

## Understanding of Leprosy in Ancient China

China has a proverb which states, "An earlier generation blazes a trail on which a later generation follows." The chief record of this trail of understanding in leprosy as it developed in China through the *T'ang* dynasty is chronicled in Table 1 and detailed in the text for both this early period and also for later periods. Some of the accounts appear fanciful to modern thinking, but they serve to indicate that leprosy was present and illustrate the thought of their period.

### Records before the Common Era (B.C.)

The recorded understanding of leprosy began with the most ancient of medical texts, the *Nei Ching*, and the first case record with that noted in the *Lun Yu* ("Analects of Confucius," c. sixth century) which states that "Pai Niu is sick. The Master went to see him and, holding his hand through the window, exclaimed: 'Fate kills him. For such a man to have such a disease! For such a man to have such a disease!'"<sup>1,2</sup> *Pai Niu* (also *Po Niu*) is venerated as one of the 12 sages attending Confucius in his temples, where he is depicted without signs of leprosy in contrast to Hawaii's official statue of Damien who is shown with the ravages of the disease. Concerning this incident, Feeny commented:

There is no proof what the disease in question was, and this illustrates how easy it is to argue backwards. *Pai Niu* had a disgraceful affliction, therefore it must have been leprosy because leprosy is still looked upon as a disgraceful affliction . . . In other words, leprosy has become a scapegoat for fear and hatred that dates back to times when the disease itself may not even have existed.<sup>3</sup>

Feeny, however, did not offer a creditable alternative diagnosis, which has also been the weakness of others who have sought to deny the presence of leprosy in the ancient past of both the Orient and the Fertile Crescent. In this case the disease was indeed leprosy, as has been nicely shown by the etymology of the characters used in the account by Wong<sup>4</sup> and more recently by Lu and Needham.<sup>5</sup> The latter demonstrated that commentators through the centuries have determined that the illness termed *Chi* was *O Chi* and that this was the equivalent of the terms *Lai*, *Li* and *Ta Feng*, all being synonyms for leprosy. The character *O* used in the designation *O Chi* for leprosy was also used in other designations such as those for vulgar pictures, evil thoughts, evil desires such as lust, evil recompense, foul, unclean, and abominable. When Buddhism later arrived in China, *O* was in time incorporated into the expression, "The evil way"—the designation for the lowest transmigration.

It is evident that the social opprobrium applied to leprosy has existed from earliest times and was continued through succeeding generations, as will be evident in subsequent quotations. The difficulty of removing the stigma of leprosy from the language of one quarter of the world's population, in view of the multiplicity of terms used and their permeation into other aspects of the language, is obvious.

The *Nei Ching* ("Canon of Internal Medicine") is the oldest as well as the most venerated Chinese medical text. Tradition ascribes its authorship to *Huang Ti* (2698–2598), the legendary third emperor. For a number of reasons it is thought that its actual authorship lies at the period represented by the end of the Eastern *Chou* (771–255) and the early part of the *Chin* (221–207) dynasties. This was roughly the period of the three great philosophers, *Lao Tzu* (b. 604), Confucius (551–479), and Mencius (372–289) and was a period of fermentation

<sup>1</sup> Wong K. Chi-min, "The early history of leprosy in China," *Chinese Med. J.*, 1930, 44, 737–743, p. 737.

<sup>2</sup> Chu Hsi, *Sze Shu Ta Chuan*. [Four great books]. In: Wang Yun-wu, ed., *Chin Ting Ssu Ku Chuan Shu*. [Imperial authorized books of four treasures]. (Taipei, Taiwan: Commercial Press, 1976), Vol. 6, p. 21. Photocopy of 1189 text in Chinese.

<sup>3</sup> Patrick Feeny, *The fight against leprosy*. (London, 1964), p. 18.

<sup>4</sup> Wong, (n. 1), pp. 737–738.

<sup>5</sup> Gwei-djen Lu and Joseph Needham, "Records of diseases in China," In: D. R. Brothwell and A. T. Sandison, eds. *Diseases in antiquity*. (Springfield, 1967), pp. 236–237.

TABLE 1. *Chronology of major leprosy research through the T'ang dynasty.*

CHRONOLOGY OF LEPROSY RECORDS	
DYNASTIES traditional dates	RECORDINGS
CHOU 1122-221	NEI-CHING, medical compendium YUE LING, "Calendar of Seasons" CONFUCIUS & PO NIU, incident PIEN CH'IAO, physician
CH'IN 221-206	HUPEH BAMBOO BOOK, archeology
W. HAN 206 1 25	B. C. 0 A. D.
E. HAN 25-220	CHANG CHUNG-CHING, physician
"THREE KINGDOMS" 220-265	HUA T'O, surgeon
CHIN 265-420	KO HUNG, physician
6 DYNASTIES 420-589	
SUI 589-618	CHAO YÜAN-FANG, pathologist
T'ANG 619-907	SUN SZE-MO, physician WANG TAO, recorder

and codification of thought, so the social movement of the time may well have also brought forth this work. The contents are much older than this period and do not come from the pen of a single individual but are a compilation by various writers. It sums up the experimental, physiologic, and theoretical knowledge from the centuries which preceded it and presents the earliest attempts to systematize the medical thoughts of those ancient times. The most popular edition is divided into two distinct books—the *Su Wen*, comprising 24 volumes, and the *Ling Shu*, containing 12 volumes, each being divided into 81 chapters.<sup>6</sup> This arrangement has held together since the edition of 762 A.D. The English translation entitled "*Huang Ti Nei Ching Su Wen*" ("The Yellow Emperor's Classic of Internal

Medicine") by Ilza Veith<sup>7</sup> covers the first 34 chapters of the *Su Wen*, while that provided by Wong Man<sup>8</sup> covers all 81 chapters of each book in commentated abstract form. Neither provides the sections on leprosy translated by Wong and Wu<sup>9</sup> as:

Those suffering from *ta feng* [leprosy] have stiff joints, the eyebrows and beard fall out.<sup>10</sup>

The wind scatters throughout the muscles and comes into conflict with the *wei chi* or defensive forces. The channels being clogged, the flesh becomes nodular and ulcerates. And because of the stagnant movements of this defensive force numbness results. The vital spirits degenerate and turn cloudy causing the bridge of the nose to change color and rot, and the skin to ulcerate. The wind and chills lodge in the blood vessels and cannot be got rid of. This is called *li feng* [leprosy].<sup>11</sup>

For the treatment of *li feng* prick the swollen parts with a sharp needle, let the foul air out until the swelling subsides.<sup>12</sup>

In speaking of acupuncture therapy of leprosy it is noted that acupuncture is applied only on diseased parts of the flesh which have lost all sensation of feeling.<sup>13</sup>

In the period of the Warring States (476-221), the *Yu Ling* ("Calendar of the Seasons") stated, "... if in the middle of winter the proceedings of government proper to spring were observed, locusts would appear and work harm, springs would all become dry, and many of the people would suffer from the itch and from leprosy."<sup>14, 15</sup> The

<sup>7</sup> Ilza Veith, *Huang Ti Nei Ching Su Wen. The Yellow Emperor's classic of internal medicine.* (Baltimore, 1949).

<sup>8</sup> Wong Man, "Nei ching, the Chinese canon of internal medicine," *Chinese Med. J.*, 1950, 68, 1-33.

<sup>9</sup> Wong and Wu, (n. 6), p. 210.

<sup>10</sup> Yang Shang-shan, *Huang Ti Nei Ching Tai Shu*. [Huang Ti's canon of internal medicine]. (Beijing: People's Health Publisher, 1981), pp. 397-398. Reproduction of Sui dynasty (589-616) text in Chinese.

<sup>11</sup> Yang Shang-shan, (n. 10), p. 521.

<sup>12</sup> Yang Shang-shan, (n. 10), p. 392.

<sup>13</sup> Yang Shang-shan, (n. 10), p. 396.

<sup>14</sup> Wong, (n. 1), pp. 739-740.

<sup>15</sup> Hu Kwang, *Li Chi Ta Chuan Yu Ling*. [Chou dynasty calendar of the seasons]. In: Wang Yun-wu, (n. 2), 1976, Vol. 6, p. 82. Photocopy of Ming dynasty (1593) Chinese text.

<sup>6</sup> Wong K. Chi-min and Wu Lien-teh, *History of Chinese medicine.* (Shanghai: National Quarantine Service, 1936), 2nd ed., pp. 28-29.

implication was that if inappropriate government ritual was followed, disaster would strike.

