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Yang, Shu-Uin,

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THE EVOLUTION OF ANATOMY IN CHINESE MEDICINE

by

Shu-Uin Yang

B.S. National Taiwan University, 1973

M.S. National Taiwan University, 1976

THESIS

Submitted in partial satisfaction of the requirements for the degree of

MASTER OF ARTS

in

HISTORY OF HEALTH SCIENCES

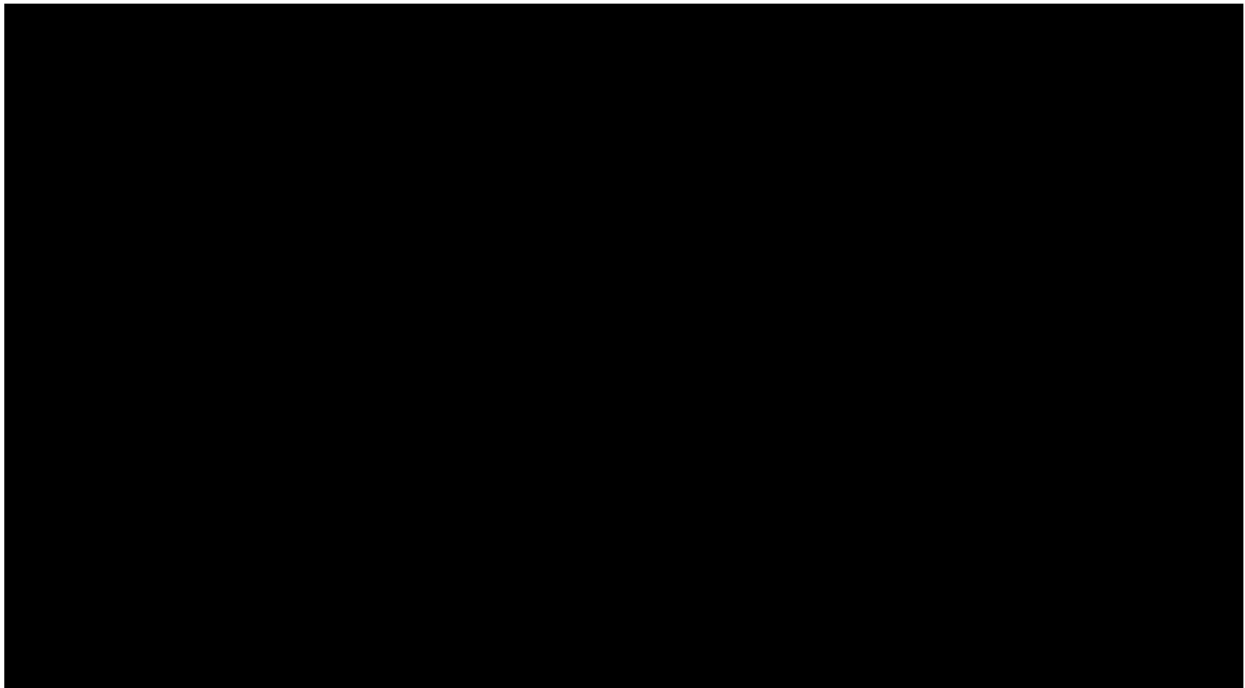
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To my teacher

DR. ILZA VEITH

With gratitude for her fruitful inspiration
and advice through my studies.

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Shu-Uin Yang

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INTRODUCTION

Chinese medicine, including both the literate, official profession and the popular traditional folk-medicine, is regarded to represent a different set of conceptions associated with philosophical, anthropological ideas; among them, the Yin yang^a and Wu hsing^b (five element principle) are the most renowned.

The description of Chinese medical theories dissociated with the Yin yang and Wu hsing principles has neither been attempted nor approached until the recent archaeological discovery of the five oldest Chinese medical textbooks in Ch'angsha^c, the People's Republic of China.^{1,2} These medical classics are assumed to have been written at the end of the 3rd century B.C., earlier than the canon of Chinese medicine, the Nei Ching^d, whose present form is believed to be compiled at the

^a 陰陽

^b 五行

^c 長沙

^d 內經

¹ The five texts are Shih I Mai Chiu Ching, 十一脉灸經, 一, Shih I Mai Chiu Ching, II 十一脉灸經, 二, Mai fa 脉法, Yin Yang Mai Ssu Hou 陰陽脉死候, and Wu Shih Erh Ping Fang 五十二病方, Chung i yen chiu yuan i shih wen hsien yen chun shih 中醫研究院醫史文獻研究室, "Ma wang tui mien shu ssu chung ku i hsueh i shu chien chieh 馬王堆帛書四種 古醫學佚書簡介", Wen wu 文物, no. 6, 1975 pp. 16-19.

² Chung, I yen 鍾益研 & Hsiang, Ling 凌襄, "Wo kuo hsien i fa hsien te tsui tsao i fang mien shu 我國現已發現的最古醫方—五十二病方", Wen wu 文物, no. 9, 1975, pp. 49-60.

1st century B.C.¹ Anatomical, physiological and therapeutic theories were described in terms of the Yin yang, but dissociated with the Wu hsing principle. However, the similarity existing in its paragraphs and in those of the Nei ching has been delineated. It soon becomes clear that the development of the Yin yang philosophy had occurred before the incorporation of the Wu hsing principle. Both later became the eminent medical theory as the Yin yang wu hsing^a operating in the Nei Ching and in almost every medical textbook. Certainly, before the text Nei-Ching was formed, the medical content without association of the Yin yang wu hsing should have been constituted. Even after the rise of the Nei ching, in the post-Nei Ching period, philosophical, religious, social, cultural influences, as well as folkloristic beliefs continued to play important functions and interweave in the medical theories throughout the evolution of Chinese medicine.

It is based on this view that the present thesis concerning about the anatomical ideas and those schematic knowledge of the human body developed in the history of Chinese medicine will be discoursed under four different periods: the Pre-Nei Ching (before the 1st century B.C.), the Nei Ching, the Post-Nei Ching (1st century B.C. -16th century A.D.), and the Transitional period (16th century A.D. -20th century A.D.).

The Pre-Nei Ching period began at the oracle-bone records of the Fourteenth century B.C. It represented rough and primitive anatomical ideas; such as the gross partitions of the human body and structures recognized at that time. Other historical documents have also shown the gradual development and sophistication of the Chinese anatomical lore based upon the medical practice including surgery.

^a陰陽五行

¹Lu, Gwei-Djen & Joseph Needham, "Records of Diseases in Ancient China," Am. J. of Chinese Medicine, vol. 4 no. 1., 1976, p. 4.

The Yin and Yang terms were first borrowed from the philosophical ideas commonly used at the time of the 3rd century B.C. Physicians used Yin and Yang to describe two functional, or physiological, conditions of the body organ. However, the Ying Yang had developed more technical connotations when they were incorporated into anatomical theory.

Medical dissections were performed in the Nei Ching period, since in the text Nei Ching, very interesting and accurate anatomical records were described. The terminology of surface anatomy was developed in more detail, although it still lacked morphological description with accurate definition. There were some eminent measurements of alimentary tract and bone with rather accuracy comparing with those measured in western standard units. Internal organs were divided and classified functionally, and the channel system was described to represent the effective acupuncture points treated in therapy.

The Nan Ching (Difficult Classic) written in the 3rd century B.C. by the physician Ts'ang Kung shows new measurements which were the corrections according to the old records in the Nei Ching. In the 1st century A.D., Wang Mang initiated the first official dissection in anatomical history. In the event, the criminals' bodies executed were opened, internal organs were measured, and the routes of the blood vessel were followed. Hua T'o's surgery with anatomical background was also well known in the 2nd century A.D. However, the increasing strictness from the conflicts of religious and traditional ethical regimes later promulgated a decree, the first written code prohibiting the dissection of the human dead body in 653 A.D. Thus, medical illustration, instead, began to function in the 7th century A.D.

The oldest surviving medical diagram of the internal organ is accredited to 848 A.D. by a Taoist nun Hu Yin. The silk models of internal organ contained in the Buddha statue were carved and molded in the 10th century A.D. in the Sung dynasty. Two bronze statues with 354 acapunture points on the surface were made in 1026 A.D. At the time when dissections were not performed in the open air, the model of these representations of real objects became a helpful and necessary aid in the discipline of Chinese anatomy.

In 1045 A.D. the first systematic volume of anatomical illustration, the Illustration of Ou Hsi Fan's viscera based on actual dissection was created. Fragments of this illustration were repeatedly reprinted and transcribed in many texts in the later periods. It apparently rose the experiential spirit among the physicians with independent mind. Many physicians began to pursue actual anatomical practice to test the knowledge acquired from their ancestors. Hsu Tun, Li I Hsing and Yang Chieh's practices thus produced very valuable illustrations. In the Yuan and Ming dynasties that followed, physicians concentrated in the understanding of these ancient anatomical records, anatomical idea came to a standstill, and not much substantial progress was made. Most illustrations were reprinted from the old diagrams. Although some isolated works were created in this period, they did not attain the high level of an organized body of knowledge.

Western anatomical texts were translated into Chinese in the 16th century A.D. However, Chinese physicians hesitated to merge their mind into the body of the western anatomical knowledge. The most important work published during the transitional period is Wang Chin Jen's I Lin Kai Ts'o in 1830 A.D. He corrected the wrong descriptions in old records and gave the new statement discovered and interpreted by himself. In 1851,

the first complete western anatomical text was translated by Benz. Hobson, and 60 years afterwards, anatomical dissection was first performed in the medical school in China.

In the following chapters, the progress of the Chinese anatomical knowledge developed in history will be presented in detail.

II

Pre-Nei Ching Period

Since neither archaeological nor historical records in the long legendary stage are known, the first reliable sources, we are concerned about, are the oracle-bone records (the 14th-13th century B.C.) of the waste of the Yin dynasty (15th-11th centuries B.C.). Some disease terms written on the oracle bones have been recognized and differentiated. In some instances, such as the pictograph "𠄎", which is composed of the symbol "口" and the pictograph "𠄎"^a, stands for the abdominal disease; in the case of "𠄎", composing of the symbol "口" and the pictograph "𠄎"^b, means the disease of extremities.¹ From the pictographs recognized, the Yin people divided the human body into several partitions; such as the head, extremities, arms, and abdomen. Body organs as eyes, ears, nose, teeth, tongue, and heart were also noted. Anatomical ideas are primitive and their anatomical knowledge is rough and gross. But, the oracle-bone records may not represent the whole medical contents developed at that time. The Yin Pen Chi^c (The Yin Annals) says, Chou^d, the king (12th century B.C.) killed his minister Pi Kan^e to see if his heart had seven openings, which were regarded as the

^a the pictograph means human figure.

^b the pictograph means the leg and the foot.

^c 殷本紀, in the third volume of the Shih Chi 史記 written by Ssu Ma Ch'ien 司馬遷 in the 1st century B.C.

^d 紂 ^e 比干

¹ Chen, Shih-hui 陳世輝, "Yin jen chi ping pu kao 殷人疾病補考," Chung hua wen shih lun tsung 中華文史論叢, vol. 4, p. 138.

saint's symbol.¹ From the anatomical point of view, Chou demonstrated a case of historical vivisection in the political revenge. However, we doubt, that at this early time, the Yin people practiced human dissection for medical purpose. It is true that some anatomical knowledge was handed down accidentally, but, most anatomical lore was accumulated from the experience of various illnesses, which attacked on different parts of human body. As the anatomical lore was progressively systematized through medical practice, structures, as well as organs, were thus naturally classified and termed.

In the following Chou dynasty (11th-8th centuries), medicine was first noted as an independent profession, other than the primitive priest-medicine. Officially, the physicians were divided into five different specialties; each in charge of the administration and pharmaceuticals (I Shih)^a, the king's nutrition (Shih I)^b, the folk healing (Chi I)^c, injuries (Yang I)^d, and veterinary diseases (Shou I)^e. The priest-physician were distinguished from the official physician and practiced in local villages. It is Yu Fu^f, a priest-physician, who performed in the Eighth century B.C., an impressive surgical practice conceiving

^a醫師
^d瘍医

^b食醫
^e獸医

^c疾医
^f俞跗

¹Kōzō, Watanabe, "General Remark on the Dissection and Anatomical Figures in China," Nihon Ishigaku Zasshi, vol. 7 no. 1-3, 1956, pp. 90-91.

interesting anatomical knowledge.¹ According to Ssu Ma Ch'ien^a:

(Yu Fu) examined the points (stone
needling points) of five viscera,
then cut skin, dissect muscles, sever
blood vessels, tie tendons, press
bone marrow and brain, divide
mysenteries with finger nails, wash
intestine and stomach, cleanse five
viscera,

It seems that the surgical techniques were achieved as wondrous tricks. However, from the statement above, more structures, such as skin, muscles, blood vessels, tendons, bone marrow, brain, mysenteries, intestines, stomach, and five viscerae were itemized. Various structures and organs were recognized in the gradual complicated body. The surgical procedure started at the cut of the skin, then muscles, blood vessels, and tendons. Bone marrow and brain, as well as the intestines and stomach were termed compatibility, probably being based on their functional relationship. Internal organs were understood in terms of the five-viscera system, but the five individual organs were not indicated in the literature. The sensitive points of stone needling and cauterization distributed on the surface of the body and connected with their relative organs functionally.

