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ACHIEVEMENTS OF CHINESE MEDICINE IN THE NORTHERN SUNG DYNASTY (960-1127 A.D.)

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The fall of the house of T'ang in 905 A.D. was followed by half a century of dynastic struggles—a period known in history as the Five Dynasties—until Chao Kuang-Yin 趙匡胤 in 960 became Emperor T'ai Tsu and founded the Sung dynasty. T'ai Tsu's successful wars against the feudatories deprived provincial chieftains of power, and the empire was again unified except for the two Tartar kingdoms of Kitan 契丹 or Liao 遼 and Hsia 夏, which remained independent. The Kitans in the reign of Shih Chin 石晋 had in 936 A.D. occupied 16 counties of Yen Yun 燕雲 in northeast China, and they were finally expelled in 1125 by the Chins or the Golden Tartars. In the middle of the Northern Sung dynasty, Tuo Pa Yuan Hao 拓跋元昊 invaded China's northwest and founded the state of Hsi Hsia 西夏 which lasted about 200 years (1038-1227). Thus during the Northern Sung dynasty which lasted 167 years the empire was less in extent as compared with the Han and T ang periods.

But although the boundaries of the empire had shrunk before the inroads from the North, there was a very long period of peace. The return to a unified country and peace was an inestimable boon to the people. The settled conditions gave the peasantry a respite to reclaim and put under cultivation waste lands, build irrigation, and improve their livelihood. Domestic trade flourished and commerce with foreign countries also increased. Sea-borne trade after the tenth century was far more active than during the T'ang dynasty. In consequence, shipping bureaus were established at Hangchow, Ningpo and Canton for the collection of taxes. Trading then was by barter; and gold, silver, lead, pewter, silks of sundry colors, porcelains and tea were used for exchanging foreign articles of luxury, such as rhinoceros horns and elephant tusks, amber, myrrh and *su mu* 蘇木 or sapanwood. Trading posts were established in Hopei and Shensi for trading with Kitan and Hsi Hsia and imported foreign fragrant drugs and rhinoceros horns and elephant tusks, etc. were the means of securing from these kingdoms horses, sheep, musk, *ling yang chiao* 羚羊角 (*Nemorhaedus crispus*), borax, *chai hu* 柴胡 (*Bupleurum falcatum* 北柴胡 and *Bupleurum sachalinense* 南柴胡), *ts'ung jung* 蓯蓉 (*Boschniakia glabra*) and *hung hua* 紅花 (*Carthamus tinctorius*). The active foreign trade had naturally a favorable effect on the national economy.

During the Sung dynasty, state monopoly of trade was in force. Such necessaries of life as salt, tea, alcoholic drinks, minerals, etc. were all handled by state monopolies, whose profits were government revenue. The system was extended also to drugs. In 1076, a drug store under the T'ai Yi Chü 太醫局 was established in the capital at Kaifeng 開封 which undertook the maufacture and sale of prepared drugs, such as pills 丸, powders 散, ointments 膏 and pellets 丹. In its first year, the store made 25,000 strings of cash, or a profit of 100 per cent. In 1103, seven drug stores were in existence in the capital, and they were also being established by the provincial and municipal authorities. Medicine in the form of pill, powder, ointment, or pellet was found by both the physician and patient more convenient than in the liquid form, and it showed progress in Chinese pharmacology. The drug stores helped promote the use of the new preparations.

In this period there was also great development in industry, notably improvement in the technic of making gun powder, the magnetic needle and compass, printing from wooden blocks, and of refining bronze and steel. These achievements not only contributed towards the advancement of Chinese culture but also influenced world civilization. In the field of medicine the making of human figures in bronze for use as models in teaching acupuncture and moxa reduced the mass of acupuncture points to a systematic form. Also, fine steel acupuncture needles were then made at Laiyang 耒陽, which made acupuncture less painful. The properties of loadstone were known and in medicine it was put to use in extracting foreign matter in the human body. But the greatest influence on the progress of medicine was the development of the art of printing.

Although printing was invented in the 8th century, A.D., transcription by hand was still mainly relied upon during the T'ang dynasty (618-907 A.D.) for the conservation and transmission of medical literature. Thus, in 713 A.D. special officers were appointed in the counties to copy the *Collection of 101 Tested Formulas of Materia Medica*. Copies for bulletin boards were also made, as was the case in 746 A.D. when county magistrates were ordered to assign officers to select important recipes from the *Kwang Chi Fang* 廣濟方 and have them copied and exhibited on bulletin boards in towns and villages. Another method of conservation was the practice of cutting inscriptions in stone for reproduction by rubbing. A stone tablet bearing the text of *Pei Chi Tao Hsing Ancient Formulas* 北齊道與古驗方, cut in 574, is still preserved at Lungmen 龍門 in Honan. In 926 A.D. Chen Li 陳立 cut in stone the text of the *Important Formulas of Peking* 北京要術 which was exhibited outside the Prefecture of T'aiyuan, Shansi. By the 10th century block-printing was in general use and printed medical works made their appearance. For example, in 974 the *K'ai Pao Materia Medica*

in the clinical field, which influenced directly the development of Chinese medicine. For example, *ju hsiang* 乳香 (*Pistacia lentisens*), *lung nao* 龍腦 or borneol, granular sugar, alcohol, *wen no chi* 膃肭臍 (*Castoreum*), and *ch'iang wei shui* 薔薇水 (*Rosa acicularis*) and the art of cauterization were all introduced to China from Arabia. Butthe introduction of Arabic astrology lent support to the metaphysical conceptions of disease and of the nature of the body that led medicine away from logical interpretation based on direct observations.