Two additional accounts from this period indicate that leprosy was indeed a part of the life of the community. The first comes from *Liu Hsiang* who, in his book the *Chang Kuo Tse* ("Warring States Bamboo Book"), tells of *Yu-yan*, an assassin who shaved his eyebrows and used varnish to mark his skin as a disguise for leprosy in order that he would not be arrested (453).<sup>16</sup> The second account, from the *Chang Szu Wai Pen* ("Chang Szu's Extraordinary Writing") dated to 343 by *Chang Kuo Tse*, tells of a leprosy midwife who delivered a baby at night and utilized a light to examine the infant's body to see if it had any marks like those on herself.<sup>17</sup>

*Pien Ch'iao*, traditionally dated to 407–310, has so many dates and medical accomplishments attributed to him that it is thought by some that this may have been the name for a composite person. He was, for example, reputed to have transplanted the heart of a melancholy man to an exuberant subject, and vice versa, thus establishing the proper psychic balance in each subject (Fig. 1). The book of memoirs attributed to him, the *Hsin Shu*, states that, "... leprosy may be caused by sleeping on wet ground on a summer night, or by evil air entering the body after sexual congress, thus causing both eyes to swell, the skin to be numb and senseless, and the flesh ulcerating."<sup>18</sup>

Also from this ancient period there is the recently excavated "Bamboo Book" coming from the tomb of magistrate *Hsi* in Yun Meng, Hupeh, and dated to 217. This is essentially a book relating to laws and regulations, but in it there appears the following account:

*Cha* went to see *Bing* and said to *Bing*,  
"I think you have leprosy (*Li*)."  
*Bing*



FIG. 1. *Pien Ch'iao* demonstrates heart transplant. The hearts are represented in the form of the ancient character for "heart," one in reverse of the other. (Painting by Johnny Shek)

replied, "At age three I was sick, my eyebrows were swollen and nobody knew what the sickness was. I was directed to see a doctor, *Ting*. The doctor said, you don't have eyebrows because they are rootless. Your nostril is destroyed; you cannot sneeze on irritation; your legs are halt because one of them burst, and your hands have no hair." He asked *Bing* to shout and the voice was hoarse. That is leprosy.<sup>19</sup>

This reference is of great significance to leprosy history since its excavation demonstrates concepts that were present at the time of writing whereas many of the old books can be regarded as having been edited by later generations.

*Ts'ao Shi* (c. 206–195) of the Han dynasty was the son of the premier *Ts'ao Tsan* of Emperor *Kao Tsu*, founder of the dynasty.

<sup>16</sup> Liu Hsiang, *Chang Kuo Tse*. [Warring states bamboo book]. In: Wang Yun-wu, (n. 2), Vol. 6, p. 9. Photocopy of Sung dynasty (1147) Chinese text.

<sup>17</sup> Lai Shang-h'u, *Chung Kuo Lai Ping Hsueh Chih Yen Pien*. [Leprosy in Chinese history]. (Taipei, Taiwan: Department of Public Health, National Taiwan University Medical School, mimeographed c. 1954), 1–107, p. 24 (in Chinese).

<sup>18</sup> Wong, (n. 1), p. 739.

<sup>19</sup> O. K. Skinsnes, "Leprosy in an archeologically recovered bamboo book in China," *Int. J. Lepr.*, 1980, 48, 333. [The terms "Cha, Bing, and Ting" are not proper names, but the equivalent of A, B, and C.]

According to the "Historical Records," *Ts'ao Shi* was also an able administrator and was military governor of Ping Yang (present Lin-Fen county, Shansi province). He had to resign his command and return home after contracting leprosy.<sup>20</sup>

Thus, before the turn of the millenia, Chinese literature contains clear references to a disease described as leprosy and accompanied by social opprobrium similar to that associated with it today.

#### The Common Era (CE) through the T'ang Dynasty (1-906 A.D.)

Two Chinese physicians were approximately contemporaneous with the three Western doctors, Cornelius Celsus (25 B.C. to 37 A.D.), Claudius Galenos (130-201), and Aretaeus Kappadox (c. 200). They had a significant influence on the development of Chinese medicine, just as the above three did on Western practice. They were *Chang Chung-ching* (150-219), and *Hua T'o* (died c. 208). *Chang Chung-ching* is often referred to as the "Hippocrates" of China and *Hua T'o* as China's pre-eminent surgeon.

In his classic book on typhoid and other fevers, the *Shang Han Lun* ("Essay on Typhoid"), *Chang Chung-ching* stated that a person having leprosy has very little hair and eyebrows left and his body is full of sores which have a fishy and stinking smell.<sup>21</sup> This odor of leprosy, now almost forgotten, was well known before the advent of modern chemotherapy and could be alleviated by good nutrition and general care including cleanliness. Father Damien, much later in his report of March 1886 to the Hawaii Board of Health, wrote:

The smell of their filth, mixed with the exhalation of their sores was simply disgusting and unbearable to a new-comer. Many a time . . . I have been compelled not only to close my nostrils but to run outside to breathe the fresh air . . . As an antidote to counteract the bad smell, I made myself accustomed to the use of tobacco, where-

upon the smell of the pipe preserved me somewhat from carrying in my clothes the obnoxious odor of the lepers. At that time the progress of the disease was fearful, and the rate of mortality very high.<sup>22</sup>

In the preface of the *Chia I Ching* ("Acupuncture Classic") by *Huang Fu-mi* (215-282), it is recorded that when *Wang Chung-hsuan*, one of the "Seven Geniuses" of the reign of *Chien An* (177-217), was 20 years old *Chang Chung-ching* said to him, "You are suffering from a disease which will cause your eyebrows to fall when you are forty, and death will follow in half a year's time." *Wang* did not believe the famous physician and ignored his advice. After 20 years his eyebrows fell, and death followed in 187 days.<sup>23</sup>

*Hua T'o* (Fig. 2), who lived during the period of the "Three Kingdoms" (220-265), recorded the use of sutures in his surgery and is widely reputed to have used an anesthetic, perhaps aconite. He is famed in folklore for his operation on the arm of *Kuang Kung*, who was later deified as the God of War and also of Good Fortune, when the latter suffered an arrow wound in battle. *Hua T'o* is also credited with devising the operation for castration. It is reputed that he was finally killed by *Tsao Tsao*, ruler of the State of Wei, but not before he had burned all his books and writings. Apparently relying on this tradition, Wong and Wu<sup>24</sup> state that the two books attributed to him are forgeries, but represent works of an ancient age. Nevertheless, there are two books, the *Nei Chao Tu* ("Reflections of Internal Conditions"), and the *Chung Tsang Ching* ("Internal Organs Text") which, together with a third, the *Hua T'o Sen Yi Pi Ch'uan* ("Hua T'o's Secret Prescriptions"), are generally attributed to him and said to have been smuggled out of his prison. In these, leprosy is described as being of four types: *Ta Ma Feng*, *General Lai*, *Black Lai* and *White Lai*.<sup>25</sup>

<sup>20</sup> Wong, K. Chi-min, "Some famous lepers in Chinese history," *Leprosy Quart.*, 1941, 15, 5-10, p. 6.

<sup>21</sup> *Chang Chung-ching. Shang Han Lun*. [Essay on typhoid]. In: Wang Yun-wu, (n. 2), 1974, Vol. 7, p. 22. Photocopy of Ming dynasty (1593) text in Chinese as edited by Fong Yu-chi.

<sup>22</sup> J. Damien DeVeuster, "A personal experience of thirteen years' residence and labor among the lepers at Kalawao," *Hawaii Board of Health Records, Appendix M*, March, 1886, 60-73, p. 61.

<sup>23</sup> Wong, (n. 20), pp. 6-7.

<sup>24</sup> Wong and Wu, (n. 6), p. 56.

<sup>25</sup> Lai, (n. 17), pp. 26-27.