^a司馬遷, the authors of Shih Chi 史記.

¹Wang, Fan-Chih 王范之, "Pien Chueh han Yu Fu ——— Wo kuo tsui tsao te nei koi Chia han wai ko i Chia 扁鵲和俞附——我国最早的内科医家和外科医家," Jen Mien Pao Chien 人民保健, no. 4, 1959, p. 386.

In the case of Yu Fu's surgery described by Ssu Ma Ch'ien, it is possible that he might have borrowed some anatomical vocabulary available in the terminological pool of his time (1st century B.C.). Nevertheless, the anatomical background hidden in Yu's surgical practice is certainly noticeable. The folk-surgeon Yu Fu's performance, indeed, not only led the surgical practice ahead, but he himself also stood out as an innovator in the history of Chinese anatomy in breaking through the plain, artless anatomical knowledge to a more sophisticated content.

Yin Yang theory

Many scholars agree that Yin and Yang first appeared as philosophical terms in the fifth chapter of the fifth appendix of the I Ching^a at the early 3rd century B.C. During the Warring States period (5th-3rd century B.C.) astrological, geographical, and other natural phenomena were commonly explained in terms of Yin and Yang.¹ Among the medical practitioners, Pien Chiao^b, who practiced late in the Spring and Autumn period (6th-5th century B.C.),² is the first physician known to apply the Yin Yang theory in diagnosing illness by differentiating the various conditions of pulsebeat. In his diagnostic theory, Yin and Yang were borrowed to describe the two functional conditions of the blood vessel.

^a 易經

^b 扁鵲

¹ Lo, Yuan-k'ai 羅元愷, "Tsu kuo i hsueh te yin yang wu hsing hsueh shuo 祖国医学的陰陽五行學說," Kuang Tung Chung i 廣東中醫, no. 1, 1957, pp. 8-12.

² According to Ilza Veith, the name Pien Ch'iao was applied to many physicians from the 6th to 2nd century B.C. In "Huang Ti Nei Ching Su Wen," (California, 1973) p. 3.

Etymologically, the Chinese pictographs and ideographs of Yin and Yang are symbolic of darkness and light; besides, a vast variety of interpretation and connotation has been found. In general, "yang stands for sun, heaven, day, fire, heat, dryness, light,, yang tends to expand, to flow upwards. Yin stands for moon, earth, night, water, cold, dampness; yin tends to contract and to flow downwards."¹ In medical usage, Yin and Yang mostly dissociated from the original ideas and philosophies they had borrowed, and conceived more technical connotations. In most instances, they help to explain the functional and pathological changes of internal organ.

In Ssu Ma Ch'ien's description, the blood vessel diagnosed by Pien Chiao could be divided into three categories: Ching^a (main branches), Wei Lo^b (small branches), and Niu^c (groups of branches). The branches were said to connect with internal organs; such as stomach, intestines, five viscera, San Chiao^d (three burning spaces), and urinary bladder. Unfortunately, the blood supply was not described in detail, neither was the morphology of organs and tissues, to which the blood vessel attached.

In both of the old medical texts (3rd century B.C.) recently discovered in China,² the courses of the eleven channels, their relative symptoms and cauterization treatment were described. The eleven channels were divided into six channels, which distributed along the lower limb, and five routes along the upper limb. The upper and lower limb channels were further divided into yang and yin groups. Therefore, there were three

^a經
^d三焦

^b衛絡

^c紐

¹Veith, Huang Ti Nei Ching, p. 14.

²Chung, "Ma Wang tui," p. 16-19.

yang, three yin upper limb channel^a, and three yang, two yin lower limb channels^b.

The channels described are different from the blood vessel taken by Pien Chiao in his diagnosis. Anatomically, these channels are not characterized as specific structure observed with the help of modern research techniques; neither do they correspond equally to the routes of the blood vessel or nerve. Although some channels do overlap the routes of blood vessel or nerve, with restricted western anatomical terminology, it is still difficult to describe them in scientific accuracy. Some scholars claimed that they only represent a set of imaginary routes being framed from the experience of effective cauterization and needling. Thus, the constitution of the idea of channel system seemingly presented the best way to elucidate the lore of these long surviving treatments.

Topographically, the channels were divided into upper and lower limb groups. After the Yin Yang concept had been incorporated, the Yin (frontal) and Yang (dorsal) groups were thus formed, and later advanced into smaller subdivisions. The direction of nine channels starts from the extremity of four limbs and ends in the center of the trunk; however, two routes point centrifugally^c. Comparing with the routes of eleven

^aThe three yang upper limb channels are Tzu Tai Yang Mai 足太陽脉 (greater yang foot channel), Tzu Shao Yang Mai 足少陽脉 (lesser yang foot channel), and Tzu Yang Ming Mai 足陽明脉 (bright yang foot channel); the three yin upper limb channels are Tzu Tai Yin Mai 足太陰脉 (greater yin foot channel), Tzu Shao Yin Mai 足少陰脉 (lesser yin foot channel), and Tzu Chueh Yin Mai 足厥陰脉 (extreme yin foot channel).

^bThe three yang lower limb channels are Pi Tai Yang Mai 臂太陽脉 (greater yang arm channel), Pi Shao Yang Mai 臂少陽脉 (lesser yang arm channel) and Pi Yang Ming Mai 臂陽明脉 (bright yang arm channel); the two yin lower limb channels are Pi Tai Yin Mai 臂太陰脉 (greater yin arm channel) and Pi Shao Yin Mai 臂少陰脉 (lesser yin arm channel).

^cThe two routes are Pi Tai Yang Mai 臂太陽脉 (greater yang arm channel) and Tzu Tai Yin Mai 足太陰脉 (greater yin foot channel).

channels among the twelve channels recorded in the Nei Ching^a, we find that both course-systems are similar. In the Nei Ching, the direction of six channels is centripetal, and is centrifugal of the rest six channels. It clearly shows a gradual transformation in systematizing the sketchy, random knowledge to attain an organized ideal system with symmetry, which was later achieved in the Nei Ching. As we know, the discovery of these old medical texts certainly helps to illuminate the process of fixation, or derivation, of the medical theory crystallized in the Nei-Ching.

^aThe twelfth channel is Pi Chueh Yin Mai 臂厥陰脉(extreme yin arm channel).

III

The Nei Ching Period

Han Shih Wai Chuang^a says that, during the period between the Chin^b and Han^c dynasties (3rd century B.C.), there were four different medical schools: I Ching^d (medical theories), Ching Fang^e (theories and prescriptions), Fang Chung^f (love making) and Sheng Hsien^g (immortality); thirty five specialists; nine hundred and twenty seven volumes of medical textbooks^h. Unhappily, the Nei Ching including nine volumes of the Su Wenⁱ and nine volumes of the Ling Shu^j was the only one passed down.^l The Nei Ching had been revived many times in the past, and several editions and commentaries were wrought out by many scholars. The present form of the Nei Ching containing twenty four volumes of the Su Wen including eighty one chapters and twenty four volumes of the Ling Shu, also including eighty one chapters, was compiled and commented by Wang Ping^k in the T'ang dynasty. Scholars often claimed that the present edition should have been attained before the time of Wang Ping. Nevertheless, it is generally agreed that the Nei-Ching was compiled not earlier than the 1st century B.C.

Since medical dissections were performed in the Nei Ching period, or even in the Pre-Nei Ching period, there existed very interesting

^a 韓詩外傳 written by Han Ying 韓嬰 in the 2nd century B.C.

^b 秦 ^c 漢 ^d 醫經
^e 經方 ^f 房中 ^g 神仙

^h the actual number is 868 volumes.

ⁱ 素問 ^j 靈樞 ^k 王冰

^l Chang, Ch'uang Hsien 張創猷, "Chieh hsun erh te chih yu shih erh ching mai tsai chieh pou hsueh shang te hsien shih i i 切循而得之第十 經脈在解剖學上的現義," Kuang Tung Chung I 廣東中醫, no. 11, 1956, p. 10.

and accurate anatomical records in the paragraphs of the Nei Ching.
The 12th chapter of the Ling Shu, Ching Sui^a (water channel), says:

Huang Ti^b (the emperor) asked his
minister Ch'i Po^c:

Twelve channels distributing
on the body are like twelve streams.
Inward, they connect with five
yin viscera^d and six yang organs^e.
Each stream, or channel, distributes
along its own route in the specific
area, depth, width and distance.....

Ch'i Po answers:

.....the flesh and skin of a man
of eight Ch'ih^f tall could be
measured, touched, pressed and probed
on body surface. After death, they
are allowed to be observed through

^a 經水

^b 黃帝

^c 岐伯

^d the five yin viscera are liver, heart, spleen, lung, and kidney, and are named five Tsang (viscera).

^e the six yang organs are gall bladder, small intestine, stomach, large intestine, urinary bladder, and San Chiao (three burning spaces), and are named six Fu (viscera).

^f 尺, ancient Chinese length unit in measurement.

dissection for further study. The quality of the yin viscera, either hard or brittle; the quantity of the yang organs, the various amounts which they contain; and the length of the blood vessel,.....all could be measured in standard units.

Motohiro Tamba^a (1755-1810 A.D.) commented, from the facts above, that in ancient time dead bodies used to be discarded in the fields when the custom of containing the body in the coffin after death was not popular. Therefore, physicians often had the opportunity to make actual observation. Although the anatomical knowledge found in the Nei-Ching remained at the gross level, it may have resulted from the practical dissection performed by ancient physicians.

In the Nei Ching, the terminology of surface anatomy was developed and clarified in more detail. Eyes, ears, nose, mouth, anus, urethral and vaginal openings were termed as nine orifices, Chiu Chiao^b. Skin, flesh, muscle, tendon, and bone were the five basic external elements; and functionally they were connected with five internal organs, respectively. Eyeball, teeth, tongue, hair, beard, and nails were identified and named, yet without detailed morphological definitions.¹ Each organ was characterized as either yin or yang viscera, and each was attributed to one of the five principle elements.

^a丹波元簡 Japanese physician.

^b九竅

¹Veith, Ilza, "Universalistic Concepts in Chinese Anatomy and Medicine," Med. Biol. Illust., Lond. vol. 8 (3), July, 1958, pp. 124-137.

The five elements: metal, wood, water, fire, and earth (Chin, Mu, Shui, Huo, and T'u)^a were treated as five basic components of the universe in ancient China. They were gradually "associated with every conceivable category of things in the universe which was possible to classify in fives."¹ Therefore, before Tsou Yen^b (350-270 B.C.), who systematized the philosophical framework of the five-element theory, a great number of categories had been constituted. The philosophy of the five element later permeated into astronomy, calendrical sciences, alchemy, political doctrines, folk beliefs, and medicine as well. It became part of the medical theory at the time of the Nei Ching and combined with the Yin Yang theory to function as the evolutive Yin Yang Wu Hsing doctrine.

In the following, the deep-seated organs recorded in the Nei Ching will be discussed.

Internal Organs

In general, the Chinese Tsang^c is indicated as the internal organ. Among the usages, the five Tsang (five viscera) is the most frequently mentioned. However, in some non-medical classics, the number of internal organs is varied. In the Hsia P'ien^d, it says that there are eleven viscera; nine are recorded in the Chou Li^e; and six in the Chuang Tzu^f.² The Nei-Ching divided the viscerae into two major categories, five yin and six yang organs. The five yin organs, Wu Tsang^g (five viscera), in

^a 金, 木, 水, 火, 土 as Wu Hsing, 五行 (five elements).

^b 鄒衍

^c 臟

^d 下篇

^e 周礼

^f 莊子

^g 五臟

¹ Needham, Joseph, "Science and Civilization in China," vol. II, (Cambridge, 1956), p. 261.

Chinese, were designated as liver, heart, spleen, lung, and kidney, which first appeared in the Han Shih Wai Chuang (2nd century B.C.) in the order of kidney, heart, liver, lung, and spleen. Functionally, the yin organs tend to "store structure potential without letting anything drain off".¹ Topographically, they are located deeply in the body cavity. The six yang viscerae, Liu Fu^a (six viscera), are gall bladder, small intestine, stomach, large intestine, urinary bladder, and San Chiao^b (three burning spaces). They "transmit and assimilate, yet do not store",² and are seated in the more superficial part of the cavity. However, not much detailed morphology was properly delineated.