Schools of the Sung dynasty were under the direction of the Kuo Tze Chien 國子監. The Confucian classics were the chief subject on the curriculum. Other courses, such as law, strategy, penmanship, drawing and medicine, were called miscellaneous studies. At the beginning, the Kuo Tze Chien had professors but no students, it being then a nominal educational institution. In 1079 Wang An-Shih 王安石, the innovator, initiated changes in the educational system and instituted promotion in academic grading by examinations, and the Kuo Tze Chien became the highest collegiate institution. But such institutions prepared candidates for degrees and public offices, and literary pursuits were merely a stepping-stone to place and honor. Furthermore, the examinations emphasized only literary attainment in which elegance in style, high-flown diction and a retentive memory were the chief assets. And under this system of education even physicians wrote medical dissertations in a flowery and artificial language.

Rhymed composition being then in vogue, many medical works were written in rhyme, such as *Mai Chüeh* 脈訣 (*Feeling of Pulses*), *Shang Han Chüeh* 傷寒訣 (*Treatment of Fevers*), *Tzu Wu Ching* 子午經 (*High Noon Classic*), *Hsiao Erh Yü Chüeh* 小兒玉訣 (*Treatment of Pediatric Cases*). Some took the form of catechisms, as for example, the *Nan Yang Huo Jen Shu* 南陽活人書 (*Nan Yang Life Saving Book*), *Shang Han Pai Wen* 傷寒百問 (*Hundred Questions on Fevers*). All these works were intended to be memorized, and they enjoyed a wide circulation.

To sum up, the two main factors which influenced the development of medicine during the Northern Sung dynasty were the invention of printing and the introduction of medicine from Arabia, particularly in therapy.

COMPILATION OF MEDICAL WORKS UNDER GOVERNMENT AUSPICES

The development of printing made possible, as has been said, the printing of all ancient medical works after they were revised and corrected. The most

important new books that were published were on materia medica and formularies. Discoveries of new drugs rendered the T'ang edition of materia medica out of date. Hence in 973 Emperor T'ai Tsu appointed a commission of nine men that included Ma Chih 馬志, Liu Han 劉翰, Chai Shū 翟煦, Chang Hua 張華, Wu Fu-Kuei 吳復珪, Wang Kwang-Yu 王光祐, and Chen Chao-Yü 陳昭遇 to undertake the work of revision with Li Fang 李昉, Wang Yu 王祐, and Hu Meng 扈蒙 responsible for the checking. This work which was completed in two years and included about 133 new drugs was known as *K'ai Pao Materia Medica* 開寶本草. Beside the inclusion of new drugs, a re-classification was made. Some 80 years later, in 1057, Chang Yü-Hsi 掌禹錫, Lin Yi 林億, Su Sung 蘇頌 and Chang Tung 張洞 again revised the materia medica and made an addition of 82 drugs. This new work was called *Chia Yu Materia Medica, with Annotations* 嘉祐補註本草 (Chia Yu being the year of the reign of Emperor Jen Tsung of the Sung dynasty). In 1061 the local authorities were ordered to submit drawings of medicinal herbs found in their districts and subsequently Su Sung 蘇頌 compiled with illustrations the *Tu Ching Materia Medica* 圖經本草. In this book all strange drugs were eliminated and the illustrations were based upon reliable drawings submitted by the people of the districts in which the herbs were found. Fifty years later, in 1108, T'ang Shen-Wei 唐愼微 incorporated the main texts and the notes on the illustrations of all the editions of works on materia medica and produced a new book, which was a great convenience to students. Moreover, after each drug, its method of preparation, as found in the *Lei Kung's P'ao Chih Lun* 雷公炮炙論, and the old and new recipes in circulation were all included. The edition was given the title of *Cheng Lei Pen Tsao* 證類本草 (*Classified Materia Medica*). With the completion of this work, Chinese materia medica assumed the form of pharmacology. But this book included many drugs, numbering as many as 700, which were not ordinarily used, hence though comprehensive it lacked discrimination. Emperor Huei Tsung 徽宗 (1101-1126) appropriated it as his own work, and named it after the year of his reign 1107 and called it *Ta Kuan Ching Shih Cheng Lei Materia Medica* 大觀經史證類本草. In 1116, Tsao Hsiao-Chung 曹孝忠 revised the edition, and changed its title to *Cheng Ho Ching Shih Cheng Lei Materia Medica* 政和經史證類本草, which remained in use for nearly 500 years.

In addition to materia medica, the compilation of medical formularies was also undertaken. Under orders of the Emperor, Wang Huai-Yin 王懷隱, Wang Yu 王祐, Cheng Yen 鄭彥, and Chen Chao-Yü 陳昭遇 compiled in 982-992 the *Sheng Huei Fang* 聖惠方. This book contained all the formularies written before the T'ang dynasty, and according to the scheme of *Wai T'ai Mi Yao* 外臺秘要 or *Medical Secrets of an Official*, it contained 1,670 divisions with 16,834 recipes. It could well be taken to represent the sum total of

Chinese medical knowledge in the tenth century. Copies were despatched to the provinces where they were assigned to the custody of doctors of medicine. But this work consisted of 100 volumes, much of its material being repetitions, and was unwieldy. Hence the remark by Tsai Hsiang 蔡襄 that all the provincial authorities had the book locked up in their store rooms and all they did was to give it an airing once every summer. In 1046, Ho Hsi-P'eng 何希彭 upon orders compiled the *Sheng Huei Hsuan Fang* 聖惠選方 or *Selections from the Sheng Huei Fang*. However, the original work was used as a textbook for several hundred years and exercised immense influence on medicine during the Sung dynasty. Towards the end of the Northern Sung dynasty, Emperor Huei Tsung 徽宗 ordered the court physicians to compile the *Sheng Chi Tsung Lu* 聖濟總錄 based on the *Sheng Huei Fang*. This was published in 200 volumes with 20,000 formulas and the text consisted of 2 million words. Probably, before it was printed Huei Tsung was already captured by the Chins and the book was circulated only in the Chin kingdom.