*Ta Ma Feng*—The symptoms first appear on the skin but the poison is actually stored in the internal organs. The skin is first numb without sensation; gradually red spots appear on it, then it is swollen and ulcerated without any pus. Later the disease develops to such an extent that the eyebrows fall out, the eyes become blind, the lips deformed, and the voice hoarse. The patient may also experience ringing in his ears, and the soles of his feet develop rotted holes; his finger joints may become dislocated and the bridge of his nose flattened. [Lepromatous leprosy]<sup>26</sup>

*General Lai*—All forms of leprosy result from evil pneuma or from having provoked the deities. At first the skin is senseless, but gradually it becomes itchy as if something is running underneath [formication]. It should be treated immediately. [? Early, indeterminate leprosy]

*Black Lai*—At the beginning the symptoms are similar to those mentioned above, but gradually there are purplish-black swellings of the size of a peach found in the skin. Both feet and hands become numb without feeling any pain; the feet cannot step on the ground and then the whole body becomes covered with sores. ["Mixed" neural and lepromatous = ? Borderline leprosy]

*White Lai*—The patient who suffers from this disorder will find his voice hoarse, his vision blurred, all four limbs without sensation and then white spots appear on the skin. The pupil of his eye is gradually covered with white matter and gradually all vision is lost. [Lepromatous leprosy]<sup>27</sup>

Also, during the "Three Kingdoms" period there appeared the account of *Tung Fang*, otherwise named *Chun I*, who was very familiar with Taoism. He lived in isolation on Lu Shan of Yu Chang where he treated sick people every day without collecting any fees. Whenever a severely ill person was cured he was requested to plant five almond trees. If only a slight illness was cured, the request was that only one tree be planted. After several years these trees had



FIG. 2. *Hua T'o* described several forms of leprosy and their clinical characteristics. (Shihwan ceramic figure, c. 1972)

grown into a thick forest and the ripe almonds were exchanged for rice for the poor. At Lu Shan, a person dying of leprosy was carried to *Tung Fang* for treatment.<sup>28</sup>

The epoch of Chinese history (280–589) lying between the end of the "Three Kingdoms" and the beginning of the *Sui* dynasty, and which included the *Tsin* dynasty, was an era of confusion and political disunity with many small contending states. There was little medical progress. Nevertheless, it was during the *Tsin* dynasty that the *Mo Ching* ("Pulse Classic") was compiled by *Wang Shu-ho*, who is generally acknowledged as the greatest authority on the pulse and who lived in about 265–317. A spurious work known as the *Mo Chueh* ("Secrets of the Pulse") was published much later and translated into French by Hervieu, on the

<sup>26</sup> Hua T'o, *Hua To Sen Yi Pi Ch'uan*. [Hua To's secret prescriptions]. (Shen-yang, Liaoning: Liaoning Science and Technology Publisher, 1983), p. 79. Reproduction in Chinese of 1762 text edited by Pang Shin-san from a copy of 682 by Sun Sze-mo.

<sup>27</sup> Hua T'o, (n. 26), pp. 255–256.

<sup>28</sup> Lai, (n. 17), p. 24.



FIG. 3. *Ko Hung*, an alchemist and physician, noted many of the clinical signs of leprosy. He is shown working with an "elixir of life." (Fukien "blanc de chine" figure, c. 1981)

assumption that he was dealing with the original work. This was also mistakenly commented on by *Chang Shih-hsien* of the *Ming* dynasty.<sup>29</sup> In volume eight of the "Pulse Classic" (280), there is a paragraph which states, "The disease can be cured if the *Tsin Yin Chuang* [leprosy] is spread from the mouth to the four limbs, but if it spreads from the four limbs to the mouth, it cannot be cured."<sup>30</sup>

Almost contemporaneous with this work was the *Chou Hou Pei Chi Fang* ("Prescrip-

tions for Emergencies")<sup>31</sup> written by the famous Taoist *Ko Hung* (281–361). It is an eight-volume work dealing with therapeutics and contains perhaps the first authentic description of smallpox. Being an ardent Taoist, *Ko Hung* devoted much time to experimenting with the elixir of life (Fig. 3) and retired into the Lo Fou mountains in Kwangtung province at the age of 81 to continue his studies, although his original home was in Nanking, Kiangsu. In volume five it is stated, "At first the skin is senseless; gradually there is itching as if insects are crawling underneath, and the vision becomes blurred, or black swellings are found in the skin."

In another volume, the *Pao Pu Tzu*, *Ko Hung* tells of a patient named *Chao Ti* who suffered from leprosy for years without finding any cure. Dying, he was relegated with some food to a mountain cave by his son and grandsons. He was so distressed by his misfortune that he cried day and night. After some time a fairy passed the cave, was surprised to find *Chao Ti* there and took pity on him. *Chao Ti* knew that this was not an ordinary mortal and told him of his distress, asking for help. The fairy gave him a packet of medicine and taught him how to take the medicine. After taking it for over a hundred days, *Chao Ti* was completely cured. His skin was again smooth and color was restored to his face. The fairy again came to see him and *Chao Ti*, thanking him, asked for the prescription. The fairy said, "It is only pine cones. There is a great deal of this on the mountain. If it is taken after it has been refined it will make you an immortal."

In a third volume, *Ko Hung* described another patient, a military official named *Tsui Yen* who was suddenly afflicted with leprosy. "His eyes grew dim; he could not distinguish either objects or men. The eyebrows and hair fallen off, the nasal bridge dropped and the skin was covered with sores." Everyone said that it was an evil disease which could not be cured. A Taoist, who refused to give his name, gave *Tsui Yen* a prescription consisting of one or two catties (c. 600–1200 grams) of saponin ground into a powder after repeatedly being steamed

<sup>29</sup> Wong and Wu, (n. 6), p. 83.

<sup>30</sup> Wang Shu-ho, *Mo Ching*. [Secret of the pulse]. (Shanghai: Han Fan Lu Bookstore, n.d.), Vol. 8, p. 24. Reproduction of Sung dynasty (1068) text as edited by Lin I, *et al.*

<sup>31</sup> Wong and Wu, (n. 6), p. 82.

and dried in the sun, to be taken together with rhubarb solution. Following this treatment the hair grew again and the patient was considered cured.<sup>32</sup>

Pine cones and saponin are still part of the Chinese pharmacopeia, the latter for the treatment of scrofulous swellings and severe ulcers and the former has been listed as useful in leprosy.

As part of this period of political confusion, which was essentially a struggle between the Tartars in the north and the Chinese in the south, a usurper named *Hsiao Yen* took the dynastic title of *Wu Ti* and set up a Chinese dynasty named the *Liang* (502–557). *Wu Ti* was favorably inclined to learning and established Confucian schools throughout the country. He had an extremely learned scholar, *Chou Hsing-ssu* (died 521), as a minister. This minister first suffered from abscesses on both hands. Within the year he was diagnosed as having leprosy and his left eye became blind. The king went to console him and, stroking his hand, repeated the statement of Confucius, "That such a man should have such a disease."<sup>33</sup>

In 589 *Yang Chien*, known to posterity as *Kao Tsu* or *Wen Ti*, who, although he had been in the employ of the Northern Tartar Kingdom, was a Chinese by birth, seized the throne and established over the whole country a new dynasty known as the *Sui* (589–618). This was followed by the *T'ang* dynasty (619–907), and the whole country was once more united under the rule of the Chinese.

In 610 a famous work on pathology, the *Ch'ao Shih Pin Yuan* ("Chao's Pathology") was compiled by a committee of physicians having *Ch'ao Yuan-fang* at its head and issued under imperial orders. The work comprises 50 volumes, divided into 67 headings with 1720 chapters. Later, in the *Sung* dynasty, this was used as a textbook for state medical examinations. It was influential in Korea and Japan. Not much is known about the life of *Ch'ao Yuan-fang* (Fig. 4) except that he was an Imperial physician of the *Sui* dynasty in the Imperial Medical Academy,



FIG. 4. *Ch'ao Yuan-fang*, pathologist, who suggested that leprosy was caused by "worms." (Painting by Johnny Shek, after a Hakim M. Said illustration)

that he was a native of Chang-an, Shensi, and lived in 550–630.<sup>34, 35</sup> An account of leprosy is found in his book which states:<sup>36</sup>

The disease of *Ta Feng* is caused by having absorbed water during perspiration; or when cold water has entered the muscles; of sleeping on wet ground after drinking wine; or lying or sitting beneath a tree or on wet grass when there is a draught; or having itching sores that do not heal. [It is also stated that fish without gills should not be eaten because this will cause leprosy.]

<sup>34</sup> Wong and Wu, (n. 6), pp. 83.

<sup>35</sup> Shanghai Chinese Medical School Traditional Medicine Study Committee, *Ku Tai I Hsueh Wen Hsuan*. [Selected topics from ancient Chinese medicine]. (Shanghai: Science and Technology Publisher, 1980), p. 72 (in Chinese).

<sup>36</sup> *Ch'ao Yuan-fang, Ch'ao Shih Pin Yuan*. [Chao's pathology]. In: Ch'ou Hsueh-hai, ed., *Chu Bing Yuan Hou Lin*. [Diagnosis of disease]. (Beijing: People's Health Publisher, 1955), Vol. 2, pp. 14–16. Reproduction of 1891 Chinese text.

<sup>32</sup> Lai, (n. 17), p. 28.

<sup>33</sup> Wong, (n. 20), p. 7.

