plague could be transmitted through respiration, marking a significant advancement in the field. Building on a series of experimental studies, Dr. Wu Lien-teh completed "A Treatise on Pneumonic Plague" (Geneva: League of Nations, Health Organization, 1926), a 480-page theoretical monograph on plague. This work established the theory of "pneumonic plague" and laid the foundation for the classification of various types of plague, including bubonic plague, pneumonic plague, and septicemic plague. This treatise is hailed as a milestone in the theory of plague prevention and control.

The establishment of the theory of pneumonic plague brought international recognition to its author. As a result, Dr. Wu Lien-teh was nominated as a candidate for the Nobel Prize in Physiology or Medicine in 1935. However, Dr. Wu himself remained indifferent to this recognition and did not utter a word about it. His children were also unaware of it. In 2007, the Singapore National Television — Asia News Television (Channel NewsAsia) planned to produce a three-part documentary series titled "Dr. Wu Lien-teh: Plague Fighter," with Ms. Wang Li-feng, the Vice President of International News at the channel, serving as the planner and scriptwriter. During the research process, they discovered the original documents recommending Dr. Wu Lien-teh as a Nobel Prize candidate. Dr. Wu's daughter, Wu Yu-ling, was exceptionally excited upon learning about this and described the document as being unveiled for the first time.

In his later years, Liang Qichao commented on Dr. Wu Lien-teh, saying, "In the past fifty years of scientific endeavors, among the scholars who could meet the world on equal terms, there is only Dr. Wu Lien-teh!"

Dr. Wu Lien-teh was later referred to by posterity as the "Triple Scholar," signifying the first Chinese to obtain a doctorate from the University of Cambridge, an imperial medical licentiate personally conferred by the emperor, and a plague fighter honored by the League of Nations Health Organization. This was the epitome of an extraordinary national figure.

Even when summoned by three successive heads of state, Prince Regent of the Qing Dynasty, Yuan Shikai, and Chiang Kai-shek, to serve as Minister of Health, Dr. Wu declined. He opted instead for the position of Director-General of National Ports Quarantine.

Dr. Wu Lien-teh discovered that many epidemics, including cholera and plague, were entering through the customs. At that time, the quarantine authority at the ports was in the hands of foreigners. Dr. Wu advocated for reclaiming control. The foreigners used to say that China had no scientists, but now when they looked

at Dr. Wu Lien-teh, the internationally renowned plague fighter, they had no choice but to concede it to China. Dr. Wu Lien-teh personally drafted the country's first port quarantine regulations, known as the "Port Quarantine Regulations." This was later hailed as the precursor of independent quarantine in China.

The first to be reclaimed was the largest quarantine station in the country - the Shanghai Quarantine Station. Dr. Wu himself took up the post of director. He gradually regained control over quarantine authority at various ports. He delved into major ports to oversee and inspect quarantine work, train quarantine personnel, conduct scientific research, and enhance medical equipment and transportation. In the seven years from its establishment to the eve of the Anti-Japanese War, the management office had set up 20 service stations, quarantine hospitals, and laboratories at various ports, with over 2,000 beds. This formed a nationwide network. When infectious diseases spread, quarantine hospitals in various port cities actively participated in isolating and treating patients. This was especially significant in areas without infectious disease hospitals. In just seven years, Dr. Wu elevated China's quarantine standards to an international level, making it a first-class quarantine institution in Southeast Asia. The success of China's current port quarantine efforts, in terms of sovereignty, unified command, and operational capacity, is inseparable from Dr. Wu Lien-teh's unwavering and diligent efforts.

Later, he not only prevented two major outbreaks of cholera in Harbin but also, while overseeing customs quarantine in Shanghai, averted the largest cholera epidemic in China. Moreover, the death rate from cholera was much lower in China compared to countries like England, America, France, and Japan at the time. It can be said that Wu Lien-teh's research and prevention efforts against epidemics were of the highest standard in the world at that time.

As a leading figure in the Chinese medical community, Dr. Wu Lien-teh collaborated with the Rockefeller Foundation to establish Peking Union Medical College, which is now known as China Union Medical University. This institution played a crucial role in training a large number of medical professionals in China. Dr. Wu was also the first to propose the creation of the China Medical Association. Alongside Yan Fuqing and others, he co-founded the association and served as its first and second president. He initiated the publication of the Chinese Medical Journal and became its first editor-in-chief.

Dr. Wu personally spearheaded the establishment of the most modern hospital in China at the time - Beijing Central Hospital, which is now known as Peking University People's Hospital. He served as the first hospital director for four years. In total, Dr. Wu led the establishment of 20 quarantine stations, hospitals, and research institutes, providing a total of 2,387 beds. In addition to the Beijing Central Hospital, other significant establishments included epidemic hospitals set up in various parts of Northeast China in 1912, the Northeast Army Hospital, commissioned by Zhang Zuolin, which was the largest in the country at the time, and quarantine hospitals established at various ports under the management of the National Quarantine Service after 1930. In 1926, he also founded the Binjiang Medical Specialized School, which was later renamed Harbin Medical University in 1938.

Furthermore, after graduating from the University of Cambridge, Dr. Wu Lien-teh consistently stood at the forefront of the anti-drug movement. Whether in his birthplace of Malaysia and Singapore, or in China, the United Kingdom, the United States, and other countries, he staunchly advocated for drug prohibition. He can be considered a pioneer of modern drug prohibition. In this endeavor, he invested a significant amount of effort and dedication, determined to eradicate drugs from the countries he visited. However, despite his utmost efforts during his lifetime, the proliferation of drugs remained a matter of great regret and frustration for him.