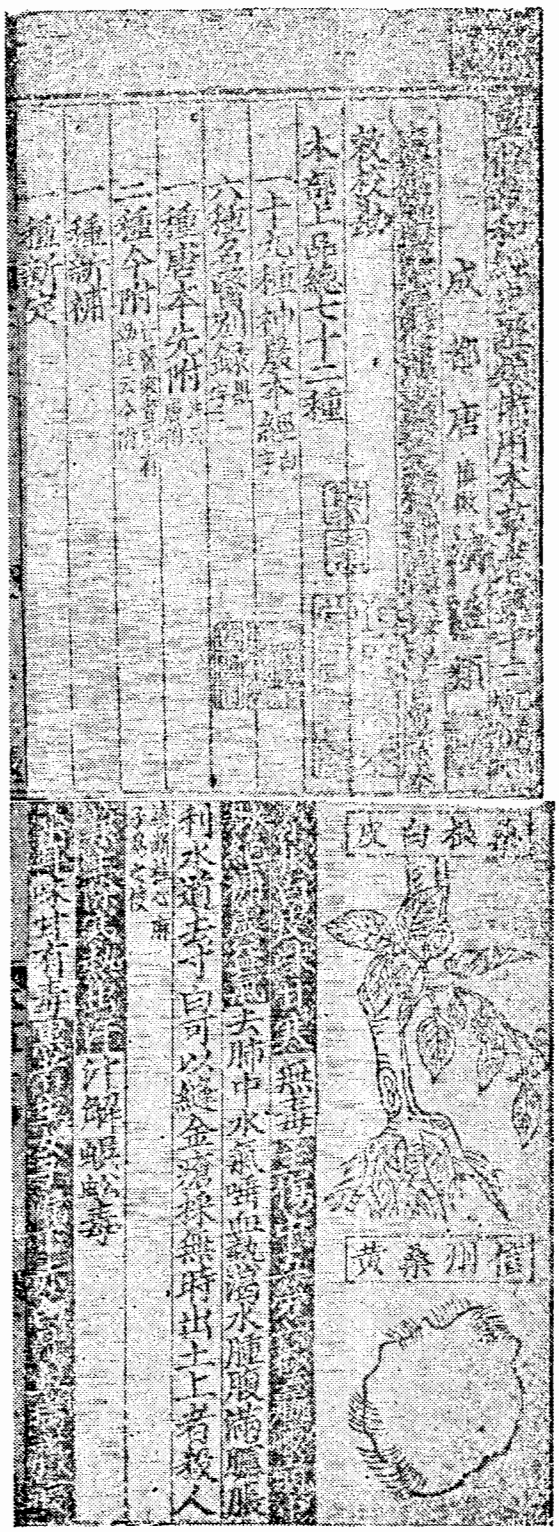


Fig. 1. Pages from the revised edition of *Cheng Ho Materia Medica*, written by T'ang Shen-Wei and edited by Kou Chung-Shih. Mongolian edition—cir. 1249.

As has been mentioned, drug stores that made and sold drugs were first established in 1076. In order to facilitate the manufacture of drugs, an official formulary was issued in 1080, in which formulas for making pills, powders, ointments, pellets, and tinctures were given but not for liquid drugs. This was the first manual on formulas ever published in China and was a great convenience to both physicians and pharmacists. In the reign of Ta Kuan 大觀 (1107-1110), it was

revised by Chen Shih-Wen 陳師文, Pei Tsung-Yuan 裴宗元, and Chen Ch'eng 陳承, and was named *T'ai P'ing Huei Min Ho Chi Chü Fang* 太平惠民和濟局方, comprising 795 formulas. This formulary went through several revisions and was in circulation for more than 200 years.

The compilation of materia medica and formularies by the government as outlined above is unprecedented in the history of the world, especially in the respect that they represent the collective effort of many minds and are most comprehensive in scope.

Fig. 2. A page from the *T'ai P'ing Huei Min Ho Chi Chü Fang* written by Chen Shih-Wen. Yuan edition—cir. 1330.

Fig. 3. A page from the "Ta Teh" revised edition of the *Sheng Chi Tsung Lu*. Yuan edition—cir. 1299.

MEDICAL THEORIES

The examination system of the Sung dynasty followed the traditional pattern and emphasized literary composition. Where medicine was concerned, it fostered the production of works written in a flowery language, dealing with idle abstractions and scholastic subtleties. As a result, medical study became dominated by elaborate but irrational and incomprehensible theories divorced from observation and practical knowledge. Wang Ping 王冰 in the time of the T'angs had systemized these superstitious beliefs; and Tsui Chih-T'i 崔知悌 had gone so far as to determine the lucky position that women during childbirth might take on the basis of the sexagenary cycle with its "celestial stems" and "earthly branches" that play an important part in divination and

astrology. During the Sung dynasty the varied speculations on the theory and causation of diseases became most popular and occupied the minds of scholars. Outstanding examples of such works with pretentious systems of healing are Liu Wen-Shu's 劉溫舒 *Su Wen Ju Shih Yun Ch'i Lun Ao* 素問入式運氣論奧, published in 1099, Sung Huei Tsung's 宋徽宗 *Sheng Chi Ching* in 1118, and the *Sheng Chi Tsung Lu* 聖濟總錄.