In Chapter 52, Tzu Ching^c (the prohibition of needling) of the Su Wen, it notes:

The liver derives from the left,
the lung is seated in the right
side, and the heart is located more
superficially. The kidney functions
from the deep inside, and the spleen
is in charge of transmission."

The statement above is sketchy and sometimes it turns out to be a wrong concept from modern morphological point of view. In modern sense, the liver should be originated from the right, and the lung be referred

^a 六腑

^b 三焦

^c 刺禁

¹Porket, Manfred, The Theoretical Foundations of Chinese Medicine, (Cambridge, 1974), p. 110.

²Porkert, The Theoretical Functions, p. 110.

in symmetry. It reflects that the Chinese approached and based with a different view. In Chapter 31, Ch'ang Wei^a (intestines and stomach) of the Ling Shu, it gives rather accurate description about the alimentary tract.

The Hsiao Ch'ang^b (small intestine) attaches to the spine posteriorly; and anteriorly, to the navel. It exhibits sixteen loops. The Hui Ch'ang^c (revolving intestine) lies on the left side of the navel and also has sixteen curves.....The Kuang Ch'ang^d (wide intestine) lies near the vertebrae, curves up and down along the vertebrae....."¹

In the same chapter, it also gives the measurement of alimentary tract, which has been summarized by Hsieh as follows:

Distance from lip to teeth.....1/9 (ts'un)
 Width of mouth.....2 1/2 (ts'un)
 Distance from teeth to epiglottis..... 3 1/2 (ts'un)
 Capacity of mouth and pharynx..... 5 ko
 Weight of tongue..... 10 (liang)

a 腸胃
 b 小腸
 c 迴腸
 d 廣腸

, corresponds to duodenum and jejunum.

, equals to the ileum and the upper part of the colon.

, equals to the sigmoid colon and rectum.

¹Hsieh, E.T., "A Review of Ancient Chinese Anatomy," Anat. Rec., vol. 20, no. 2, 1921, p. 109.

Length of tongue.....	7 (ts'un)
Width of tongue.....	2 1/2 (ts'un)
Weight of esophagus	10 (liang)
Width of esophagus	1 1/2 (ts'un)
Length of esophagus	1 (ch'ih) 6 (ts'un)
Length of stomach stretched out.....	2 (ch'ih) 6 (ts'un)
Circumference of stomach.....	1 (ch'ih) 5 (ts'un)
Diameter of stomach.....	5 (ts'un)
Capacity of stomach (dry measurement).....	3 tou 5 shong
Circumference of (hisao-ch'ang).....	2 1/2 (ts'un)
Diameter of (hsiao-ch'ang).....	8/16 (ts'un)
Length of (hsiao-ch'ang).....	3 chang 3 (ch'ih)
Circumference of (hui-ch'ang).....	4 (ts'un)
Diameter of (hui-ch'ang).....	1 1/2 (ts'un)
Length of (hui-ch'ang).....	(2 chang e ch'ih)
Circumference of (kuang-ch'ang).....	8 (ts'un)
Diameter of (kuang-ch'ang).....	2 1/2 (ts'un)
Length of (kuang-ch'ang).....	2 (ch'ih) 8 (ts'un)

However, in Chapter 32, P'ing Jen Chueh Ku^a (the fast state of a healthy man), new items were added and different measurements were shown.

Capacity of stomach.....	3 tou (grain 2 tou, water 1 tou 5 sheng)
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^a 平人絕穀

¹ Hsieh, E.T., "A Review of Ancient," pp. 108-109.

Length of hsiao-ch'ang.....	3 chang 2 ch'ih
Weight of hsiao-ch'ang.....	2 chin 14 liang
Capacity of hsiao-ch'ang.....	grain 2 tou 4 sheng, water 6 sheng 1 1/2 ko
Capacity of hui-ch'ang.....	grain 1 tou, water 7 1/2 sheng
Capacity of kuang ch'ang.....	dregs of grain 8 sheng 3 ko
Length of intestines.....	5 chang 8 ch'ih 4 ts'un*

Unfortunately, we are unable to ascertain the equivalents of the ancient Chinese units to the western standard units at the present. Liang made the comparison of the relative values measured in Chinese and Western units, and found that both ratios are quite close. According to him, the ratio of the distance of the esophagus to the distance of the intestines recorded in the Nei Ching is 1.6 : 56.8, which is about 1 : 36. The relative value in western standard unit : 25 cm : 925 cm counted by anatomist Spaltehelz is about 1:37. He thus claimed that the measurements given in the ancient medical text Ling Shu were rather accurate. Therefore, these ancient records are alluded to be derived from the practical observation based on actual dissection.¹

The term San Chiao^a (three burning spaces), one of the six yang viscera, is known to be the most controversial word in Chinese medicine

^a 三焦

¹ Liang, Pe-chiang 梁伯強, "Hsueh hsi huang ti nei ching te i hsieh t'i hui 學習黃帝內經的一些體會," Chung hua i hsueh tsa chih (Pei-ping) 中華醫學雜誌(北平), no. 5, 1955, pp. 404-405.

* Ancient Chinese units for measurement are transliterated as:
 Length: Chang 丈, Ch'ih 尺, Ts'un 寸.
 Weight: Chin 斤, Liang 兩.
 Capacity: Tou 斗, Sheng, 升, Ko 合.

for centuries. According to Wang Ping's comment (750-762 A.D.), in Chapter 4, Chin K'uei Chen Yen Lung^a (Treatise on the truth of the golden box) of the Su Wen, the San Chiao includes three spaces: the Shang Chiao^b (upper burning space), the Chung Chiao^c (middle burning space) and the Hsia Chiao^d (lower burning space). Among the five yin viscera, the heart and lung are seated in the upper burning space, the liver and the spleen are located in the middle burning space, and the kidneys are in the lower burning space. Functionally, the upper burning space is attributed to the yang area and the middle and lower burning spaces belong to yin areas. On the whole, the San Chiao (three burning spaces) represent the places, where metabolic mechanism including food ingestion, air breathing, digestion, secretion, excretion and transmitting processes. However, neither morphological description nor suitable definition were of concern. Scholars now agree that the three burning spaces encompass both thoracic and abdominal cavities. The upper burning space equals to the thoracic cavity and contains the viscerae located beyond the diaphragm, including heart, lung, and the pylorus of the stomach. The middle burning space equals to the upper abdominal cavity and contains stomach, spleen, and small intestine. Liver, kidney, urinary bladder, and large intestines are located in the space of the lower burning space, which belongs to the lower part of the abdominal cavity.¹

^a 金匱真言論

^b 上焦

^c 中焦

^d 下焦

¹ Wu, Kou Ting 吳國定, Nei Ching Chieh Piou Sheng Li Hsieh 內經解剖生理學, (Taipei, 1969), p. 297.

Brain, marrow, bones, blood vessels, gall bladder and woman's womb are classified as Chi Heng Chih Fu^a (organs other than general viscerae). Functionally, they are claimed to store, but not dispel, however, no morphological description was discussed. We could only regard these structures as the organs being newly identified with vague definition. New items of internal organ were gradually recognized and specific terms were thus created. Eventually, the viscera-system contained more organs except the traditional five yin viscerae and six yang organs.

Bone measurements

In chapter 14, Ku Tu^b (bone measurements) of the Ling Shu, Po Kao^c gave the following record:

Head circumference.....	2 (ch'ih) 6 (ts'un)
Thorax.....	1 ch'ih 5 ts'un
Hairy area of scalp.....	1 ch'ih 2 ts'un
Vertex of head to angle of mandible.....	1 ch'ih
Thyroid eminence to interclavicular notch.....	2 ts'un
Sternum length.....	9 ts'un
Sternum to umbilicus.....	8 ts'un
Umbilicus to transverse bone (pubes).....	6 ts'un
Width of transverse bone	6 1/2 ts'un
Upper border of the pubes to upper border of internal condyle.....	11 ch'ih 8 ts'un
Upper border of internal condyle to its lower border....	3 1/2 ts'un
Lower border of internal condyle to internal malleolus..	1 ch'ih 3 ts'un
Internal malleolus to sole	3 ts'un

^a 奇恒之腑, in Chapter 11, Wu Tsang Pieh Lung 五臟別論 (treatise on the organs other than the general viscera) of the Su Wen.

^b 骨度

^c 伯高

Back of knee-joint to foot, dorsal surface	1 ch'ih 6 ts'un
From dorsal surface of foot to ground	3 ts'un
External angle of frontal bone to the clavicle	1 ch'ih
Clavicle to axillary space	4 ts'un
Axillary space to twelfth rib	1 ch'ih 2 ts'un
Twelfth rib to hip-joint	6 ts'un
Hip to the middle of the knee	1 ch'ih 9 ts'un
Knee to external malleolus	1 ch'ih 6 ts'un
External malleolus to calcaneus	3 ts'un
Calcaneous to ground	1 ts'un
Between two mastoids	9 ts'un
Between two ears	1 ch'ih 3 ts'un
Between two mark prominences	7 ts'un
Between two hips	6 1/2 ts'un
Foot length	1 ch'ih 2 ts'un
Foot width	4 1/2 ts'un
Shoulder to elbow	1 ch'ih 7 ts'un
Elbow to wrist.	1 ch'ih 2 1/2 ts'un
Wrist to first joint of middle finger	4 ts'un
First joint of middle finger to tip of finger	1/2 ts'un
Border of hair of scalp to seventh vertebra.	2 1/2 ts'un
Seventh vertebra to sacrum	3 ch'ih....." ¹

Bone measurements were used to help the physician in finding out the accurate acupuncture points in treatment. In the Nei Ching period, not only stone needling and cauterization, but also acupuncture technique

¹Hsieh, "A Review of Ancient," pp. 121-122.

with metal needles became the popular treatments. Although, the sensitive points with therapeutic efficacy had been known to distribute throughout the body surface, and the idea of the channel system had developed into a sophisticated medical theory, the Nei Ching was the first medical textbook to stabilize, standardize, and unify the courses of the channel and to define the precise location of the acupuncture points by quantitative measurement, the bone measurement.

The units used in bone measurement were relative values gauged on a man of seven Ch'ih^a five Ts'un^b tall, but not absolute values by means of actual measurement. These values given in the measurement were quite accurate applied to the individual of various height. However, the absolute values varied among different figures. It is also noted that the changeability of the morphology of internal organ in different functional stages was indicated as a reference in the measurement. For instances, the normal length from the sternum to the umbilicus is eight Ts'un. If the length is over eight Ts'un, a larger stomach is diagnosed, if less, then a much smaller stomach is referred.¹

Channel System

The channel system composes of Ching^c, the longitudinal channels, and Lo^d, the horizontal channels. The term Ching Lo^e is generally used to stand for the channel system in Chinese medical theory. In the text

^a 尺, ancient Chinese length unit.

^b 寸, ancient Chinese length unit.

^c 經

^d 絡

^e 經絡

¹Ma, Hung-Chao 馬鴻昭; Tsai, Tien-Chiao, 蔡天皎; and Huo, Chin-K'ai 郝金凱, "Hsueh hsi nei ching ku tu p'ien te ti hwei 學習內經骨度篇的體會," Chung Hua-I Hsueh Tsa Chih (Pei-king) 中華醫學雜誌, no. 16, 1956, pp. 566-567.

Nei Ching, the channel system is classified under three categories:

- (1) the Ching, the longitudinal channels, composing twelve Ching Mai^a (main longitudinal channels), twelve Ching Pieh^b (branches from the Ching Mai), and eight Chi Ching Pa Mai^c (eight channels other than Ching Mai or Ching Pieh).
- (2) the Lo, the horizontal channels, including fifteen Lo Mai^d (reticular channels radiate from Ching Mai), the Pieh Lo^e (reticular branches issue from Ching Mai at each joint) of unspecified number, and the Sun Lo^f (smaller reticular branches).
- (3) Channels connecting with the internal organs at the ends of the body surface, comprising twelve Ching Chin^g (branches from Ching Mai, travel underneath the body surface), and the twelve P'i Pu^h (the smallest branches issue from the Ching Mai and distribute in the zone near the skin surface).¹

Topographically, the main channels are divided into yin and yang groups. Six yin channels distribute on the frontal, inner side of the body, and six yang channels travel on the dorsal, external side of the body. Both the yin and yang channels are further advanced into the upper and the lower limb branches. The upper limb yang channels are divided into three branches as: the greater yang, the lesser yang, and

^a 經脈

^d 絡脈

^g 經筋

¹ Porkert, The Theoretical, pp. 197-216.

^b 經別

^e 別經

^h 皮部

^c 奇經八脈

^f 孫絡

the bright yang upper limb channels.^a The lower limb yang channels are divided as: the greater yang, the lesser yang, and the bright yang lower limb branches.^b As to the upper limb yin channels, three branches are recognized as: the greater yin, the lesser yin, and the extreme yin upper limb channels^c. The lower limb yin channels are classified as: the greater yin, the lesser yin, and the extreme yin lower limb channels^d.