Dr. Wu Lien-teh, together with Wang Ji-min, co-authored a book in English titled "History of Chinese Medicine." This book broke through the ethnic biases of Western scholars, allowing people to witness the glorious era of Chinese medicine. It filled the gap in which Chinese scholars had not previously introduced the history of Chinese medicine to the world in English. The book objectively presents the development of medicine in China, thus advancing the study of Chinese medical history. As a pioneering work, it has had a significant impact on the international history of medicine and is still considered a reference book in the

field. Especially with regards to the development of modern medicine in China, including primary source materials on the research of plague and cholera conducted by the Northeast Anti-Epidemic Plague Bureau, as well as a wealth of data from the port quarantine, it has become essential reading for future generations studying the history of modern medicine in China. Due to this contribution, Dr. Wu was appointed as a Corresponding Fellow of the International Academy of the History of Science, and to this day, there are fewer than ten Chinese individuals who hold this title in the International Academy of the History of Science.

The methods of isolation, disinfection, and wearing masks that are currently employed during epidemic outbreaks all draw from the strategies used by Dr. Wu Lien-teh to combat the Great Epidemic of Northeast China. It's also worth noting that the rotating dining table we use today was invented by Dr. Wu Lien-teh. His contributions have had a lasting impact on public health practices worldwide.

Before Dr. Wu Lien-teh passed away, he wrote his autobiography in English, titled "Plague Fighter: The Autobiography of a Modern Chinese Physician." It was published by Cambridge University Press and gained worldwide renown. His autobiography can be found in major libraries in the United States and the United Kingdom, but curiously, not in major libraries in China. It's worth noting that all of Dr. Wu Lien-teh's research and work took place on Chinese soil. Over the course of 30 years, from the age of 28 to 58, he devoted the best years of his life to China, benefiting the Chinese people. When I introduce Dr. Wu Lien-teh to people, most of them say, "Is Dr. Wu Lien-teh Chinese, or is he a Chinese expatriate? There are so many Chinese expatriates like him, such as Yang Zhenning, Ding Zhongxing, and even more recently, Nobel laureate Qian Yongjian, etc." (I posted many students' replies on DXY). I feel deeply saddened when I hear such remarks, because Dr. Wu Lien-teh is so internationally renowned. In his autobiography published by Cambridge, he clearly states that he is a Chinese. The title of his book is "Plague Fighter: The Autobiography of a Modern Chinese Physician." Yet, we have revoked Dr. Wu Lien-teh's Chinese citizenship. I believe that today's university and graduate students, in addition to mastering their professional knowledge, really need to enhance their humanistic cultivation. Many outstanding students aspire to go abroad and hope that the country will invest in them, but they may not think about what they can contribute to our beloved motherland and the hardworking Chinese people. Of course, Yang Zhenning, Ding Zhongxing, Qian Yongjian, and others are all very great, but what sets Dr. Wu Lien-teh apart from them is that he dedicated all his contributions to us Chinese people, truly benefiting the Chinese people. The person the Chinese people truly appreciate is Dr. Wu Lien-teh. Without Dr. Wu Lien-teh's efforts to take control of the ports in Northeast China and stop the rat-borne plague that could have devastated the land of China, we really don't know what China would be like now. Just look at the current global panic caused by the outbreak of swine flu in Mexico. We can see that the truly frightening thing in today's world is a major epidemic. Dr. Wu Lien-teh was an international authority in this field. In an era without antibiotics, when people had little understanding of modern medical knowledge, Dr. Wu Lien-teh not only eradicated the Great Epidemic of Northeast China, which claimed the lives of nearly 60,000 Chinese people, in less than four months, but he also effectively prevented major cholera outbreaks multiple times. I believe Dr. Wu Lien-teh's contributions to the Chinese people are truly immense. It's a great pity that very few Chinese people know his name, including fellow medical professionals and students who work in the same field as Dr. Wu. Every time I think about this, my emotions are truly hard to calm.

On January 21, 1960, at No. 39 Lorong Kinta, Penang, a humble yet extraordinary retired physician passed away. Dr. Wu Lien-teh, aged 81, departed with serenity and composure. Very few of the people in the homeland he once served knew of him. Despite his strong confidence in New China and his early decision to donate his residence in Beijing to the nation for use by the Chinese Medical Association, he chose to live out his days as a simple physician, foregoing the accolades he rightfully deserved.

In 1983, in the "Dictionary of Epidemiology" edited by the renowned epidemiologist Last, the only Chinese name mentioned is Wu Lien-teh.

Today, Wu Lien-teh does not live on in the hearts of us Chinese. Very few people know who he is, and those who do have only a vague knowledge about him.

Wu Lien-Teh: “The Old China, to which the author had devoted the best part of his life, from the later days of the Manchu Dynasty through the formative years of the Chinese Republic until the collapse of the Kuomintang regime, is still fresh in the minds of many, and it is hoped that the ascendency of the new Chines People’s Government may result in the continued happiness and prosperity of that great country, which in the course of its 4000-5000 years of history has seen so many triumphs and vicissitudes before achieving its present status in this everchanging world.”

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