These books attempted to establish a connection between disease and the pre-conceived theories of the Six Vapors (wind, heat, cold, dryness, wetness and fire), and the Five Elements (wood, fire, metal, earth, and water). A conjunction between these and the ten celestial stems and the symbolical animals of the twelve branches was supposed to determine for each year what particular element was in the ascendancy. For example, the year with the symbols Chia Ssu 甲巳 was a wet year and therefore would have a heavy incidence of kidney diseases; and based on such calculations the ascendant element for each year of the sexagenary cycle could be worked out, the nature of prevailing diseases foreseen, and the mode of treatment made manifest. These aberrations due to cosmology, astrology, and numerology flourished during the 12th century. They served well the ruling classes for state purposes and were strongly endorsed by the Taoists, but they stifled the development of Chinese medicine age after age. In these mystical fancies the influence of Arabic medicine could also be traced. While the Greeks were the first to link medicine with astronomy by means of astrology, Arabic writers revived and extended the system.

CLINICAL MEDICINE

During the Northern Sung dynasty, the branch of medicine that made considerable progress was clinical medicine, as may be seen in such works as *Su Shen Liang Fang* 蘇沈良方 and *Hsiao Erh Yao Cheng Chih Chüeh* 小兒藥證直訣 in which full records were given on clinical cases. These records were a big step forward as they enabled physicians to recognize the characteristics of a disease and also learn the nature of treatment prescribed.

In the field of recognition of diseases, smallpox and measles were the first to be differentiated. Later, chicken pox was recognized. It was stated in the *Sheng Huei Fang* 聖惠方 that heat in the so-called "hollow" internal organs produced measles and in the "solid" internal organs produced smallpox. It was stated in the above *Hsiao Erh Yao Cheng Chih Chüeh* that chicken pox was related to the liver, smallpox to the lungs and measles to the heart. A distinction was made in the *Sheng Chi Tsung Lu* 聖濟總錄 between measles and smallpox. Although the causes as ascribed to the diseases were derived from the imagination of the authors of these works, there is no question that they could differentiate the diseases. As the treatment for them was identical, they were known at that time under the general term ulcerative pimples. In 1093, Tung Chi 董汲 wrote the first treatise on these diseases called *Hsiao Erh Pan Chen Pei Chi Fang* 小兒斑疹備急方 or *Emergency Treatment of Measles in Children*.

Chung feng 中風 or paralysis was continued to be studied by Sung physicians; there was a division for "wind" diseases comprising cerebral hemorrhage, rheumatism, etc. No definite treatment for paralysis could be found in the medical works of the T'ang period; but after the appearance of the *Sheng Huei Fang* 聖惠方 early in the Sung dynasty drugs for this disease came into use, some beneficial and some merely harmless, and they included *fang feng* 防風 (*Siler divaricatum*), *tu huo* 獨活 (*Angelica polyclada*), *tang kuei* 當歸 (*Ligusticum acutilobum*), *niu huang* 牛黃 or bezoar, and *chu sha* 朱砂 (*Hydrargyri sulphidum* Rubrum).

The name for tuberculosis was still under some confusion during the T'ang dynasty. After the tenth century, it was definitely known as *hsü lao* 虛勞 or feebleness and exhaustion. The *Sheng Huei Fang* contains descriptions of as many as 44 symptoms of *hsü lao*. The *Sheng Chi Tsung Lu* contains 8 volumes on the disease, showing that much attention was given to it in this period.

Records are also found on symptoms due to allergy, such as lacquer poisoning and egg poisoning.

Surgery. Suppurative infections were classified according to the size of the area of infection. They were called *chieh* 癤 or furuncle if the affected part was one to two inches in diameter, *yung* 癰 or carbuncle if the area was two to five inches in diameter, and *tsü* 疽 if it was five to ten inches in diameter. Great advance in those times was made in the treatment of suppurative infections, which became more and more rational. Treatment would begin with hot compress, fomentation or moxa, and after suppuration set in the infection was pierced with a needle, the instrument used having been disinfected by burning. After operation, the wound would be packed with silk yarn. *Yen hu suo* 延胡索 (*Corydalis ambigua*), *chuan chiao* 川椒 (Japanese pepper), and *t'ien nan shing* 天南星 (*Arisaema japonicum*) were used to mitigate pain, *ch'an su* 蟾酥 or "toad cake" to stop hemorrhage and *liu suan t'ung* 硫酸銅 or *Cupri sulphas*, *mi tuo seng* 蜜陀僧 or litharge, and *lu sha* 碌砂 or *Ammonium chloratum* by way of disinfection. For tuberculosis of the lymphatic glands or scrofula arsenic essence and various fragrant drugs were used. That much attention was paid to the study of scrofula during this period is shown by the fact that the *Sheng Chi Tsung Lu* contains two volumes of formulas for the treatment of this disease.

In the treatment of infected wounds, mention should also be made of attempts, where necessary, to promote suppuration on the one hand and on the other to stop suppuration and facilitate the process of healing. Irrespective of the efficacy of the drugs used, these ideas were astonishingly sound for the period.