All kinds of leprosy are the result of evil pneuma. In the beginning the skin has lost all sensation; gradually the patient feels worms moving under his skin [formication]; then his vision becomes obscure. This disease should be treated at its very beginning.

The symptoms of this disease in the early beginnings are not noticeable, but if not treated in time the person may find himself unable to perspire, his four limbs ache, and his whole body tingles. If he scratches, sores may be formed. Or he may be unable to move his four limbs, his eyes swollen, his urine reddish-yellow and his face pallid.

If the poisonous worms eat the person's liver his eyebrows will fall off, if they eat the lungs the bridge of his nose will be deformed or little lumps of flesh will grow in the nostrils thus causing difficulty in breathing; when they eat the spleen the voice becomes hoarse; when they consume the kidneys the ears will ring with drumming noises; if they destroy the muscles the joints will be dislocated; when they attack the skin and flesh the patient will not feel pain. If the symptoms of the disease start from the head and face it is called the *Shun Fung* ("With the wind"); if it starts in the feet it is called *Ni Fung* ("Against the wind").

This description reflects the Chinese concept of external relationships with the various viscerae which is the basis of acupuncture. It also presents the first statement of "worms" causing the disease. This concept may have been suggested by the presence of formication which is not uncommon in leprosy and which was also noted by *Hua T'o*<sup>26</sup> and *Ko Hung*.<sup>32</sup> The microscope not having been invented, the germ theory of disease was unknown. For its time this was a remarkably close approximation. The bacillus, or "microscopic worm," which is the cause of leprosy was not discovered until 1873 by Hansen in Norway. The earliest of the microscopists was Athanasius Kircher (1602-1680) of Fulda, Germany, who was probably the first to employ the microscope in investigating the causes of disease. Interestingly, it is said that he found that the blood of plague patients was filled with a

countless brood of "worms" not perceptible to the naked eye.<sup>37</sup>

*Sun Sze-mo* (581-682) was a native from the southeast of the present Yao Hsien, Shensi. He authored the *Pei Chi Chien Chin Yao Fang* (627) ("Thousand Golden Remedies for Emergencies") which is a general encyclopedia of medicine in 30 volumes. A supplement, the *Ch'ien Chin I Fang* in which are several chapters on incantation and magic, was written 30 years later. He also wrote of "worms" causing leprosy, quoting *Chao Yuan-fang*. The twenty-third volume of the original set contains one essay with ten prescriptions and the supplement has seven short discussions with eleven prescriptions. Wong's<sup>38</sup> literal translation of a portion of one of the essays follows.

There are several varieties of leprosy and the symptoms in each case vary. In some varieties the eyebrows and beard drop off and there may be no other signs. Others have sores all over the body and yet the eyebrows and beard remain intact. Some look like normal people but the extremities and back have indurated spots. In severe cases the fingers and toes drop off. Some have violent chills; heavy clothing will not make them warm. Some have slight fever and are afraid of cold. In some the body may be dry and wrinkled, while in others there is incessant sweating and copious secretions. Some feel intense suffering night and day, while others are so numb that they cannot feel anything.

The color also varies with different persons. Some are green, others yellow, purple, white, black, shiny and dull. Although the symptoms are different, the results of treatment depend more on the patient than on the doctor. For once a person contracts the disease, be he clever or stupid, it is very difficult to make them understand. Invariably, they will refuse to take the doctor's full advice, but rather pin their hope on drugs alone. Therefore, I say that the prog-

<sup>37</sup> Fielding H. Garrison, *An introduction to the history of medicine*. (Philadelphia, 1929), p. 252.

<sup>38</sup> Wong K. Chi-min, "Sun Szu-mo, the first Chinese leprologist," *Leper Quart.*, 1939, 13, 66-74, p. 70.



nosis depends rather on the patient himself and not on his treatment. I have treated more than 600 cases, with only ten percent cures. And all these cured cases I nursed personally. So when treating such patients it is necessary to give the most explicit directions. If they decline to listen to advice, it is better to refuse to treat them, for in the long run the disease will be incurable and it will be a waste of energy.<sup>39</sup>

This author also indicated that persons who suffer with leprosy (lepromatous) may not live more than ten years and some die within five or six years.

Wang Tao, although not himself a physician but an official, wrote the *Wei Tai Pi Yao* ("Medical Secrets of an Official"), published in 752, after diligent work at the Hung Wen Library where he had available several thousand reference works. Many newly recorded methods of treatment had been introduced as a result of influences from India, but no significant new treatment was available for leprosy. Wang Tao had no faith in acupuncture, holding that its techniques had been lost. Hence he omitted this from the treatments he recommended. Volume 30 deals with leprosy and in it a well known prescription repeated by the author was made up of *Siao Shih* (potassium nitrate) refined into medicine and mixed with *Sheng Wu Ma You* (raw black sesame oil). Before taking this medicine the patient should be made to sweat in a warm room.<sup>40</sup>

In the *Yiu Yang Miscellany*, written by Tuan Ching-shih of the T'ang dynasty (618–906), it is recorded that Tsui Chang-hsin, a cousin of Li Shu, had leprosy. Li had no beard or whiskers and people called him the "natural eunuch." One day Tsui said, jokingly, to Li, "I'll teach you how to raise a beard. Just bore some holes in your lip and plant them with hairs." "A good prescription," replied Li. "Try this on your eye-

brows first and when I see the results I will follow your example." Both men lived in the Northern *Chi* (479–501) period.<sup>41</sup>

Finally, there lived in the latter part of the T'ang dynasty one of the four great beauties of Chinese history. Yang Kuei-fei (*Kuei-fei* = Precious Consort) was coopted into the harem of Emperor Hsuan Tsung from the harem of his eighteenth son in 745, when the emperor was about 60 and she about 26 years old. He fell completely under her influence and she encouraged him in a life of extravagance and pleasure, leading to the neglect of his imperial duties. An Lu-shan, who had risen to power by repressing some of the raids of the Khitans and had become a favorite of the Emperor and Yang Kuei-fei, organized a revolt in the northeast and obtained mastery of the country north of the Yellow River. He proclaimed himself Emperor and Hsuan Tsung was compelled to flee from Changan to Szechuan. On 13 July 756, a small imperial cortege with a troop escort secretly abandoned the city ahead of the victorious rebel army and arrived at Ma-wei on the second day. The Emperor's troops demanded the death of Yang Kuei-fei, being under the apprehension that she was causing Hsuan Tsung to neglect affairs of state. The Emperor granted her wish that she be strangled before a Buddhist chapel. Her death put an end to the troop insurrection and the soldiers, after viewing her corpse, swore eternal allegiance to the T'ang dynasty.<sup>42</sup>

However, in the folklore of South China, leprosy opprobrium has the effect of changing the ending of the account. There it is commonly said that, as the flight continued, the soldiers were enamored by the beautiful body of Yang Kuei-fei lying by the roadside and had sexual congress with it. All who did so are said to have developed leprosy and this is said to be the origin of this disease.<sup>43</sup>

#### Treatment by segregation

The account of *Pai Niu* suggests that segregation, probably because of disfigure-

<sup>39</sup> Sun Sze-mo, *Pei Chi Ch'ien Chin Yao Fang*. [Thousand golden remedies for emergencies]. (Beijing: People's Health Publisher, 1955), Vol. 23, p. 427. Reproduction of Northern Sung dynasty (1123) Chinese text.

<sup>40</sup> Wang Tao, *Wei Tai Pi Yao Fang*. [Medical secrets of an official]. In: Wang Yun-wu, (n. 2), 1974, Vol. 30, p. 61. Photocopy of Chinese Tang dynasty (618–906) text.

<sup>41</sup> Wong, (n. 20), p. 7.

<sup>42</sup> Howard S. Levy, *Harem favorites of an illustrious celestial* (Taichung, Taiwan, 1958), pp. 116–121.

<sup>43</sup> O. K. Skinsnes, "Leprosy in society. I. Leprosy has appeared on the face," *Lepr. Rev.*, 1964, 35, 21–35, p. 23.

ment, was practiced at the time of Confucius—perhaps not generally but at least selectively for important personages.

In the period of the "Three Kingdoms," *Tung Fang* treated those living at Lu Shan, a famous mountain probably the one of this name in Kiangsi.

In the *Chin* dynasty, *Chao Ti* was sent off to a mountain cave because of his illness, as was also the case with *Lu Chao-lin* of the *T'ang* dynasty, who was required to move to the mountain Chu Tzu Shan, located in Honan, where there was a colony.