Each channel, functionally, is assumed to connect with one respective viscera and attach to a specific complementary organ. Therefore, an additional yin viscera, the pericardium, is added to meet the complete six-coupled correspondences. The six complementary relationships between the yin viscera and the yang organs can be traced back to Chapter 47, Pen Tsang^e (main internal organs) of the Ling Shu, shown as below:

<u>Yin viscera</u>	<u>Yang organ</u>
Liver.....	Gall bladder
Heart	Small intestine
Spleen.....	Stomach
Lung.....	Large Intestine
Kidney	Urinary bladder
(Pericardium.....)	San Chiao, three burning spaces).

Each yin channel is said to be originated from its own yin viscera; and each yang channel from its specific yang organ. Therefore, we obtain the picture as follows:

<u>Yin Channels</u>	<u>Yin viscera</u>
Extreme yin lower limb channel.....	Liver
Lesser yin upper l.c.....	Heart
Greater yin lower l.c.....	Spleen
Greater yin upper l.c.....	Lung
Lesser yin lower l.c.	Kidney
Extreme yin upper l.c.....	Pericardium

^a 手太陽脉, 手少陽脉, 手陽明脉 ^b 足太陽脉, 足少陽脉, 足陽明脉 ^c 手太陰脉, 手少陰脉, 手厥陰脉
^d 足太陰脉, 足少陰脉, 足厥陰脉 ^e 本臟

<u>Yang Channels</u>	<u>Yang organs</u>
Lesser yang lower limb channel....	Gall bladder
Greater yang upper l.c.....	Small intestine
Bright yang lower l.c.....	Stomach
Bright yang upper l.c.....	Large intestine
Greater yang lower l.c.....	Urinary bladder
Lesser yang upper l.c.....	Three burning spaces

The channel only travels in a definite direction, either centrifugal or centripetal. The three upper limb yin channels start from the thoracic cavity and end at the hand, where they connect with the three upper limb yang channels, which travel centripetally back to the head. The three lower limb yang channels, continuously, travel from the head down to the foot, where they connect with the three lower limb yin channels, which, then, travel centripetally again up to the thoracic cavity and connect with the original three upper limb yin channels. Among these twelve main channels, there are many horizontal channels and smaller branches, which form the web-connecting system. Thus, the twelve channels complete a circuit, which starts from the greater yin upper limb channel, then travels along the channels as shown in the order: the bright yang upper limb channel, the bright yang lower l. c., the greater yin lower l. c., the lesser yang upper l. c., the greater yang upper l. c., the greater yang lower l. c., the lesser yin lower l. c., the extreme yin upper l. c., the lesser yang upper l. c., the lesser yang lower l. c., and ends in the extreme yin lower limb channel, which connects with the beginning greater yin upper limb channel.

Each course is described in the paragraph of the Su Wen in great detail; for example, the greater yin upper limb channel:

"(the channel) originates in the middle
burning space, descends in order

to attach to (the large intestine):
 then, again skirts the stomach up to
 (the cardiac part); from where it penetrates
 the diaphragm and unites with the
 (lung). From there it ascends again
 along the traches, deflects into the
 transverse and reaches the extremity
 in the axilla. Then it runs in front of
 (the extreme yin upper limb channel) along
 the inner side of the arm and down to the
 inner side of the elbow into the Ts'un K'ou^a
 (the radial side of the head of the radius)
 and from there across the thenar to the tip
 of the thumb. A ramification leaves the
 channel proximally to the wrist and runs
 laterally on the inner side along the index
 finger to its tip."¹

The courses of the channel are not always overlapped with those of the nerves, arteries, or veins. However, amounts of anatomical knowledge were highly conceived, sophisticated descriptions were presented, more and more structures were illucidated at the detailed morphological level.

^a 肘口

¹Porkert, The Theoretical, p. 218.

IV

Post-Nei Ching Period

There is a tendency to believe that in this period the Nei Ching became the very canon of Chinese medicine and won widespread attention. Physicians often accepted the doctrine of the Nei Ching without question, therefore, little attempt was made to solve the problems beyond the scope of the text Nei Ching. Such a view is grossly unjust. Vivid evidence of new observations were held. Medical theories derived either from the Nei Ching or from these discoveries were often translated into active treatment. Anatomical knowledge obtained was further elaborated in more detail through several innovative observations. For convenience, the following paragraphs concerned about will be discoursed under three periods: The Pre-Sung (1st century B.C.-10th century A.D.), the Sung^a (10th century A.D.-13th century A.D.), and the Yuan^b and Ming^c periods (13th century A.D. -16th century A.D.).

I Pre-Sung Period

The Nan Ching^d, or Difficult Classic believed to be written in the early Han dynasty (3rd-2nd century B.C.) by the physician Ts'ang Kung^e, or Ch'un Yu I^f, consists of 81 difficult treatises inherited from the

^a 宋

^d 難經

^b 元

^e 倉公

^c 明

^f 淳于意

text Nei Ching.¹ The 42nd difficulty describes the morphology, weight, length, and capacity of internal organs. Comparing with those recorded in the Nei Ching, the description seems to be resulted from new measurements under actual observation.

The liver was described to compose of three left lobes and three right lobes with the gall bladder resting on the short lobe. The heart contained seven openings and three pillars. The lung consisted of eight lobes. The spleen was flat in morphology, and the kidneys were two in the number. However, the two kidneys were classified as two separate, and functionally distinct organs. The left one functioned as a real kidney; the right one was claimed to be the gate of life, Ming Men^a. The gate of life contained semen in the male, and uterus in the woman. It also says that the three burning spaces existed only in name, but not in form, as in the Nei Ching.

There are also several quantitative measurements in the Nan Ching. As to further assessment, it is still difficult for us to give confirmation without accurate equivalents transcribed from the standard units of today. Likewise, we are reluctant to conclude that the morphological descriptions recorded were based upon actual dissection performed by unknown physicians in that period.

^a 命門

¹Ho, Ai hua 何愛華, "Kuan yu nan ching te chi ke wen t'i 关于難經的几个问题," Jen Ming Pao Chien 人民保健, no. 3, 1960, p. 169.

At the turn of the 1st century A.D. an interesting investigation was recorded in Volume 99 of the The Annals of Han^a. Wang Mang,^b a reformer who undoubtedly was interested in technology and science, in a rebellious event (16 A.D.) commanded his official physicians T'ai I^c along with the officers Shang Fang^d, who took charge of weapons, and Ch'iao T'u^e, a profession who killed and dissected animals, to dissect the turncoat. It is said that the bodies were opened, and internal organs were measured. The routes of the blood vessel were also followed with fine bamboo fibers. Unfortunately, neither anatomical illustration was drawn, nor was any new discovery registered.

The active controversies, which arose out of the *? corresponding* ircorrespondent statements shown in the old textbooks, usually became part of the literature in the evolution of Chinese medicine. In Wang Mang's event, attempts with either revolutionary spirit or experimental aptitude, were made to corroborate the old literature and to correct the misleading content.

Hua T'o^f (141-207 A.D.) is credited with the abdominal operation carried out under anaesthesia by Ma Fei San^g, an Indian hemp dissolved in wine. According to the The Annals of the Late Han^h, Volume 72, The History of the Three Kingdomsⁱ, and Volume 29 of the The Three Kingdoms Story^j, he cut the back, opened the abdomen, drew out the ill substance accumulated and cleansed it; then sutured the wound and smeared upon it an ointment.

^a漢書

^d尚方

^g麻沸散

^j三國志本傳

^b王莽

^e巧屠

^h後漢書

^c太醫

^f華佗

ⁱ三國志

The anatomical knowledge concerned about in the operation is assumed to be available at the time when Hua T'o performed his art of surgery. But, as we know, the details of his surgical procedures were destroyed after his death¹, and the anatomical lore applied remained as uncovered. In the ancient bibliography of the I Wen Chih^a (records of literature) of the Han histories, there listed 85 volumes of Corporeal of External Medicine^b, which contained theories and procedure of surgery practiced before the Han dynasty. Unhappily, they suffered the same fate as Hua T'o's surgical book. The destitution of the authorized textbooks of surgery in ancient China became one of the inhibiting factors which prevented the development of surgery. Anatomy, in the standstill of Chinese surgery, also made no substantial progress in the following centuries.

An examination of the anatomical terminology used in non-medical textbooks published at this period reveals the common anatomical knowledge held among it's contemporaries. Hsu Sheng's^c etymological dictionary, Shuo Wen Chieh Tzu^d (121 A.D.), the first dictionary in the Chinese history, defines one hundred and seventy eight characters concerning about the human body structure. Most of the terms stood at the gross

^a藝文志 Han Shu i Wen Chih, 1st A.D. was compiled by experts in magic medicine, military science, history, philosophy, divination and astronomy.

^b外經, includes 37 volumes Huang Ti Wai Ching 黃帝外經, 12 volumes Pien Chiao Wai Ching 扁鵲外經, and 36 volumes Pai Shih Wai Ching 白氏外經.

^c許慎

^d說文解字

¹Veith, Huang Ti Nei Ching, pp. 3-4.

level, but the anatomical terms which frequently used in medicine were systematized and clarified in brief definition. The small book, the Exposition of Names, A Dictionary, Shih Ming^a (196 A.D.) by Liu Hsi^b also gives the terms of gross body structures with rather precise definition. In the Eighth chapter of the Second volume, Liu presented the fine structures of the face, the gross sections of the head, the particular structures of the four limbs, the morphology and function of internal organs, and the tissues, such as skin, flesh, muscles, bones, tendons, blood, fluids, and sweat.

The anatomical terms appearing in the two dictionaries, as mentioned above, could be traced back to those recorded in the older authorized medical texts flourishing at the same time. The terms that appeared in old medical texts often lacked unified definitions. The non-medical dictionaries not only presented the words of common use, they also helped to clarify the specific meaning of the term and its precise definition when these medical words became vague and confused without systematization.

The influence of Buddhism, Taoism, and Confucianism

Buddhism was first introduced into China from India at the beginning of the Christian era. For a few centuries followed, the Buddhist philosophy was much developed and explored owing to the disruption and war devastation

^a 釋名 (Analytical Dictionary of Characters).

^b 劉熙

when the religion provided a refuge for popular belief. A tremendous body of Buddhist literature, including medicine, were translated. Buddhist priests often involved in the medical profession, and medical texts apparently flourished among Buddhist priests. It is claimed that the trace of Hindu medicine could be found in I Ching^a, the Buddhist pilgrim's writings (671-695 A.D.),¹ in the contemporary physician Sun Ssu Miao^b's (581-682 A.D.) medical textbook, the Book of Prescriptions Worth a Thousand Gold^c, which shows the influence of the Hindu medical theories, and in the bibliographical catalogue of the official history of the Sui dynasty (636 A.D.) edited by Wei Cheng^d, which contains a number of medical books including the Hsi Yu Ming I So Chi Yao Fang^e (The best prescriptions collected by the most famous physicians of the Western countries).²

However, the eminent ancient Hindu surgery including laparotomy and trapanation, which had been achieved in ancient time was never brought in with the religion of Buddhism. The Hindu medicine carrying with the Buddhist philosophy was, actually, modified to cope with the Chinese culture, and Chinese medicine as well, through a process of the "Sinicization of Buddhism"³.

^a 義淨

^b 孫思邈

^c 千金要方

^d 魏徵

^e 西域名醫搜集藥方

¹ Needham, Science and Civilization, vol. I, pp. 207-211.

² Ch'en Kenneth, K.S., Buddhism in China, (Princeton, 1964) pp. 482-484.

³ Ch'en, Buddhism in China, p. 5

Since, at that time, Chinese medicine including Hua T'o's surgery, a long list of drugs of better quality, the treatments of acupuncture and cautery, and the diagnosis of the pulse skill (Wang Shu Ho^a of the 3rd century A.D.) surpassed in the world. Yet there were certain effects played by the Buddhist philosophy upon the Chinese scientific minds. As Needham pointed out, the Chinese biological thought of the nature of transformation, the embryology in the early 12th century A.D. was connected with the metamorphosis ideas of the Buddhist philosophy.¹ On the other hand, from the anatomical point of view, the doctrine of Buddhist compassion, which prohibited animal sacrifices and dissection, certainly played a negative influence on the development of anatomy.

Like Buddhism, the natural philosophy of Taoism school once provided a refuge for the religious faith during the period of war devastation. However, it is well known that the empiricism of Taoist philosophy was closely associated with the events, such as astronomy, calendar science, earth sciences, systematic botany and zoology, alchemy, and technology in the history of science in China.² Besides, ample evidence has also shown that Taoist alchemists, or iatro-chemist, pharmacists, and physicians were engaged in amounts of health training in dietetics, breathing exercises, gymnastic, sexual, and heliotherapeutic techniques to attain material immortality.³

^a 王叔和

¹ Needham, Science, and Civilization, vol. II., p. 422.