There were records also concerning flesh tumors 肉瘤 (or *fan hua ch'uang* 反花瘡), tuberculous abscesses known as cold abscesses, ulcers in the lower section of the leg, burns, and frostbites.

Wounds caused by metal and bone fractures were described in greater detail than previously. There was no detailed report on surgical operations, but there were records on the sewing together of ruptured intestines with white thread made from mulberry bark fibers and the removal of arrow heads from the body by Yen Wen-Hsien 閻文顯 and Liu Pin 劉賓.

Gynecology and Obstetrics. In the field of gynecology, records of absence of menstruation, irregularity, excessive discharge and pain in menstruation were first made after the 10th century. These records show that experience had been gained in the use of such drugs as *hung hua* 紅花 (*Carthamus tinctorius*), *tang kuei* 當歸 (*Ligusticum acutilobum*), *su mu* 蘇木 or sapanwood to facilitate menstruation; charcoal, calcium compounds and mucilage to stop hemorrhage; *yen hu suo* 延胡索 (*Corydalis ambigua*) to relieve pain; and *niu hsi* 牛膝 (*Achyrranthes bidentata* var. *japonica*) to induce abortion. Advance was also recorded in prenatal and nursing care.

Pediatrics. The best known work of this period on pediatrics was *Lu Tsung Ching* 顱顖經 (*Classic on Cranium and Fontanel*), which was written probably in the 10th century. Its records on erysipelas was especially detailed and the treatment prescribed was simple and practical and was widely accepted. Towards the end of the 11th century, Ch'ien Yi 錢乙 was the most distinguished physician in children's diseases. He had specialized in them for more than 40 years and had made most acurate observations. His works give only six kinds of pulses that were actually needed. The cases reported were also confined to a few diseases which were important and of frequent occurrence, such as convulsion, measles, gastrointestinal disorders (vomiting and looseness of bowels), and coughing. In 1119, his pupil Yen Hsiao-Chung 閻孝忠 wrote and published *Hsiao Erh Yao Cheng Chih Chüeh* or *Diagnosis and Treatment in Pediatric Cases* for the guidance of physicians in their practice. This book is a most important contribution to pediatrics in Chinese medicine. Next to it, the section on pediatrics in the *Sheng Chi Tsung Lu* is also comparatively sound and detailed. In the treatment of indigestion in children, emphasis was laid on nutrition. Another feature of the latter work, remarkable for the age, is that cases from actual experience were presented. In the use of drugs, it advocated the use of fewer but more effective drugs instead of a large number of drugs of doubt-

Fig. 4. Ch ien Yi, noted pediatrician of the 11th century.

ful value. In the general survey on the value of ancient formulas it has this remark: "In making up a prescription, one who is not well qualified seldom escapes from committing the blunder of compounding a mixture of toxic materials in making up a pill. This may be likened to a hunter who does not know the whereabouts of the hare but mobilizes all the inhabitants of the plain in the hope that one person in the crowd might succeed in making the catch, which is quite stupid." Since this statement was made in an age when compound prescriptions were in vogue, it was obviously most appropriate.

Undoubtedly, there was great improvement in this period in the use of drugs for children's diseases. In addition to drugs for the expulsion of worms, others, such as drugs for promoting digestion and fragrant or pungent preparations for improving the appetite, were skilfully used.

In a word, during the Northern Sung dynasty the greatest progress was made in clinical medicine, particularly in the field of children's diseases, in which measles, smallpox and chicken pox were differentiated and remedies were found for ailments such as malnutrition and acute and gastrointestinal inflammation.

Ophthalmology. The *Lung Mu Lun* 龍木論, a work of Indian origin, was translated during the T'ang dynasty and was still in general use about this time. Consequently, it was used as a reference book in both the *Sheng Huei Fang* and *Sheng Chi Tsung Lu*. Arabic ophthalmology had made considerable progress after the seventh century, and apparently the use of mineral drugs in ancient China in the treatment of eye diseases was due to the influence of Arabic medicine. During this period treatment of eye troubles with the hook, knife, needle, and scythe technics and by cauterization with iron was known. The *Sheng Huei Fang* contains a description in 1,200 words of the technic for the removal of cataract with full directions as to the preparations to be made before operation, posture of the patient, and postoperative care.

ACHIEVEMENTS IN DRUG THERAPY

During the period under review, the belief that drugs were all-powerful had gained general acceptance. Physicians devoted much attention to the making of medicaments, and ready-made and proprietary medicines took the place of prescriptions. The emphasis on drugs caused even medical books to change in form. Whereas previously descriptions of diseases formed the main part of medical books and prescriptions for treatment came second, as are found in such works before the *Sheng Huei Fang* compiled at the end of the tenth century, this was reversed in the eleventh century. The *Su Shen Liang Fang* and the *Wang Shih Po Chi Fang* 王氏博濟方 of this period, for

example, devoted their main text to prescriptions of medicaments and relegated the description of symptoms and even case reports to second place. The establishment in 1076 of government apothecaries called Shu Yao Suo 熟藥所, and the publication of the pharmacopoeia in 1081 further promoted the use of standard formulas by physicians. During this period, in addition to the standard medicaments such as pills,p owders and ointments, tinctures came into extensive use, like the tincture of *tang kuei* 當歸 (*Ligusticum acutilobum*) and the tincture of tiger's bone.