*Narendryasas*, Chinese name *La-lin-ti-li-ye-sha*, an Indian monk who died in China in 589, established *Li-yen-fang* (houses for those with leprosy), divided into male and female quarters, and provided the inmates with adequate food. This was at Changan, Shensi, which was the capital of the *Sui* dynasty.<sup>44</sup>

*Sun Sze-mo*, also from Shensi province, treated 600 patients. There must have been available a concentration of a considerable number of patients, perhaps from the facility established by *Narendryasas*. He recorded that there were nearly 100 persons who left their earthly possessions to live as Taoists because they suffered from an evil disease.<sup>39</sup>

It is further recorded that the Buddhist monk, *Si Tsi-yen*, who died in 654, went to "Stone City" (near the present Nanking, the ancient name for which was "Stone City") to preach. He stayed in the homes of those who had leprosy, took care of the patients, washed their wounds, and did everything he could for them. He died in a leprosy home, but it is not recorded whether or not he had leprosy.<sup>44</sup> Perhaps he was an unsung equivalent of Hawaii's Father Damien.

In a *T'ang* book, the *Wu Chung Kee*, it is recorded that as from the reign of Empress *Wu-hau* (684–704), *Li Yen Fang* (leprosy homes) were cared for by monks. At the same time, she also established government officials to administer affairs concerning leprosy. During the *Sung* and *Yuan* dynasties there also were government officials appointed to deal with leprosy problems.<sup>45</sup>

<sup>44</sup> Fan Hsian-chun, *Chung Kao Yu Fang I Hsueh Szu Hsian Shih*. [Principles of the history of preventive medicine in China]. (Beijing: People's Health Publisher, 1955), p. 87 (in Chinese).

<sup>45</sup> Lai, (n. 17), p. 40.

Then, also in the *T'ang* dynasty, at the time of the famous general *Kao Pien* (died 887), whose home was in Yangchow, there is recorded the account of a Taoist who had been sentenced to death for having set fire to several thousand houses. *Kao Pien* was minister of Wei Yang (presently Yangchow). The culprit said to the executioner, "I have a little knowledge which may be beneficial to the people. If this could be handed down I would face death without regret." Hearing this, *Kao Pien* personally came to make inquiries. The culprit said, "I have no other knowledge than the skill to cure leprosy." When asked how he could prove this he replied, "I could try my skill on one of the most serious sufferers from leprosy at *Fu Tien Yuan*." The account does not indicate whether or not he was successful. Its importance lies in the fact that the Chinese characters for *Fu Tien Yuan* refer to the rough garments worn by Buddhist monks, raising the supposition that this referred to a charitable Buddhist home of that name, probably located near Yangchow, where leprosy patients were cared for.<sup>46</sup>

#### **Chien Chen (Japanese: Kanjin; Pinyin: Jianzhen)**

The famous monk *Chien Chen* (688–763) made five unsuccessful attempts to reach Japan from his home in Yangchow after having been invited by the Japanese monks *Eiei* and *Fusyo*. On his sixth successful voyage he became blind, perhaps from closed angle glaucoma.<sup>47</sup> While in Yangchow he was widely known for his charitable works in caring for the poor. While in Nara, Japan, he was medical consultant to the Empress *Komyo* whose tragic life led her to have a major interest in the care of leprosy patients.<sup>48</sup> He spent ten years in Japan and wrote many medical books. The Japanese worshipped *Kanjin* as the ancestor of medicine. With *Ko Hung* having worked earlier in Kiangsu, with the record of a leprosarium

<sup>46</sup> Ming Chiang-kuan, *Ming I Lui An*. [Famous physicians' medical records]. In: Wang Yun-wu, (n. 2), 1976, Vol. 9, p. 47. Photocopy of Ming dynasty (1549) Chinese text.

<sup>47</sup> Chen Yao-zhen (Eugene Chan), "The courageous and brilliant blind monk Jianshen," *Chinese Med. J.*, 1980, 93, 130–133.

<sup>48</sup> O. K. Skinsnes, "History, art and a congress meet in Tokyo," *Int. J. Lepr.* 1972, 40, 306–309.

located in the Nanking District (near Yangchow) and with the record of a *Fu Tien Yuan* being in Yangchow, which was his home, and finally with his association with Empress *Komyo*, it would be surprising if this humanitarian monk was not involved in leprosy work. Thus far, however, no records have been found of such work.

### Summary through the T'ang Dynasty

In the absence of specific information regarding the distribution of leprosy in China, it is possible to make a determination on the basis of where the evidence of leprosy was found, on the residences of the physician who wrote of the disease, and on the recorded location of leprosy asylums. This has been done in Figure 5. It is evident that leprosy was prevalent in the area where the Chinese empire first developed since that is where the records were made. There are no records as to the presence or absence of leprosy in the areas regarded as underdeveloped, although the presence of leprosy in the southwestern, southern, and southeastern parts of the country is generally regarded as having occurred early due to commerce between these areas and southwest Asia. It is, however, of interest that the area of the recorded prevalence in these ancient times is, for the most part, the area of relative absence of leprosy in later times.

Table 2 demonstrates the early development of diagnostic observations for leprosy. It is evident that the clinical characteristics of leprosy were recognized in the earliest records.

### Use of chaulmoogra oil in China

Chaulmoogra oil is obtained from the seed of the *Hydnocarpus* tree which is native to Thailand. It is also common in Cambodia, Malaysia, Assam, the Indian Archipelago, and other parts of eastern India. Chaulmoogra is the Indian vernacular for the drug. The Burmese call it *Kalaw*; in Thailand, it is known as *Lentam*; and in China it is known as *Ta Feng Tzu*.<sup>49</sup> It was probably introduced into China in the Southern Sung period (1127–1278). *Ta Feng Tzu* refers to the seeds and *Ta Feng Yao* to the oil.

*Chau Ta-kuan*, after a trip to Cambodia together with the Chinese Ambassador in



FIG. 5. Pre-Sung dynasty distribution of leprosy in China based on available records. (Painting by Johnny Shek)

1295–1297, described the fruit in his *Chen Lai Chi* ("Diary of Cambodia") as being shaped like a coconut and having a seed that is white when fresh but turning yellow as it becomes stale and useless as a medicine.<sup>50</sup> *Chu Chen-heng* (1281–1358; alias *Chu Tan-chi* or *Tan-chi*) in his *Tan Chi Chuan Yao* ("Tan Chi's Collected Important Records") was the first to record the use of the oil and stated that many herbalists often used *Ta Feng Tzu* oil in their prescriptions, but since they were not aware that the nature of the oil is very hot and it is very harmful to the blood, many patients became blind just when the disease was beginning to get better.<sup>49</sup> *Hsueh Li-chai*'s (1488–1558) *Lei Yang Chi Yao* ("Confidential Text Regarding Malign Ulcers"), written in the Ming dynasty, indicated that *Ta Feng Tzu* was used in the treatment of all kinds of sores;<sup>51</sup> while *Miao Hsi-yung* (died 1627, alias *Miao Chung-chuan*), native of Changshu, Kiangsu, in his *Pen Ts'ao Ching Shu* ("Simplified Herbal

<sup>50</sup> *Ts'u Hai*. [Chinese encyclopedia]. (Shanghai: Encyclopedia Publisher, 1979), p. 459.

<sup>51</sup> *Lai*, (n. 17), pp. 66–67.

<sup>49</sup> Wong and Wu, (n. 6), pp. 114–115.

TABLE 2. Signs and symptoms of leprosy recognized in China throughout the T'ang dynasty.

RECORDING BOOKS & PHYSICIANS	IDENTIFICATION OF LEPROSY IN ANCIENT CHINA										
	BAD BREATH	NASAL INVOLVEMENT	HOARSENESS	EYEBROW LOSS	EYE INVOLVEMENT	LEPROMA NODULES	DE- OR HYPER- PIGMENTATION	PERSPIRATION LOSS	ANESTHESIA	LIMB PARALYSIS	DEFORMED LIMBS ULCERS
NEI-CHING * 6TH CENT B.C. +	+	+		+			+		+	+	+
PIEN CHIAO 3RD CENT B.C.					+			+			+
HUPEH * BAMBOO BOOK 217 B.C.		+	+	+						+	
CHANG CHUNG- CHING 150-219 A.D.				+							+
HUA T'ao 190-265 A.D.		+	+	+	+	+		+	+	+	+
Ko HUNG 253-333 A.D.		+		+	+	+		+			+
CHAO YÜAN- FANG 550-630 A.D.		+	+		+		+	+	+	+	+
SUN SZU-MO 581-682 A.D.				+		+				+	+
* BOOKS. THESE AND THE PHYSICIANS ALL USED TERMS RECOGNIZED AS LEPROSY.											