² Needham, Science and Civilization, vol. I., p. 111.

³ Needham, "Medicine and Chinese Culture," (with Lu Gwei-Djen) in the Clerks and Craftsmen in China and the East, (Cambridge, 1970), pp. 283-286.

In Taoist philosophy, the idea of body was captivated as a unity and served as a home for souls and spirits. Through the perpetuation of body, wrote Maspero, "one could conceive of a continuation of the living personality as a whole."¹ It is in the pursuit of the immortality of body that Taoist priests developed a sophisticated knowledge of body structure and function acknowledged in terms of philosophical concept. Although, as Wang Chung^a said, they even touched the concept of spontaneity (Tzu Jan)^{b, 2} unfortunately, they did not form an adequate body of technical terms with precise definitions after body investigation.

As is generally known, the intense doctrines of Confucius have excluded the observation of non-human phenomena. From the anatomical point of view, the Confucian idea that the body should be kept out of injuries as one basic morality of obedience was a hindrance, or a negative influence on the development of anatomical studies. In 653 A.D. the Emperor of the T'ang dynasty, Kao Tzung^c initiated a decree, the first written code^d, which prohibited the dissection of the dead body.³ It says:

^a王充

^b自然

^c高宗

^dTai Tang Shu I 大唐疏議, is produced by Tang Scholars, deals mostly with criminal law.

¹Needham, Science and Civilization, vol. II, pp. 153-154.

²Needham, Science and Civilization, vol. II, p. 163.

³Kōzō, "General Remark on the Dissection," p. 90.

Whoever severs, burns, or destroys
 the corpse, or discards it into
 water should be charged with a degree
 less than the punishment in the
 murder case.

There followed, in 712 A.D., the Emperor Hsuan Tzung^a inflicted the punishment on whoever severed the flesh and bones from the bodies of criminals executed.¹ Since the folk believed that human blood and flesh could be used as drug for healing, the decree was promulgated in order to protect the traditional ethics, which had been repeatedly depicted in the religious stigmas of Buddhism, Taoism, Confucism, and in the old classics, such as the The Book of Etiquette and Ceremonial^b, and the Record of Rites (50 B.C.)^c. Unfortunately, the proclamation of the codes gradually became a dark picture, which was exaggerated in the way that made the practice of medical dissection impossible.

^a 玄宗

^b 儀禮

^c 禮記

¹In the Chiu Tang Shu 旧唐書 (the old history of the T'ang dynasty). T'ang Chi Chiung, 唐志炯, "Medical decree in the Tang and Sung dynasties," I Hséh Shi Yu Pao Chien Tzu Chi 医学史与保健組織, no. 4, 1958, p. 307.

The qualified examination of medical practitioners began in 758 A.D. of the T'ang dynasty. Among the medical subjects tested, the Nei Ching was held as the main focus among medical disciplines. Several editions and commentaries of the Nei-Ching were thus wrought out by scholars, such as Ch'uan Yuan Chi's^a the Commentary on the Su Wen^b (6th century A.D.), Yang Shang Shan's^c Huang Ti Nei Ching Tai Su^d (30 volumes, 683 A.D.), and the most influential accomplishment, Wang Ping's^e Commentary on the Su Wen of the Nei Ching (750-762 A.D.). Wang collected several editions, reedited them and set up the present form of the Huang Ti Nei Ching Su Wen^f. Wang's text contained eighty-one chapters, which were classified in twenty-four volumes. Researchers claimed that among eighty-one chapters, two had been edited in the text in the 5th century A.D. by the physician Liu Shu Wen^g;¹ seven chapters were incorporated into the text by Wang at the time of his compilation.²

The institution of the civil examination system also demanded enhanced amounts of textbooks, which used to be written or copied by hand. As we have known, the writing instruments, paper, ink, and seals which were

^a 全元起

^b 素問訓解

^c 楊上善

^d 黃帝內經太素

^e 王冰

^f 黃帝內經素問

^g 劉舒溫

¹The two chapters are the 72nd chapter 刺法, and the 73rd chapter 本病. Ho 何, "Kuan yu Nan Ching 关于'难經'的几个," p. 167.

²The seven chapters include the 66th 天紀元, the 67th 五運行, the 68th 六徵者, and 69th 气交變, the 70th 五政当, the 71th 大元正紀, and the 74th 至真要. Peiking Chung I Hsueh Yuan ed., 北京中医學院, "Chung kou i hshieh shih Chiang i 中国医学史講義," (Hong Kong, 1968).

made out of metals, stones, or clay had long been used by the Chinese. However, it had not been until the block-printing was widely used that the reproduction of the texts, which were required by the candidates, became available. There are strong evidence for scholars to believe that, early in the 4th century A.D., Taoists printed the charms for prayer formulae and for warding off evils and diseases with the seal. Furthermore, the printings containing the illustration of the Buddha along with the prayer formulae were made in the late Eighth century A.D. From then on, the printing of general textbooks and illustrations beyond religious purpose became popular. Therefore, there is no doubt that in the Sui^a (581-618 A.D.) and T'ang (618-907 A.D.) dynasties, when medical illustration, mainly on the internal organ came into being, Buddhism and Taoism should have the greatest share. Many drawings were made for the religious worship. However, not many of them existing before the T'ang dynasty have come down to us, probably, due to the lack of wide application of printing technique. Among those rare diagrams that have survived, the Illustration of the Viscera of Huang T'ing Nei Ching^b (848 A.D.) is claimed to be the oldest medical illustration existing in the history of Chinese anatomy, and of the western anatomy as well².

^a 隋

^b 黃庭內景五臟六腑圖

¹ Chou I-liang 周一良, "Chih yu Ing shua shu 紙與印刷術," in the Chung kuo ko hsieh chi shu fa ming han ko hsieh chi shu jen wu lun chi 中國科學技術發明和科學技術人物論集, edited by Li Kuang-pi & Ch'ien Chun-yeh 李光壁 & 錢君擘, (Peiking, 1955), pp. 1-20.

² Kōzō, "General Remark on the Dissection," p. 111.

The term Nei Ching^a (inner scenery), which is originated in the classic Record of Rites^b of the 1st century A.D., usually represents the structural and functional phenomenon of general internal organs. Terms appearing in the ancient bibliographies, such as Nei Ching T'u^c (illustration of internal sceneries), Nei Hsing T'u^d (illustration of internal figures), Nei Chao T'u^e (illustration of internal pictures under illumination), and Tsang Fu T'u^f (illustration of viscera) generally stand for the diagram of internal organs.¹

The Illustration of the Viscera of Huang T'ing Nei Ching was drawn and commented by a Taoist nun Hu Yin^g at the end of the T'ang dynasty. She drew each organ on a separate chart. The individual viscera shown is remindful of the old signs derived from internal organs, such as uterus, heart, trachea, and lung amulets in Egypt (4500 B.C.), and of the clay model of the sheep's liver used for divination in early

^a 内景

^b 大戴礼(曾子天圆篇)

^c 内景图

^d 内形图

^e 内照图

^f 臟腑图

^g 胡愔

¹ Yu, Tzu-wang 于祖望, "Tzu kou i hsieh kun yu chieh pou fang mien te chi shu 祖国医学關於解剖方面的記述", Shang Hai-Chung I Yao Tsa Chi 上海中医藥雜誌, no. 10, 1956, p. 446.

Mesopotamian civilization (2000 B.C.).¹ It may not be too hasty to assume that Hu Yin's work was produced for the purpose of religious motive. Indeed, during the T'ang and Sung dynasties (9th and 10th centuries A.D.), drawings and models of internal organ were often worshipped in religious ceremonies.²

Accordingly, the original edition of Hu's drawing was destroyed in the past. But the illustrations were compiled into five medical texts in the later periods.³ The pictures shown below are taken from the Japanese

¹Singer, Charles, The Evolution of Anatomy, (New York, 1962), pp. 6-9.

²Kōzō, Watanabe, "Anatomical Study on the Traditional Chinese Medicine," Nihon Ishigaku Zasshi, vol. 7, no. 1-3, Sept. 1965, pp. 30-31.

³The five texts include:

- (1) 黃庭內景五臟六腑補瀉圖一卷
明正統道藏洞玄部靈圖類
- (2) 黃庭內景五臟六腑圖一卷
明正統道藏洞真部方法類修真十書
- (3) 五臟六腑圖一卷
醫方類聚, 卷五 (1862, 喜多村直竟)
- (4) 黃庭內景五臟六腑圖說一卷 (1583)
上海王圻刊黃庭內
- (5) 新刻黃庭內景五臟六腑圖說一卷
萬曆錢唐胡文煥刊. 百家各書 (格致全書).

Kōzō, "General Remarks on the Dissections," p. 111-112.

text Ihō ruiju^a edited by the Japanese physician Kitamura Chokkan^b
(1804-1876 A.D.) in 1862 A.D. Six diagrams of the viscera were presented
in the order as: lung, heart, liver, spleen, kidney, and gall bladder.
The explanation for each drawing was also translated and presented in
the following:

^a 医方類聚

^b 喜多村直竟



Fig. 1. In the first diagram, the lung is shown. Although six lobes were depicted, seven lobes were drawn in the diagram. Hu says that the lung has plain white color with glaring redness. It weighs three Chin^a three Liang^b, and hangs like an ancient Chinese musical stone.^c The white fauna is its spiritual figure^d. Seven male angles and fourteen female angles of seven Ts'un^d tall are the patrons.

^a 斤 (ancient Chinese weighing unit).

^b 兩

^c 磬 an ancient Chinese musical instrument made by hollowing out the hard sonorous stone.

^d 寸



Fig. 2. The heart is located beneath the lung, at the upper side of the liver; about one inch from the end of the breast bone. It is shaped like a lotus bud with white color glaring in redness. It weighs twelve Liang. The red bird is its spiritual figure, and the angel dressed in brocade, holding a jade tablet is the patron.



Fig. 3. The liver is located at the left side of the heart. It has three lobes at the left, and four lobes at the right; whitish color with dark redness, and four Chin four Liang in weight. Chinese dragon is its spiritual symbol. One angel dressed in blue, the other in yellow, both holding the bowls of jade fluid are originally transformed from its soul generated in the liver.



Fig. 4. The spleen is about three Ts'un upward from the umbilicus. It weighs two Chin three Liang with white color glaring with yellow. Hu Yin depicted it as an overturned bowl. The Chinese poenix is the symbol. The female angel of seven Ts'un tall is said to circulate in the spleen and is originally transformed from the thought generated by the spleen.



Fig. 5 The kidneys attach to the lumbar vertebrae posteriorly at the level of the umbilicus. They have white color glaring with purple and three Chin two Liang in weight. Like two hanging stones, the kidneys are symbolized as two-headed white deer spiritually. They generate the will, which is transformed into the male angel of one Chih tall, who protects the kidneys.



Fig. 6. In the last picture, Hu Yin described the gall bladder, which attaches to the liver. It has white color glaring with blue, and weighs three Liang three Chu^a. The gall bladder looks like a hanging gour and is symbolized as a turtle tied by a snake. The male angel is one Chih tall, holding a spear and stands as its guard.

^a 銖

As shown above, the drawing itself inevitably reflects the conventional humanistic atmosphere of the T'ang dynasty. The organs drawn are like the real object, thus the anatomical background demanded may have come to the stage of maturity. On the other hand, the style and technique of the illustration seem to be standardized in a sketchy form. The diagrams depend mainly on the accompanying explanation as a necessary aid in elucidation, which apparently involves the popular folkloristic and religious themes. Back to 653 A.D., a law was promulgated to prohibit the Buddhist and Taoist monks and nuns to engage in medical practice.¹ Therefore, Hu's achievement somehow depicted a possible outlet for the religious class who had the medical knowledge, however, could not put it into practice at that time.

II The Sung Period

The Sung dynasty was a time of ferment; not only marked by the reforms in politics and humanistic studies, it also led to an extremely rapid development in science and technology. Novel inventions, such as the famous printing, gunpowder, and variolation (precursor of vaccination) were discovered and diffused to the world. The old medical system in the atmosphere of fresh thinking, indeed, faced an irresistible reclamation and recodification.

Teng Chuang^a of the Sung dynasty once described the craft for making the drawing and model of internal organs. In the Hua Chi^b

^a 鄧椿

^b 畫繼, vol. 10, 中印度僧畫佛.

¹ Needham, Clerks and Craftmen, p. 278

(inheritance of the drawing), he says that Buddhist priests sketched the figures of the organs at the reverse side of the paper, then painted them with colors on the front. The molding of organ-model, according to Tuan Ch'eng Shih^a of the T'ang dynasty, was performed by artisans in accordance with the illustrations already made. The models molded were then fitted into the cavity of the Buddha statue.¹

There exists, so claimed as, the oldest silk organ-model in the world. Since its discovery in Japan in 1964, several impressive works of scholarship were published in 1956.² It is true that the publication not only mapped out in the oriental art history, it also substantially enlarged the great interest in the anatomical history of Chinese medicine.