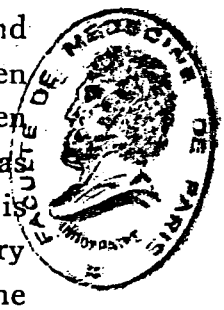
Next, mineral and animal substances began to be extensively used. While vegetable drugs were mostly employed before the T'ang dynasty, minerals came into use after the tenth century. The *Sheng Huei Fang,* for example, contains passages which indicate that white arsenic was used in the treatment of malaria, dysentery, hemorrhoid and scrofula, mercury to induce urination, and a compound of mercury and date pulp for thread-worms (oxyuriasis). Gold was considered a panacea, a belief which was acquired from the Arabs, and gold foil was used in the treatment of many diseases. Borax and mercurous chloride also came into use about this time.

In the use of animal substances, *ch'an su* or the secretion of the toad, *Bufo vulgaris* Laur, was an important discovery. The secretion was obtained by puncturing the toad with a needle, and the toxin mixed with flour was employed to stop hemorrhage in wounds, toothache and pain during menstruation, and as a cardiac stimulant. These therapeutic uses of toad toxins, the origin of bufotherapy, have proved their value. Next, the treatment of diseases by the use of animal organs corresponding to the diseased organ of the patient was widely practiced. Examples of such treatment are the use of chicken's stomach in the treatment of diabetes mellitus, sheep's kidney for tuberculosis and tiger's bone for backache, etc., which is the origin of the modern practice of homologous organotherapy. Finally, under the theory of fighting poison with poison, snakes, scorpions, lizards (*Gecko japonicus*) and scores of other such creatures were used for the treatment of diseases.

In the vegetable kingdom, the chief discoveries of the Sung period were drugs for relieving pain, such as *yen hu suo* 延胡索 (*Corydalis ambigua*), poppy, *t'ien nan shing* 天南星 (*Arisaema japonicum*), and *ch'uan chiao* or Japanese pepper, which are more efficacious than *fu tzu* 附子 (*Aconitum sineuse*), the only drug previously used for the purpose. Also, fragrant drugs were employed for stomachic tonics, such as *tou kou* 豆蔻 or cardamoms, *mu hsiang* 木香 (*Rosa banksiae*), *ju hsiang* 乳香 or Indian frankincense, *ping lang* 檳榔 or (*Areca-nut*), *ting hsiang* 丁香 or *Caryophyllum* and *chen hsiang* 沉香 (*Aquilaria agallocha*). These fragrant drugs were held in high esteem by physicians of the time and they were considered as a cure-all for all complaints from fevers to paralysis, the only exceptions being gastrointestinal troubles. Chu Kung 朱肱 remarked in his preface to

the *Lei Cheng Huo Jen Shu* 類證活人書 in 1107 that some physicians of his time favored cooling or laxative drugs, such as *ta huang* 大黃 (rhubarb), *mang shiao* 芒硝 (sodium sulfate), etc., while others followed the tendency of the time and favord heating drugs, i.e. fragrant drugs, such as *fu tze* (*Aconitum sineuse*), and *mu hsiang* (*Rosa banksiae*). Contemporary formularies, such as the *Huei Min Ho Chi Chü Fang* 惠民和濟局方 and *Sheng Chi Tsung Lu* 聖濟總錄 placed emphasis on the heating drugs. At this point in the history of Chinese medicine there began to appear different theories of medicine and their rival schools.

In regard to nutritional therapy, the *Sheng Huei Fang* contains prescriptions for 28 diseases. The essential technic was the administration of various substances of nutritional value in the form of infusion or broth. Cow milk was given for diabetes, carp broth or black bean porridge for edema, almond tea for cough, and fish broth for dysentery. The special diet for women during confinement consisted chiefly of animal protein foods, such as chicken and fish. The importance of nutrition in the treatment of tuberculosis was known, as is shown by the large variety of nourishing foods prescribed for this disease. The progress of nutritional therapy was closely related to the dietary practices of the adherents of Taoism, which was in great favor during the Northern Sung dynasty. Both the *Sheng Hui Fang* and the *Sheng Chi Tsung Lu* contain numerous animal and vegetable items of Taoist dietetics. There is no doubt that the nutritional value of many animal and vegetable substances were then known.



ACUPUNCTURF, MOXA, AND ANATOMY

Acupuncture and moxa, both of very ancient origin, had become most complicated in application. Under the Sungs the acupuncture points were systematically studied, and Wang Wei-I 王維一 in 1026 designed and had life size bronze human figures made, on which were engraved the acupuncture points and their terms. In this following year there appeared his monograph entitled: *Bronze Man, with Acupunture and Moxa Points and Charts and Legends* 銅人俞穴針灸圖經. Thereafter, candidates for the course on acupuncture were required to pass an examination on the models. Acupuncture and moxa may be said to have become a science in this period. The great importance attached to the bronze figures may be seen by the fact that the Chins in 1128 demanded the surrender of a model as a condition for peace negotiations. In 1034 when the reigning emperor recovered from his illness through the successful treatment of Hsu Hsi 許希, a special temple was built and dedicated

to Pien Ch'üeh 扁鵲, the celebrated physician of the Chou dynasty who was skilled in the application of acupuncture and moxa. From this time on acupuncture increased in popularity. But as the study of acupuncture and moxa required some understanding of the structure of the human body, physicians began to be interested in anatomy. Records show that on two occasions in the reigns of the Sung Emperors, Jen Tsung 仁宗 and Huei Tsung 徽宗, the internal organs of two executed prisoners were examined. These examinations naturally led the Sung physicians to question the accuracy of the ancient notions of the internal structure of the human body as given in the *Nan Ching* 難經, the venerated canon of medicine. Hence, Ting Teh-Yung 丁德用 in 1062 and Yü Shu 吳庶 in 1067 added fresh annotations to the *Nan Ching*. But in the absence of autopsy or dissection for anatomical study no progress was possible.