Text"), also indicated that the drug was used for leprosy, ringworm and all kinds of sores. It also noted that *Ta Feng Tzu* had a "bitter taste and its nature is hot and poisonous."<sup>52</sup>

<sup>52</sup> Chou Tze-lin, *Pen Ts'ao Yung Fa Yen Chiu*. [Applications of the great herbal]. (Shanghai: China Book Company, 1951), pp. 932-933.

*Li Shih-chen* (1518-1593) stated in the *Pen-Ts'ao Kang-mu* ("The Great Herbal"), that the chaulmoogra fruit could be found in Hainan Island. This work describes the preparation of *Ta Feng Yao* as follows:

Take three catties of the seeds, discard those that have turned yellow, re-



move the husks and grind into a fine powder. Pack in earthenware jar and seal up tightly. Put the jar into a pot of boiling water and seal the pot so that no steam can escape. Boil until the oil assumes a black and tar-like appearance. It is administered in the following way:

Chaulmoogra oil      1 ounce

Saphoro flavescens    3 ounces

Mix into a paste with wine and make into pills the size of a *stercula* seed.

Sig: Take 50 pills with hot wine before meals.<sup>53, 54</sup>

#### Developments from the Sung through the Ch'ing Dynasties (907-1911)

Much of the writing related to leprosy during this period was concerned with treatment or with largely repetitious statements of prior descriptions of this disease. The large number of prescriptions tried will not be reviewed since none of them have proven to be of significant value. There were, however, a number of reports of changing ideas or reports which represent the thinking during this period.

A hint of opprobrium is contained in the following account. *Liu Pan* was a poet and humorist, and a friend of the famous poet *Su Tung-po* (1037-1101) of the *Sung* dynasty. His eyebrows and whiskers had fallen off and his nose had collapsed. One day he dined with *Su Tung-po* and other friends. Everyone had to quote a humorous passage from the classics so *Su Tung-po* plagiarized a familiar poem, substituting a few characters so it read, "Oh! the great wind: the eyebrows flown. Where to find a strong man to guard my nose!" The crowd roared with laughter, to *Liu's* annoyance. His legs also were affected and he had difficulty in walking.<sup>55</sup>

*Chen Yen*, in his *San Yin Fang* ("Three Diagnostic Principles," 1174), held that all diseases resulted from one of three causes: a) external causes, b) internal causes, and c) neither external nor internal causes. Leprosy was held to be in the third category and

*Chen Yen* was the first to suggest that it is an infectious disease.<sup>56</sup>

*Chang Chung-cheng*, also known as *Chang Tse-ho*, was a skillful physician, a native of Honan province who lived in 1156-1228, and recorded the case of a patient.

*Chang Tzu-pe* had been suffering from leprosy for more than ten years. His hair and eye-brows had all fallen off and his skin was hard and dry like the bark of a tree. He was put in a blazing hot room and an herbal, *Er Sheng San*, administered. The patient sweated as if he were floating in water. The perspiration was sticky and had an awful, stinking smell. His sputum smelled like the saliva of fish and there was perspiration under his two feet. He was then given two other herbals several times and was cured.<sup>57</sup>

*Chu Chen-heng* (1281-1358), a native of Ching Hua Hsien, Chekiang, who traveled in Kiangsu and Anhui, was also known as *Chu Tan Chi* or *Tan Chi*, as noted above. In his *Pen Ts'ao Yien I Pu I* ("Revision of the Great Herbal"), written during the Mongol *Yuan* dynasty, he utilized a "Five deaths" classification for leprosy: a) skin death, when the skin is numb and senseless; b) pulse death, when blood may form pus; c) flesh death, when the flesh is without pain when cut; d) muscle death, when the four limbs are without strength; and e) bone death, when the nasal bridge is flattened. If any of these "deaths" is found, the disease cannot be cured.<sup>58</sup> Possibly, "cure" in these instances meant restoration to normal. He first recorded the use of chaulmoogra oil but disapproved of its use because of the irritating effect of the stomach.<sup>53</sup>

With the *Ming* dynasty (1368-1643), the tempo of contact with the West began to speed up, but the medical literature shows no significant Western influence and con-

<sup>53</sup> Wong and Wu, (n. 6), p. 211.

<sup>54</sup> Li Shih-chen, *Pen Ts'ao Kang Mu*. [The great herbal]. (Shanghai: Commercial Press, 1930), Book 5, Vol. 35, p. 68. Reproduction of original Chinese text of 1578.

<sup>55</sup> Wong, (n. 20), p. 9.

<sup>56</sup> Chen Yen, *San Yin Fang*. [Three diagnostic principles]. In: Wang Yun-wu, (n. 2), 1973, Vol. 15, p. 22. Photocopy of Ching dynasty (1775) text.

<sup>57</sup> Chang Chung-cheng, *Yu Men Tzu Chin*. [Medical care of patients]. In: Wang Yun-wu, (n. 2), 1978, Vol. 6, p. 5. Photocopy of Ming dynasty (1541) Chinese text edited by Shao Fu from 1228 original copy by Chang Chung-cheng.

<sup>58</sup> Lai, (n. 17), pp. 47-48.

cepts concerning leprosy did not change significantly. The area of China firmly under the control of the central government had expanded greatly.

*Hsueh Li Chai*, alias *Hsueh Chi*, was an Imperial physician during the reign of *Cheng Te* (1506–1521). The *Hsueh Shi I An* (completed in 1554) is his collection of works including surgery, medicine, obstetrics, pediatrics, etc. One set of three volumes is the *Lei Yang Chi Yao* ("Confidential Text Regarding Malign Ulcers"), which has a chapter on "treatment of leprosy." *Hsueh Li Chai* wrote that "Lepers are found mostly in Honan, Fukien and Kwangtung." He noted that chaulmoogra oil was an important medicine for treating all kinds of sores.

*Hsueh Li Chai* noted that leprosy does not only infect one organ but by the blood circulation may cause secondary infections in other viscerae (bacillema?). It may take many years for the lesions to appear. Before treatment good nourishment should be provided so as to build up the health of the patient.

If an accumulation of bad blood is noticed in the skin it should be bled with a stone probe (an arrowhead-like instrument), while for infections of internal organs laxatives should be used. For lesions chiefly in the upper trunk, the interphalangeal spaces and cubital areas might be bled or the "Drunken Goddess Powder" used to drive the contaminated blood from between the tooth spaces. For lesions on the lower trunk, the stone probe was used in the intertarsal spaces and "reconstructed powder" was taken to let the "worms" pass out through the digestive system. Bleeding should be done once or twice daily until fresh blood flow is obtained.

He noted that mercury powder was commonly used in leprosy treatment. However, a number of side effects occurred, such as stomach pain and diarrhea with discharge of large amounts of mucosubstances in the feces, pain and swelling of the tongue and mouth with increased secretion of saliva accompanied by thirst, bleeding from the mouth with fever and constipation, exhaustion of salivary flow with tongue and mouth still uncomfortable and with continuing thirst. For each of these complications a remedy was provided. Imbalance of the pneuma will cause the "worms" to grow

in the internal organs and then break through to the body surface.

The causes of nonresponding cases were given as: a) improper nutrition and exercise, b) injury to internal organs by secondary infection, c) loss of blood through over-treatment, and d) failure to follow the doctor's instructions, or refusal to take medicine. The causes of relapse are noted as: a) failure to control the diet, b) failure to control sexual activities, c) failure to control temper and emotions, d) a residue of toxic pneuma causing secondary infection, and e) imbalance in the "six airs," e.g., wind, cold, heat, wetness, dryness, and fire.<sup>59</sup>

The *Tung I Pao Chien* ("Eastern Medical Treasury"), compiled by Imperial physicians of the *Ming* dynasty, relates three causes of leprosy, namely: a) the "luck" of the place (*Feng-shui*), e.g., a grave or a house which brings bad luck, b) direct transmission of infection from parents, husband, wife, or other members of the family, and c) infective fomites, such as are associated with public lavatories, bedding, and clothing.<sup>60</sup>

The *Ch'ing* dynasty (1644–1911) produced a tremendous volume of medical literature including extensive compendiums with medical subsections such as the *K'u Chin T'u Shu Chi Cheng* ("Library Collections, Ancient and Modern"). This work, printed in 1726, consisted of 5000 volumes and contained three times as much material as the *Encyclopedia Britannica* of the 1930s.<sup>61</sup> This period was, nevertheless, a time of decline in indigenous medical practices. Thus, while there were medical schools throughout the empire in *T'ang* and *Sung* times, there now existed only the Imperial College of Physicians in Peking which concerned itself with the training of physicians for the Imperial family. There being no supervision or licensure of the profession, virtually anyone who would spend a short time perusing some medical work, or who inherited a few medical prescriptions, could

<sup>59</sup> Shanghai Traditional Medicine Study Committee, (n. 35), pp. 165–168.