The silk organ-models (Fig. 7) are contained in the Buddha statue (Fig. 8). Both were carved and molded in China, then carried to Japan by two Buddhist monks, Chōnen^b and Gīzō^c in 985 A.D. The viscera models were made with colors. They include white throat, white stomach, gray

^a段成式, vol. 6, 絕芸 in 西陽雜俎集.

^b齋然

^c義藏

¹Kōzō, "Anatomical study on the traditions," pp. 30-31.

²"Special Number for Study on the Model of the Human Viscera in the Cavity of Shaka-muni's Statue in Saga Shoryo-ji Temple," Nihon Ishigaku Zasshi (Journal of the Japanese society of Medical History), vol. 7, no. 123, Sept. 1956.

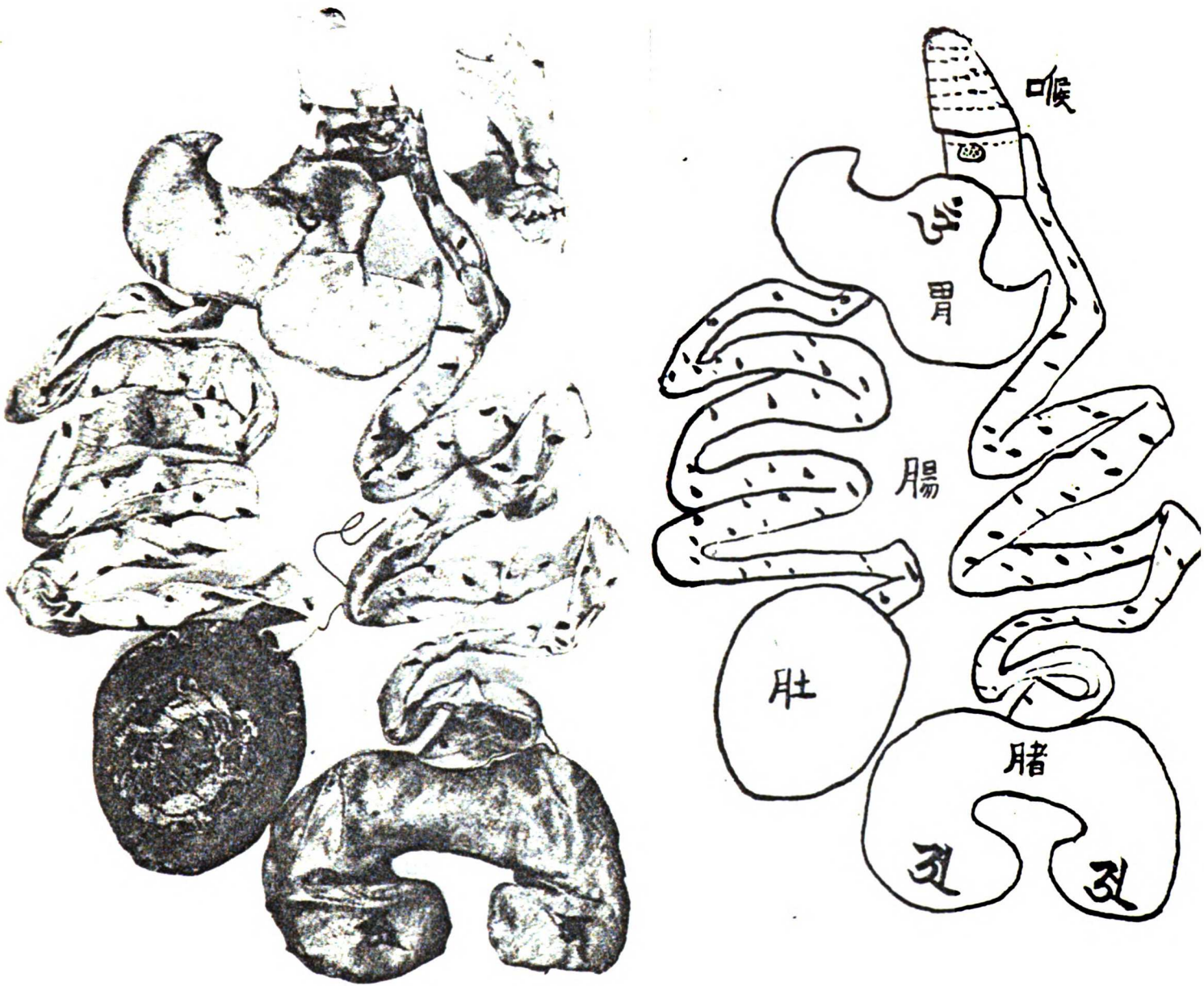


Fig. 7. The silk organ-models molded in the 10th century A.D. (from Nihon Zshigaku Zasshi, vol. 7, no. 1 ~ 3. 1956, Fig. 1).

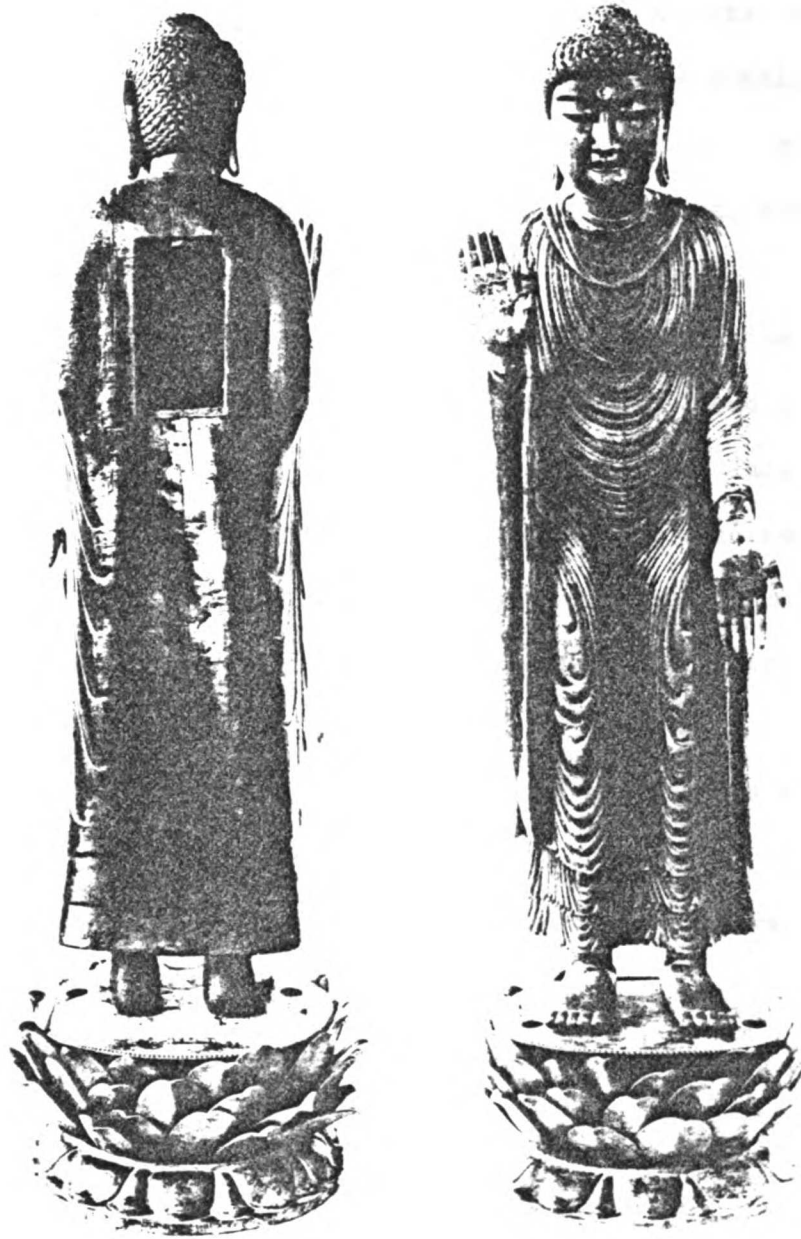


Fig. 8. The Buddha statue whose cavity contains the silk organ-models
(From Nihon Ishigaku Zasshi, vol. 7, No. 1 ~ 3, 1956, Fig. 2,3.)

intestine, red liver, red heart, spleen with assorted colors, red lung, purple kidneys, dark reddish gall bladder, and yellow urinary bladder. These representations could be easily related to the objects categorized in terms of western anatomy. A similarity between these models and those organs shown in Hu Yin's illustration has been noted. However, differences existed in the lobes of the liver, of the lung, and in the shape of the spleen.

The controversies on the lobe-number of the liver and the lung were again evolved. As we have seen, Hu Yin noted a seven-lobed liver and a six-lobed lung. But, a five-lobed liver and a five-lobed lung were shown in the model. Besides, the spleen was molded in a horse-shoe shape, rather than the overturned bowl-structured spleen in Hu's diagram. Since both works were prepared at the period when the dissection was not regularly practised, the confusion remained unresolved. The works were accomplished actually by the religious motive. But later these representations of real objects began to play a role as the practical aid in transferring anatomical knowledge, while dissection was not performed in the open air.

The two bronze statues with three hundred and fifty-four acupuncture points marked on the surface have been regarded as a landmark in the history of Chinese medicine. Both were molded in 1026 A.D. under the command of the emperor of the Sung empire. Wang Wei I^a made an intensive review through various writings contributed by different acupuncture

^a 王惟一

schools, then edited the three-volumed standard text, The Text and Illustration for Acupuncture and Moxibution Points of the Bronze Statue^a, accompanying with two actual statues.

Although acupuncture and moxibution had been practiced for centuries, as a matter of fact, the accurate sites of acupuncture points were never been systematized, nor were the precise names confirmed. The text Nei Ching (1st century B.C.) records three hundred and sixty-five acupuncture points, but in the paragraph, only one hundred and thirty-two points are termed with the specific names. It had not been until Huang Fu Mi^b (215 - 282 A.D.), a pioneer in acupuncture and moxibution, that three hundred and fifty-six points, each with his own specific name, were clarified in the outstanding text for acupuncture, the Chia I Ching^c. However, the obvious incorrelation of the number between 365 points recorded in the Nei Ching and 356 points in the Chia I Ching has never been resolved. Down to the Sung dynasty, only 354 points were recognized and craved on the bronze statue. Statues were used to test the physician who specialized the acupuncture treatment in the medical qualification examination.

The cavity of the statue also contains organ-models. The holes of acupuncture points were filled with mercury, and covered with yellow wax on the surface. Whenever the exact points were needled, the mercury filled in the hole would flow outward. The two statues not only stood as the standard models for acupuncture treatment at that time; they,

^a 銅人腧穴針灸圖經

^b 皇甫謐

^c 甲乙經 by Huang Fu Mi 皇甫謐.

later, were also reproduced for several times in order to ascertain the accuracy in the practice of acupuncture. One of the original statues was claimed to disappear during the war time of the southern Sung dynasty (1127-1279 A.D.); the other one remained as the most precious treasure in China, unfortunately, was missing during the Boxer Uprising War at the beginning of this century.¹

The Illustration of Ou Hsi Fan's Viscera^a, the first systematic volume of anatomical illustration in Chinese history was edited in 1045 A.D. It was drawn according to an actual dissection created in the Sung dynasty. This extraordinary event could be found in several historical documents.² Accordingly, Ou Hsi Fan and fifty-five of his soldiers were executed after they failed in the subduing rebellion. The bodies were investigated and dissected by the judge Wu Chian^b, who asked the artisans to draw down the viscerae shown in the practice of dissection.

^a 歐希範五臟圖 Ou Hsi Fan Wu tsang T'u.

^b 吳簡

¹ Wang, Yung-Sheng, 王永生, "T'ung Jen Shih Hua 銅人史話 (The story of the Bronze statue)", Chung I Tsa Chi 中醫雜誌, no. 19, p. 474.

² (1) Meng Chai Pi T'an 夢齋筆談, by Cheng Ching Pi 鄭景璧.
 (2) Pin T'ui Lu 賓退錄, vol. 4, by Chao Yu Shih 趙與時.
 (3) Sung Ch'ao Shih Shih 宋朝事實, vol. 6, by Li Yu 李攸.
 (4) Shih Chi Piao Chu 史記標注 (Shiki Hyochu), by Gen Un 幻雲.