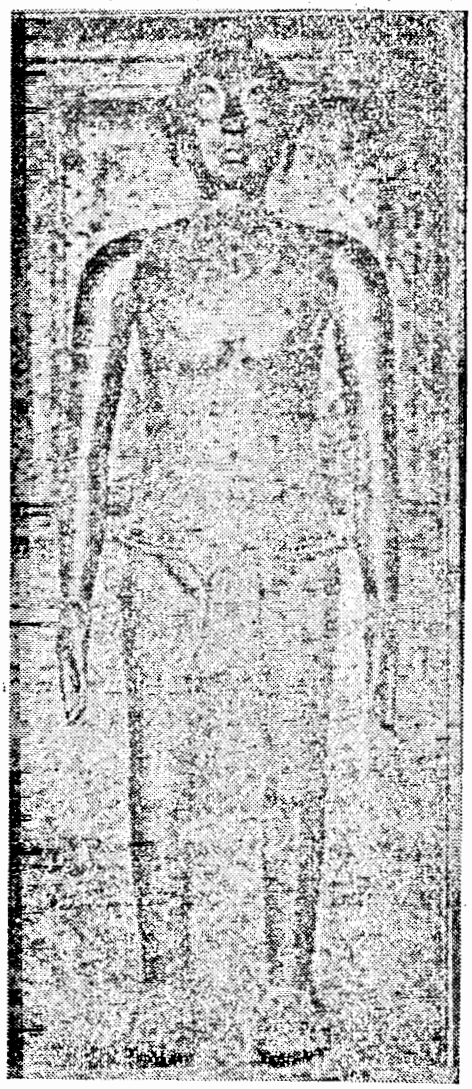


Fig. 5. Life size bronze figure of the early Sung dynasty.

MEDICAL ORGANIZATION

At the beginning of the Northern Sung dynasty the system of government of the T'ang period was followed, and there was established the Hanlin Yi Kuan Yuan 翰林醫官院 or the Hanlin College of Medical Officers which had charge of medical affairs. Army surgeons attached to the medical staff of frontier garrison troops, the imperial bodyguard, expeditionary forces, diplomatic missions to foreign countries, educational institutions (the national university and law college and military college, etc.) were all appointed by the Hanlin College. Besides, doctors for the medical services of the country were also provided by this college. The total number of staff of the College was not determined, but in 1038 the staff organization of the college was as follows:

Title	Directors	Vice-Directors	Superintendents	Pharmacists	Medical officers	Medical students	Candidates	Total
Number	4	2	7	7	30	40	12	102

Although medical officers were nominally divided into the above seven grades, their posts had often no connection with their official duties. Medical officers who rendered meritorious services might be given military promotion as Huang Ch'eng Shih 皇城使 (Imperial City Commissioner), Ts'e Shih 刺使 (Inspector), T'uan Lien Shih 團練使 (Military Training Commissioner), and Fang Yü Shih 防禦使 (Defence Commissioner). For example, Liu Han 劉翰 and Chao Tse-Hua 趙自化, both well-known physicians of this period, served as Vice-Commissioners of Military Training.

In 1111, medical officers were divided into 14 grades with as many as 22 titles. Through corruption many superfluous posts had been created and their occupants were merely office seekers and were incompetent. In 1119, the medical officers of the Yi Kuan Yuan 醫官院 numbered 1,096, and a large number of these had no medical training at all. The principal medical officers of this period may be divided into three groups, as follows: Tai Fu 大夫, Lang 郎 (officer) and Hanlin 翰林 (scholar). Today, doctors are known as Tai Fu or Lang Chung, which have their origin in the 12th century. The following list gives both the old titles and the new ones adopted during the Northern Sung dynasty:

OLD TITLES:

Arsenal Commissioner 軍器庫使	Hsi Ling Chin Shih (Inspector) 西綾錦使	Monoply Officer 榷易使	Hanlin Medical Commissioner 翰林醫官使	Vice-Arsenal Commissioner 軍器庫副使	Hsi Ling Chin Fu Shih 西綾錦副使	Vice-Monopoly Officer 榷易副使	Vice-Commissioner, Hanlin Medical Officer 翰林醫官副使

NEW TITLES (adopted in 1111):

Ho An Tai Fu 和安大夫 Ch'eng An Tai Fu 成安大夫 Ch'eng Ch'uan Tai Fu 成全大夫 Ch'eng Ho Tai Fu 成和大夫	Pao Ho Tai Fu 保和大夫	Pao An Tai Fu 保安大夫	Hanlin Liang Yi 翰林良醫	Ho An Lang 和安郎, Ch'eng Ho Lang 成和郎, Ch'eng An Lang 成安郎, Ch'eng Ch'uan Lang 成全郎	Pao Ho Lang 保和郎	Pao An Lang 保安郎	Hanlin Senior Medical Officer 翰林醫正

Apart from the above 14 grades of Sung medical officers with their 14 titles there were also 8 other titles viz: the Hanlin Yi Kuan 翰林醫官 Hanlin Yi Hsiao 翰林醫效, Hanlin Yi Ch'uan 翰林醫痊, Hanlin Yi Yü 翰林醫瘉, Hanlin Yi Cheng 翰林醫證, Hanlin Yi Chen 翰林醫診, Hanlin Yi Hou 翰林醫候, and Hanlin Yi Hsueh 翰林醫學, making a total of 22 titles. The highest Ho An 和安 doctor was only an official of the 6th rank; whereas officials of that time were divided into 9 ranks with 18 grades.