<sup>60</sup> Hsu Tsun, *Tung I Pao Chien*. [Eastern medical treasury]. (Seoul, Korea: Nan Shang Tang Book Company, 1976), pp. 556–557. Reproduction of Ching dynasty (1766) text in Chinese.

<sup>61</sup> Wong and Wu, (n. 6), p. 169.

set up practice. The better trained practitioners obtained their knowledge by serving as apprentices to established physicians, and there was a strong tendency to keep medical observations and successful treatments as secrets within the clan. The most favored practitioners were those with the longest family history in the art.<sup>62</sup> There were, of course, physicians who wrote their own works.

Under these conditions there was little opportunity for significant medical advances and the concepts regarding leprosy showed little change from those of preceding times. A complete review of the writings of this period is not feasible but a few references will illustrate the continuing thread of thought respecting leprosy.

Hitherto medical writers invariably compiled from the works of ancient writers, never daring to correct the errors or criticize the teachings of the old masters. As a parallel it is recalled that "Up to the time of Vesalius (1514–1564), European medicine was one vast *argumentatum ad hominem* in which everything relating to anatomy and physiology, as well as disease, was referred back to Galen as the final authority from whom there could be no appeal. After his death, European medicine remained at a dead level for nearly fourteen centuries."<sup>63</sup>

*Yu Chang* had the rare courage to express his own opinions freely, a characteristic not evident, however, in his brief statement regarding leprosy. He was a native of Hsien Chien, Kiangsi, but made his career in Ch'ang-shu, Kiangsu. He died at the age of 80 in about 1690 and was buried at Nanchang, Kiangsi, where his grave was still to be seen in the 1930s just outside the city by the side of *Lu Tso's* temple.<sup>64</sup>

*Yu Chang* (1585–1664) in the *I Men Fa Lu* ("Standard Methods in Medicine") discussed three treatments for leprosy. The first recommended was chaulmoogra oil as being best for killing the leprosy "worms." The second was the "Drunken Goddess Powder" consisting of a 1.5 ounce mixture of seven herbs together with 0.2 ounce of mercuric chloride. However, he stated that if

this was taken internally it would cause the teeth to fall out before the leprosy was cured. The third method consisted of sulfur elixir in wine, of which he wrote, "Its taking will cause the head to burst!" All medicines for the treatment of leprosy must be taken in appropriate dosage. If too little the disease will not be cured; if too much, the disease may be cured but the overdose effect may be more harmful to the body than the disease.<sup>65</sup>

In the fourth year (1740) of the reign of Emperor *Ch'ien Lung*, 80 writers under the Imperial physicians *Wagt Ping* and *Wu Chien* began the compilation of the *I Tsung Chin Chien* ("Golden Mirror of Medicine"), which was issued in 1749. It consists of two major sections, one on internal medicine and the second on general surgery. The work is predominantly a compilation of extracts, revisions, corrections, and summaries of earlier medical writings and was accepted as a standard authoritative work on Chinese medicine.<sup>66</sup> It lists three causes of leprosy: a) climate of areas too thickly populated, b) direct infection from persons with leprosy, or filthy conditions of public lavatories and houses, and uncleanness of bedding and clothing, and c) neglect of personal health such as catching cold while bathing, sleeping in the open air or on wet ground so that poisonous air (mal-air) could enter the body.<sup>67</sup>

There were individual physicians writing who had fresh ideas. Two of these were *Siao Hsiao-ting* and *Ku Shih-cheng*. *Siao Hsiao-ting* was a native of Chian, Kiangsi, whose book the *Fung Man Tsuan Shu* ("Handbook of Leprosy")<sup>68</sup> was completed in the summer of 1796, but was not published until 1845. It is not known where he practiced. During the interval between its writing and publication, it accumulated five prefaces by would-be publishers. The third of these, written in 1832, notes that during the time

<sup>65</sup> Yu Chang, *I Men Fa Lu*. [Standard methods in medicine]. In: Wang Yun-wu, (n. 2), 1971, Vol. 5, pp. 29–30. Photocopy of Ching dynasty (1781) Chinese text.

<sup>66</sup> Wong and Wu, (n. 6), p. 172.

<sup>67</sup> Lai, (n. 17), p. 59.

<sup>68</sup> Siao Hsiao-ting, *Fung Man Tsuan Shu*. [Handbook of leprosy]. (Shanghai: Health and Science Technology Publisher, 1959), pp. 3–4. Reproduction of Ch'ing dynasty (1845) Chinese text.

<sup>62</sup> Wong and Wu, (n. 6), pp. 141–143.

<sup>63</sup> Garrison, (n. 37), p. 113.

<sup>64</sup> Wong and Nu, (n. 6), p. 147.

of the Emperors *Ch'ien Lung* (1736–1796) and *Chia Ching* (1796–1820) leprosy was rarely seen in Kiangsi province but “nowadays (1845) we can find it among villagers here and there within a circumference of five to ten miles.” It has been noted in Figure 5 that there were no records of leprosy in Kiangsi, save for the refuge at Lu Shan. Lu Shan, however, was just across the Yangtze River and probably was an outpost receiving persons having leprosy from the North. If this be so, then it suggests the spread of the disease to a new area of low resistance, much as was the experience of Hawaii at about the same time, and a little later for Nauru. In the fifth preface it is noted that:

*Ho Sze-ch'ing* of Kwangtung, who was a publisher and also interested in medicine, after carefully reading this book was surprised at such a wonderfully detailed book. Since he knew there were many leprosy patients in Kwangtung, he rapidly put it into print in large numbers. While editing the book into a simplified and clearly understandable form, he cured a family of three who had leprosy.

*Siao's* concept of the contagiousness of leprosy is given by his statement, “Do not share the same utensils, do not eat together and use separate beds.” He also proposed a classification of 36 types of leprosy and leprosy-like conditions. This can be regarded as an early attempt at differential diagnosis. Figure 6 reproduces some of his illustrations. Numbers 1, 2, 10, 13–17, 19, and 36 he called true leprosy, and most of these involving loss of eyebrows and widespread nodularity suggested that the lepromatous form of the disease was the type concerned. Indeed, this has been the case with all the references reviewed. It seems that it was the lepromatous type that was the source of the opprobrium noted. This is consonant with the general public reaction up to the present where there is little fear expressed of the tuberculoid variety unless markedly deformed. In those classified as leprosy-like, there are descriptions, notably number 18, which may well have represented tuberculoid leprosy, or as it was then known in the West, neural leprosy. This was termed “chicken claw feng.” Its description reads,

“Because of many years of illness, blood does not flow efficiently. There is loss of sensation and all the fingers are curled like a chicken claw.”<sup>69</sup>

*Ku Shih-cheng's* family had been involved in the practice of medicine for three generations when he completed the *Yang I Ta Tsuan* (“Complete Treatise on Ulcerative Disease”). It comprised 40 volumes, one of which was devoted to leprosy, and it was completed in 1760, also during the reign of *Ch'ien Lung*. In this work he declares that leprosy does not manifest itself in some people until middle age, but that it does occur in adolescence and, in some, appears as early as in infancy. It was opined that when the disease becomes manifest during middle age its cause is probably due to over-indulgence in sexual congress thus leaving the body weak and without resistance to disease. When leprosy appears in adolescence it does so because the body is not fully developed and negligence on the part of the parents with respect to the child's health makes the body further susceptible to disease. Once leprosy develops in such an adolescent it progresses so rapidly that only four or five out of 100 afflicted will survive. When the disease occurs in a child four or five years of age, it is even worse for then it is congenital and entirely the fault of the parents.<sup>70</sup>

### Summary through the Ch'ing Dynasty

Thus, by the reigns of Emperors *Chia Ching* (1796–1820) and *Tao Kuang* (1821–1850), the diagnosis of lepromatous leprosy had long been firmly established and there was more than a hint of recognition of tuberculoid disease. Leprosy was regarded as a systemic disease rather than an affliction involving only skin and nerves for, as *Hua T'o* wrote, “The symptoms first appear on the skin but the poison is actually stored in the internal organs.” Chaulmoogra oil and many other treatments were in use. There was a recognition and constant reiteration of the value of good nutrition and promotion of good health, and there were claims of cure, approximating ten percent. Leprosy was recognized as being contagious, and the

<sup>69</sup> Siao, (n. 68), pp. 8–20.

<sup>70</sup> Lai, (n. 17), p. 60.