The illustrations thus made were referred and mentioned in the bibliography of several books.¹ Kōzō held that the fragments of Ou's illustrations were reprinted and transcribed in the Ton'i Shō^a (1320 A.D.), and in the Man'an Pō^b. From the figure shown below (Fig. 9), we see three holes existed in the throat; one for transporting food, the other for water, and another for air. But according to the description, they did not connect with each other. The viscerae; heart, liver, gall bladder, and spleen were located below the lung. The small intestine was seated under the stomach and the large intestine was below the small intestine. The urinary bladder was near the large intestine. Yang Chieh^c, the author of the Ts'un Chen Huan Chung T'u^d (the genuine illustration, 1113 A.D.) commented that the morphological description of these viscerae often varied; such as the heart: some were smaller, others were large; some had square shape, some with straight figure, or oblique shape; moreover, some hearts had holes, the others had none. As to the liver, there were one-lobed, two-lobed, and three-lobed livers. Of the two kidneys, one was seated at the right side below the liver; the other was hanging at the left side over the spleen. The spleen was seated at the left side of the heart. Yellow fatty substance filled up the spaces between the viscera .

^a 碩醫抄, vol. 44, by Seizen Kajiwara 梶原性全

^b 萬安方, vol. 54, by Seizen Kajiwara 梶原性全

^c 楊介

^d 存真環中國

¹ a. Shao Chai Tu Shu Hou Chi 邵齋讀書後志 vol. 2, by Chao Hsi Pien 趙希弁 .

b. Ts'un Chen Huang Chung T'u 存真環中國 (in the bibliography), by Yang Chieh 楊介 .

c. Meng Hsi Pi T'an 夢溪筆談, vol. 26, by Sheng Kua 沈括 .

d. Hua T'o Nei Chao T'u 華陀內照圖 .



Fig. 9. The frontal view of the viscera from the first diagram in vol. 44 of the Ton'i Shō 頓醫抄. (From Kōzō, "General Remark," p. 135.)

Shen Kuo^a remarked in the note Meng Hsi Pi T'an^b (1086 A.D.) that only two holes, rather three holes, existed in the throat. However, in the Hsun Ching Kao Hsueh Pien^c (the compilation of the acupuncture points along the channels) (1537-1619 A.D.), we find that only two holes appeared were shown (Fig. 10). Evidently, the fixed and rigid style of Ou's viscera-illustration were then followed by the artisans.. Not much creation was either stimulated or attempted.

The miscellaneous notes and records of the Sung dynasty, such as the Meng Chi Pi T'an, which has been mentioned above, and some others are considered to be the very helpful material in the present research. Since most of the original medical texts and illustrations were destroyed or missing, these non-medical writings with numerous scientific observations, including many anatomical evidences, indeed, play an important role in elucidating those anatomical events occurred in the history.

It being the case, initiated by Ou Hsi Fan's illustration, the physicians with independent mind and experiential spirit began to pursue actual anatomical investigation to test the knowledge acquired from the previous ancestor. Su Che^d (1039-1112 A.D.), a famous writer in the history of Sung literature, once described a physician's anatomical investigation in one of his miscellaneous records, the Long Ch'uan Lueh Chi^e. Hsu Tun^f, a physician, said (to Su Che) that men were once murdered to serve as food during the years of hunger. Occasionally, the internal

^a沈括

^d蘇轍

^b夢溪筆談

^e龍川略志

^c循經考穴編

^f徐遁

歐希範五臟圖

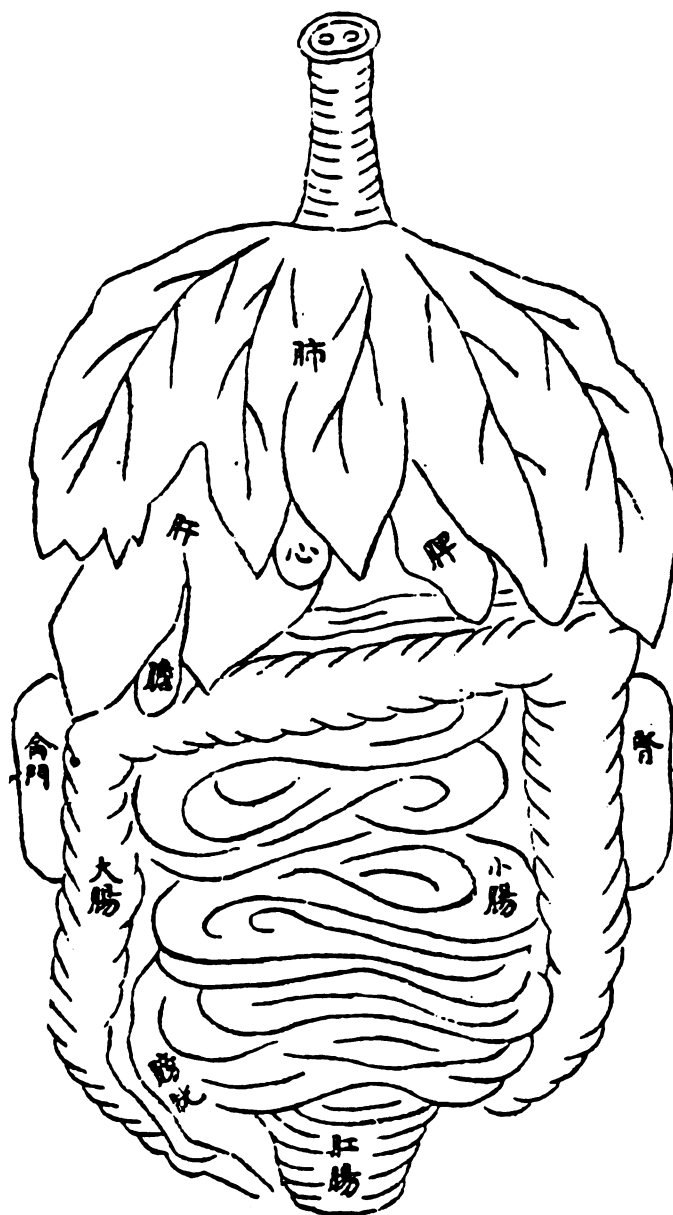


Fig. 10. The drawing of Ou Hsi Fan's viscera. (From Kōzō's "General Remark," p. 136.)

organs exposed could be viewed and examined. As Hsu described, the three burning spaces were noticed as the structure with form. It composed of fatty mesentery, which is about one hand size, and was located beneath the right kidney, against the urinary bladder. Two white vessels originating from the burning spaces attached to both sides of the vertebra, along which they travel upward to the brain. The mysterious burning spaces had been the controversial focus in the past, Hsu again added new description to its list in terms of his own interpretation. But his investigation was carried out in an isolated atmosphere, no written record was accomplished.

The Genuine Illustration^a (1113 A.D.) was the second systematic drawing edited in volumes in the Sung dynasty. Although the original illustration was lost, the diagrams were referred frequently in its contemporary notes and records. Some of the drawings were found to be adopted, reprinted, and transcribed in the texts as the Illustration of Internal and External Sceneries^b (1118 A.D.), the Introduction to the Illustration of the Commentary on Huang Ti Nan Ching^c (1296 A.D.), (Fig. 11), the Recompilation of Hsuan Men's Illustration of Internal Figures for Sphygmology^d (1273 A.D.), (Fig. 12; Fig. 13), the Ton'i Sho^e (1320 A.D.), (Fig. 14), the Great Assembly of Acupuncture^f (1546 A.D.), the Encompassment

^a存真環中圖

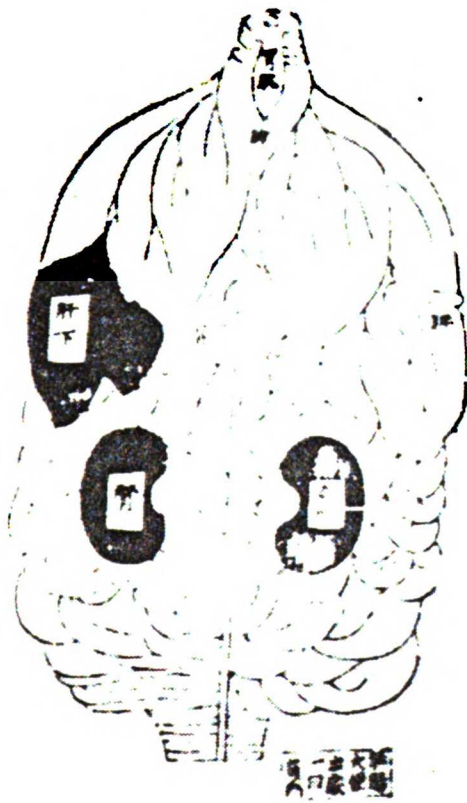
^bNei Wai Drh Ching T'u 內外一景圖, by Chu Kung 朱肱.

^cHuang Ti Pa Shih I Nan Ching Chu I T'u Hsu Lun 黃帝八十一難經註義序論, by Li Chiung 李昉.

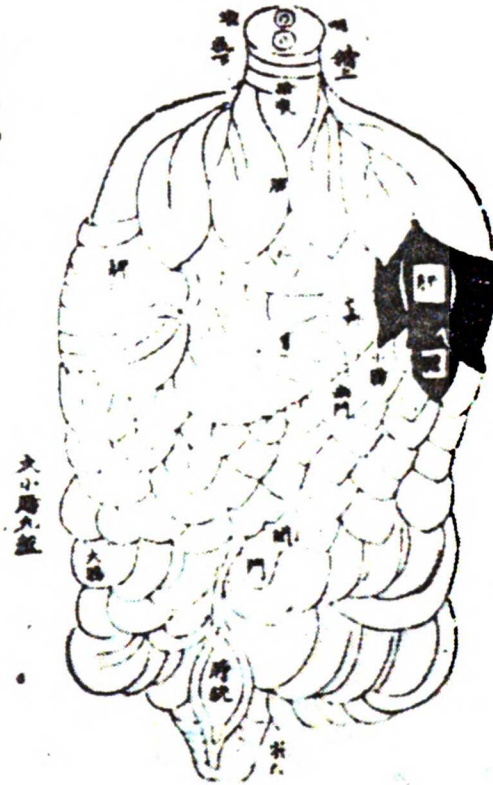
^dCh'ung Kah Hsuan Men Mai Chueh Nei Chao T'u 重刊玄門脈訣內照圖, by Sun Huan 孫煥.

^e頓醫抄 by Seizen Kajiwara 梶原性全.

^fChen Chiu Chu Ing 針灸聚英, by Kao Wu 高武.



内境背面圖



内境正面圖

Fig. 11. The dorsal view of the internal cavity (left), and the frontal view of the internal cavity (right), (From Kōzō, "General Remark," p. 144, in *黃帝八十一難經註義序論*, 1296 A.D.)

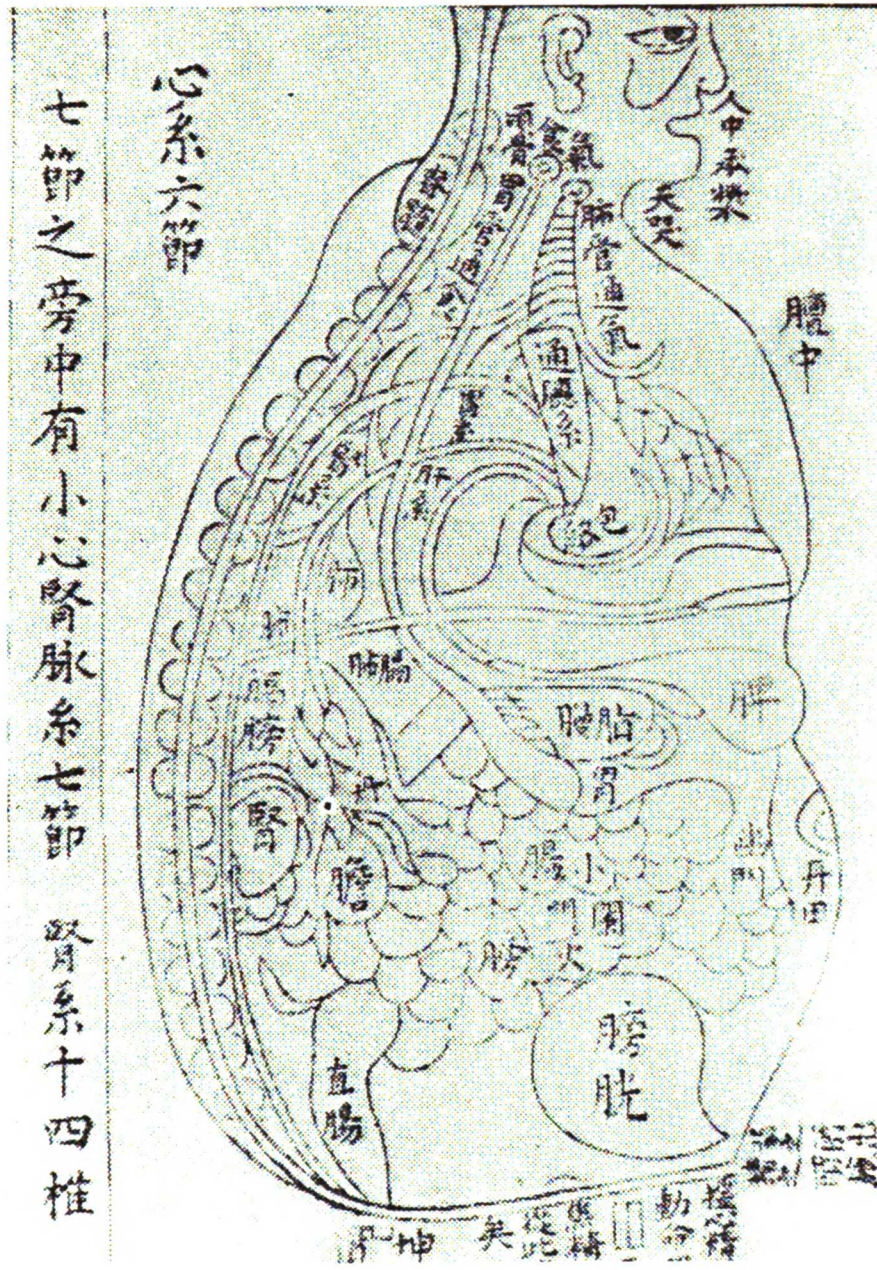


Fig. 12. The Illustration of internal organs. (From Kōzō, "General Remark," p. 146, in *重刊玄門脉訣内照圖*, 1213 A.D.)