MEDICAL EDUCATION

At the beginning of the Sung dynasty there were no proper medical schools. Doctors were recruited by examination as occasion arose in accordance with the general practice of the civil service. For instance, towards the end of the 10th century Emperor T'ai Tsung on account of the death of Chia Huang-Chung 賈黃中 from apoplexy 風眩 had all the doctors in the capital (Kaifeng, Honan) examined for possible service. In 1076, as a result of Wang An-Shih's 王安石 reform movement, the T'ai Yi Chü 太醫局 or Imperial Medical College became an independent institution. It had 300 students and was administered by one director and two associate directors and a number of professors. Examinations were held each spring in internal medicine (pulses 方脈), surgery, and acupuncture. Candidates for the course in internal medicine were examined in set books, the *Su Wen* 素問, *Nan Ching* 難經 and *Mai Ching* 脉經, called the Major Classics, and also *Ch'ao's Ping Yuan* 巢氏病源, *Lung Shu Lun* 龍樹論, and *Ch'ien Chin Yi Fang* 千金翼方, called the Lesser Classics. Candidates for the courses in acupuncture and surgery were required to pass examinations in the above books with the exception of that on pulse and also in three books on acupuncture and moxa.

From the years 1078 to 1085 the T'ai Yi Chu or Imperial Medical College had 9 departments in which students could specialize, the courses were given in the *Yuan Feng Pei Tuei* 元豐備對. A comparison of the medical course of the T'ang dynasty with that of the Sung, as given in the following table, indicates the progress made in the latter dynasty.

T'ang dynasty	Medicine		Pediatrics		Ulcers, swellings	Ears, eyes, mouth	Acupunc. ture		Inhibi- tions
Sung dynasty	Medicine	Wind divi- sion	Pediatrics	Eye	Ulcers, swellings and frac- tures	Obstetrics	Mouth and throat affec- tions	Acu- punc- ture and moxa	Metal arrow heads and inhibi- tions
Number of students	120	80	20	20	20	10	10	10	10

In 1079 A.D., Wang An-Shih introduced the system of three divisions into the National University under the Kuo Tse Chien 國子監. But as medical education, at one time under the direction of the T'ai Ch'ang Ssu 太常寺 or Board of Rites, was after 1102 transferred to the Kuo Tse Chien, the system of three divisions was also adopted for medical studies. The upper division had 40 students, the internal division 60 students, and the external division 200 students, and each division was supervised by one proctor, four doctors of philoso-

phy, and four recorders. Thus, the medical school system which had been interrupted as from the middle era of the T'ang dynasty was restored.

Examinations were carried out in the schools every year, the subjects being the general principles of the three medical classics, feeling of the pulse, clinical observation, metaphysical theories, and treatment of hypothetical cases. The examinations in medicine and in surgery were slightly different from those in acupuncture. The best of the successful candidates were eligible for appointment as physicians of the Shang Yao Chü 尙藥局. Those of inferior scholarship became doctors, chief recorders and professors of medicine of provincial medical institutions.

CONCLUSION

The Northern Sung dynasty was a period of transition from ancient to medieval medicine. During this period, not only the old medical works were checked and revised but also compilations were made of newly acquired medical knowledge, which were all published in book form. Works such as *Cheng Lei Materia Medica* and *Sheng Chi Tsung Lu* laid the foundation of Chinese medicine after the 12th century.

As a result of the development of printing, there was large scale publication of medical books, both public and private, that made possible the spread of medical knowledge and enabled more minds to participate in the fight against disease.

The epoch of the early Sungs was a period of numerous contacts with the lands of the West, particularly the Moslem Empire. In the field of medicine the Arabs learned from China our pulse lore and the making of pills that was connected with alchemy and the search for the elixir of immortality. The Chinese, on the other hand, acquired from the Arabs their knowledge of pharmacology and astrology. The last was a mixed blessing. Like the metaphysical aberrations in Chinese medical theories, it was also a source of error and confusion, and it influenced Chinese medicine for several centuries.

Greatest advance was made during the Northern Sung dynasty in clinical medicine, particularly in pediatrics and surgery.

In pharmacology, more effective anesthetic drugs were discovered such as *yen hu suo* 延胡索 (*Corydalis ambigua*), *t'ien nan sheng* 天南星 (*Arisaema japonicum*), and poppy. Fragrant drugs such as *mu hsiang* 木香 (*Rosa banksiae*) *tou k'ou* 荳蔻 or cardamoms, etc. were prescribed as stomachic tonics, and mineral and animal substances were utilized increasingly for medicinal purposes. Further attention to dietetics helped prevent diseases and restore health. It is of interest to note that according to one early writer the introduc-

tion of tea drinking in the T'ang dynasty lowered the incidence of jaundice in the 12th century.

The practice of acupuncture and moxa may be said to have been placed on a scientific basis with the making of the bronze human figures in this period. Although this practice aroused an interest in the study of the structure of the human body, no real progress was made.

The examination system and the emphasis placed on elegance of style and diction in literary composition brought about a deterioration in the standard of medical works, such as *Yun Ch'i Lun Ao* 運氣論奧 and *Sheng Chi Ching* 聖濟經. However, the placing of medical colleges in 1076 on an independent footing and the reorganization of these institutions in 1102 into medical colleges in substance as well as in name was undoubtedly a step forward in the promotion of medical studies.

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