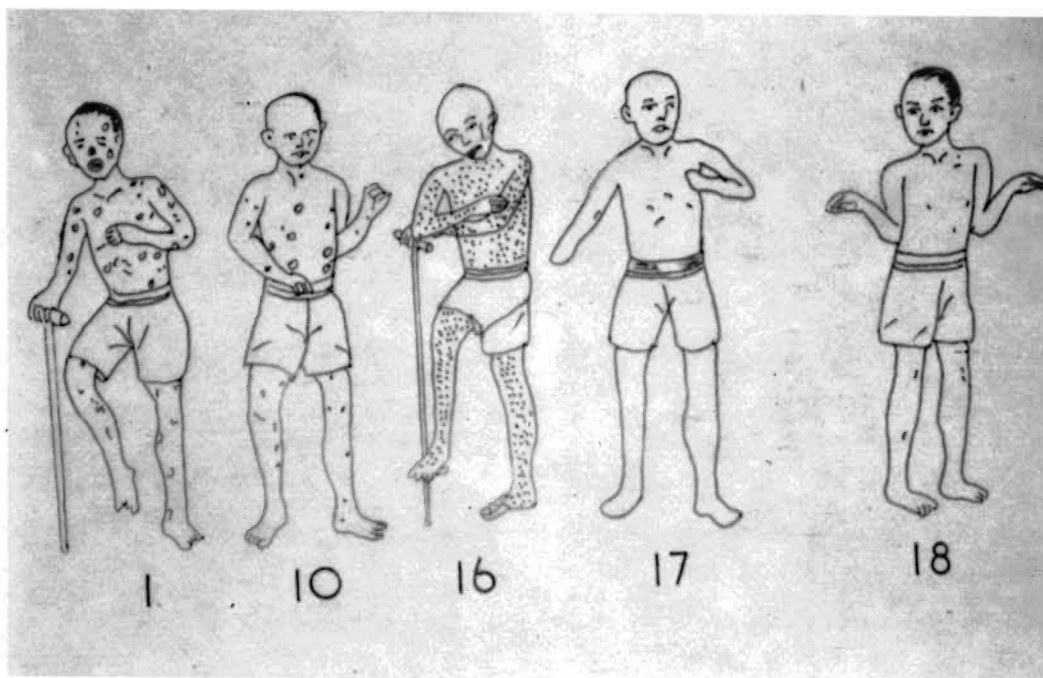


FIG. 6. Selected illustrations of leprosy from *Siao Hsiao-ting*.<sup>69</sup>

significance of contaminated clothes, bedding, and other agencies in its transmission was noted. There was speculation that the disease was caused by "worms" and that it could spread from organ to organ (foreshadowing concepts of "germs" and "bacteremia"?). It was recognized that lepromatous patients tended to live five or six years, sometimes ten, after contracting the disease. There was a recognition of childhood susceptibility in terms of childhood lack of development of resistance. The concept also appeared that the childhood disease is congenital. This concept that leprosy has a congenital basis was also widely held in European medicine at about this time. Danielssen (1815–1894) in Norway was one of its chief exponents. It would be left to Hansen (1841–1912) also of Norway, to explode this idea for both the West and the East.

From the earliest records, leprosy was associated with fear and opprobrium centering chiefly around the thought that it was related to sexual excesses, supported by its mutilating effects and by the belief that it was hereditary and largely incurable. How-

ever, as far as has been determined there was no significant body of nonmedical literature, in terms of novels, poetry or art, related to the disease, as there was in the Occident.<sup>71</sup> Thus, we are unable to reproduce a single Chinese or Japanese art representation of leprosy as is so extensively seen in Western churches.<sup>72</sup>

It was as if the world of leprosy was poised for significant discoveries that would follow on the discovery of the method of discovery itself and lead to means of eradicating the age's long plague. There followed four significant findings that would permit the eradication of the disease. These were: the understanding of the disease that followed on the work of Danielssen and Boeck, Hansen's discovery of the leprosy bacillus, the discovery of the value of segregation in controlling the disease as demonstrated in Nor-

<sup>71</sup> O. K. Skinsnes and Robert M. Elvolve, "Leprosy in society. V. 'Leprosy' in occidental literature," *Int. J. Lepr.*, 1970, 38, 294–307.

<sup>72</sup> William B. Ober, "Can the leper change his spots? The iconography of leprosy," (Parts I and II), *Am. J. Dermatopathol.*, 1983, 5, 43–58, 173–186.



FIG. 7. Leprosaria in China, 1948. (Map by Johnny Shek)

way and Hawaii, and the discovery of definitive treatment by Faget in 1943. To these must be added the present rise in standards of living in many parts of the world, including China, which was foreshadowed by the Chinese emphasis on good nutrition.

### The Twentieth Century

The Twentieth Century brought an influx of developing Western concepts, without specific therapy until the middle of the century, although in Hawaii the esterification of chaulmoogra oil made this agent much more effective. These were reflected in the "China Medical Journal" and in "The Leper Quarterly," which was the official organ of the Chinese Mission to Lepers founded in 1927.<sup>73</sup> No effective or coherent govern-

mental leprosy eradication program was developed and most leprosy work was still in the hands of charitable organizations. Maxwell, in 1937, published the book *Leprosy. A Practical Textbook for Use in China*<sup>74</sup> in which he estimated that there were perhaps 300,000 cases of overt, recognizable leprosy in the country. He concluded that if there were added to this number those early cases which did not have evident stigmata of leprosy and which often healed without treatment the figure might then rise to about one million. This figure of one million cases came to be the accepted estimate for workers in the area, but a little noted over-estimate of 2,279,000<sup>75</sup> has tacitly been official

<sup>74</sup> James L. Maxwell, *Leprosy. A practical textbook for use in China*. (Shanghai, 1937), pp. 4-5.

<sup>75</sup> L. M. Bechelli and V. M. Dominguez, "The leprosy problem in the world," *Bull. WHO*, 1966, 34, 811-826.

<sup>73</sup> T. C. Wong, "The Chinese mission to lepers," *China Med. J.*, 1930, 44, 746-748.

in the subsequent reports of the WHO Expert Committees on Leprosy.

In 1948, there were 40 foreign-mission-sponsored leprosaria with 2394 beds in all of China (Fig. 7).<sup>76</sup> Additionally, there was a 100-bed teaching National Leprosarium in Shanghai, and a 900-bed leprosarium in Taiwan which was built by the Japanese government. Their distribution reflects the distribution, although not the prevalence, of leprosy. In the early 1950s, with the development of the "barefoot doctor" system, leprosy surveys became feasible under government auspices, and it was concluded that there were 500,000–600,000 leprosy cases on the mainland. Approximately 800 leprosaria with a bed capacity of about 80,000 were set up, and multibacillary patients were required to be hospitalized. The staffs were required to wear caps, masks, gowns, gloves, and knee-high boots; a policy said to have been derived from the Russian plague experience. The policy of segregation of multibacillary cases together with predominant therapy by diaminodiphenyl sulfone (dapsone, DDS), served to markedly decrease the prevalence of leprosy. Experience has shown that the isolation works unnecessary hardships on the patients separated from their families, and the current trend is to-

ward outpatient treatment now that the total prevalence has dropped to less than 200,000. The essential eradication of new, active infectious leprosy by the year 2000 is anticipated.<sup>77</sup> If this can be achieved, it will bring an end to the 2500-year history of China's recorded experience with leprosy, and it will have been accomplished in about 50 years by the application of the essentially simple concepts of segregation, treatment, and a rising standard of living<sup>78</sup> which have, however, not been simple in their achievement. There will remain for an indefinite period the problem of the rehabilitative care of those who have had leprosy and the probability of smoldering foci of the disease due to ineffective treatment.

—Olaf K. Skinsnes, M.D., Ph.D.

—Peter H. C. Chang, R.M.T.

*Department of Pathology  
John A. Burns School of Medicine  
University of Hawaii at Manoa  
Honolulu, Hawaii 96816, U.S.A.*

**Acknowledgments.** Mr. Johnny Shek prepared Figures 1, 4, 5, and 7. Mrs. Paul Yap translated reference number 17. Miss Anwei Skinsnes prepared the several drafts of this paper.

<sup>76</sup> Wong K. Chi-min and W. S. Flowers. *Directory of Christian work and prayer cycle*. (Shanghai, 1948), pp. 20–22.

<sup>77</sup> Ma Haide (George Hatem) and Ye Gan-yun, "Leprosy work in China," *Lepr. Rev.*, 1982, 53, 81–84.

<sup>78</sup> O. K. Skinsnes, "The decline of leprosy in Asia," *Int. J. Dermatol.*, 1983, 22, 348–366.