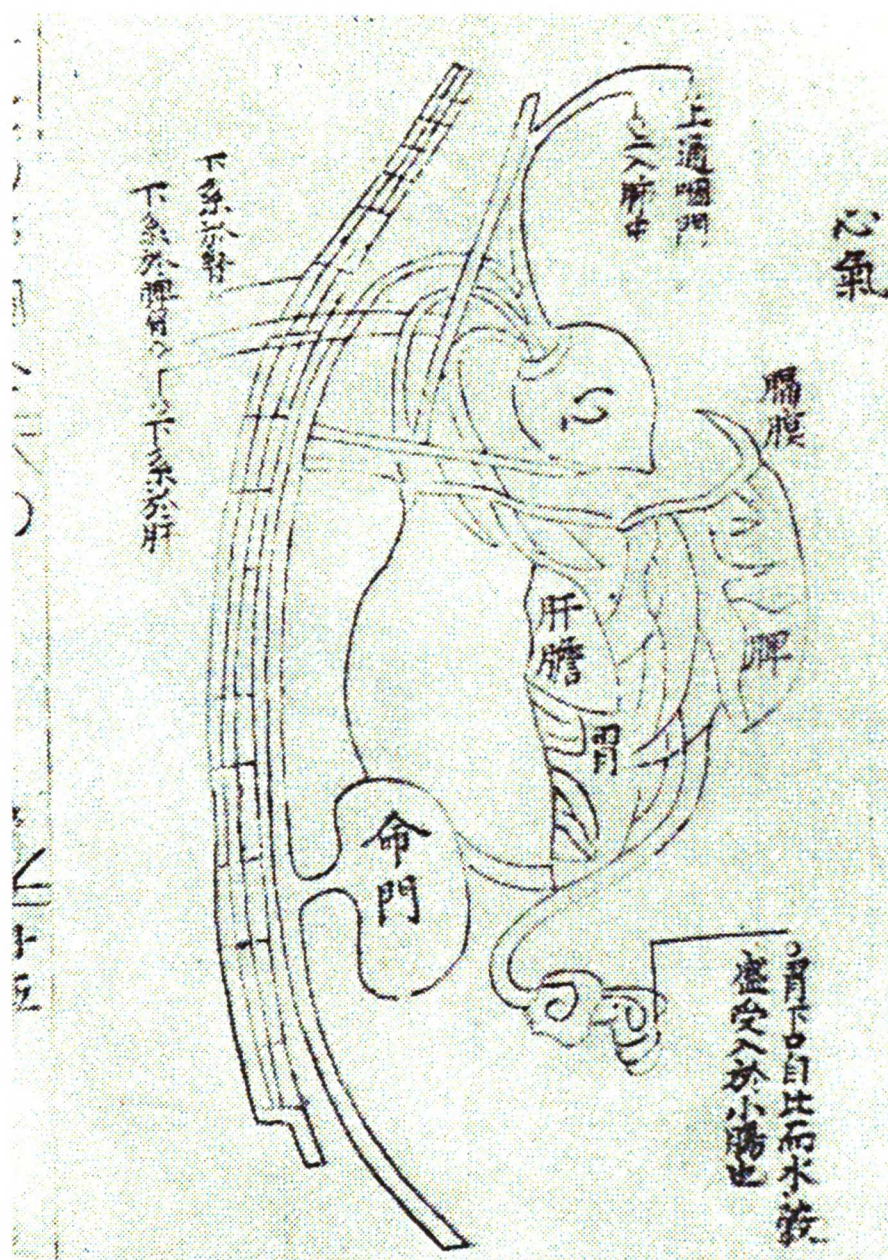


Fig. 13. The heart and the Chi 氣 systems. (From Kōzō, "General Remark", p. 153 in 重刊玄門脉訣内照图 1273 A.D.).

of Sphygmology^a (1599 A.D.), the Great Accomplishment of Acupuncture^b (1601 A.D.) the Compilation of Acupuncture points along the Channel^c (1573-1619 A.D.), (Fig. 15), the Cannon of Man's Mirror^d (1606 A.D.), the Universal Encyclopaedia^e (1607 A.D.), and the Intelligible Illustration of Viscera^f (1636 A.D.), (Fig. 16).

During the years, from 1102 to 1106 A.D., the magistrate Li I Hsing^g ordered the physician and artisan to investigate the thieves' bodies after they were executed in Szu Chou^h. They tore the mesenteries, cleaned up the fatty tissue, then drew down the shape and structure of the organ exposed. The physician Yang Chiehⁱ, later corrected the drawings and reedited them to be the illustration of the Ts'un Chen Huan Chung T'u^j (the genuine illustration of viscera). As Yang said, the internal organs shown in the pictures could be recognized in a systematic way. The channel system connected with the blood vessel. Urine and feces were excreted separately through two different openings. The transporting ducts for semen could be traced up to the origin where the semen was produced.

^a Mai Chueh Tzung T'ung 脉訣宗統, or 太上天寶張神仙脉訣玄微綱領宗統, by Wang Wen Chieh 王文潔.

^b Chen Chiu Tai Cheng 針灸大成 by Yang Chi Chou 楊繼洲

^c Hsun Ching Kao Hsueh 循經考穴編 by the unknown author.

^d Jen Ching Ching 人鏡經, by Ch'ien Lei 錢雷.

^e San Ch'ai T'u Hui 三才圖會, by Wang Chi 王圻.

^f Tsang Fu Chih Chang T'u Shu 藏府指掌圖書, by Shih Pei 施沛.

^g 李夷行

^h 泗州

ⁱ 楊介

^j 存真環中圖

關門水穀泌別之圖

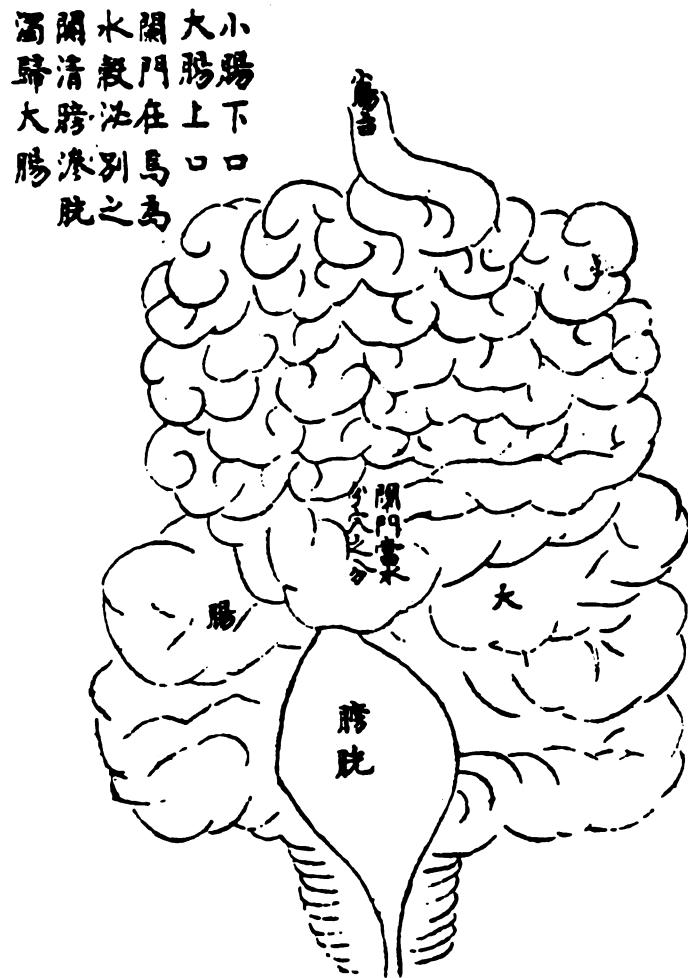


Fig. 15. The excreting and the urinary systems: the appendix is seated at the end of the small intestine and at the beginning of the large intestine. Water and excrement are excreted through two duct-systems. (From Kozō, "General Remark," p. 149, in *循經考穴編* 1513-1619 A.D.)



Fig. 16. The Stomach and the spleen from the lateral view. (From Kozo, "General Remark," p. 147, in **藏府指掌圖書** 1636 A.D.).

From the illustration transcribed, as shown above, they included two diagrams of the main internal organs seated in the thoracic and abdominal cavities. The rest of them contained (1) diagram of lateral view of the lung, (2) diagram of the distribution of the blood vessel on the right side of the thoracic and abdominal cavities, (3) the distribution of the blood vessel on esophagus and diaphragm, (4) diagram of the digestive system, (5) diagram of the urinary system, and (6) diagram of the reproductive system.¹

The morphology of internal organ still remained as the focus of the illustration. The location of the organ in its relative space was grossly correct from modern anatomical point of view. Notes for these illustrations were depicted more clearly. Organs were attributed to and presented under different physiological systems. The role of the blood vessel began to win special attention. The idea of systematization was much advanced. According to Saburō Miyasita, these anatomical drawings were taken to West Asia and appeared in the famous Persian medical text Tankusunāmah-i Īlkhān dar funūn-i 'ulūm-i Khitāi, which was discovered in 1939 in the Aya Sofya Library, Istanbul. However, the westward flow of Chinese anatomy has not yet been traced or profoundly discoursed.²

¹Sung, Ta Jen 宋大仁, "Sung Tai I Hsueh Chia Yang Chieh Twei Yu Chieh Pou Hsueh Te Kung Hsieh 宋代医学家杨介对于解剖学的贡献," Chung I Tsa Chi 中医杂志, no. 4, 1958, p. 283-285.

²Saburō Miyasita, "A Link in the Westward Transmission of Chinese Anatomy in the Later Middle Ages." Isis, vol. 58, no. 194, Winter, 1967, pp. 486-490.

The examination of the wounds in various criminal cases could be traced back as early as the Han dynasty (206 B.C. - 25 A.D.). But it was in the middle of the Thirteenth century, the period when the interest in human dissection became active, numerous writings on coroner's art came into being. This early system of forensic medicine was known to have been applied practically to the body of anatomical knowledge. The earliest comprehensive text on legal medicine was first issued in 1252 A.D. by a judicial official in the late Sung empire, Sung Tzu^a. He created the Hsi Yun Lu^b (the right conduct in washing away injustice), which was designed as a practical manual leading to postmortem examination in criminal case. This very work remained as the most important authorized official code in Chinese forensic medicine until early this century.

In the book special attention was directed to the investigation of body surface; such as the top of the head, ears, nostrils, throat, and vagina.¹ No description concerning about the deep-seated internal organ is found. However, there were two major amendments to the compendium concerning about anatomy. The first part include the cadaver sketches (Fig. 17, Fig. 18), which were incorporated into the book in 1304 A.D. of the Yuan^c dynasty, and the second part are the osteological diagrams (Fig. 19; Fig. 20), which were appended in 1771 A.D. of the Ch'in^d dynasty.²

In the skeletal sketches, the text says that there are three hundred and sixty-five bones in the body. The male had twelve ribs on each

^a 宋慈

^b 洗冤錄

^c 元

^d 清

¹ Kiel, K. W., "Forensic Science in China-Traditional and Contemporary aspects," J. Forensic Science, vol. 15, Apr. 1970, pp. 202-204.

² Chung hsu 仲許, "Chung Kou Fa I hshih shih 中國法醫學史," Chung I Tza chi 中醫雜誌, no. 8, 1956, pp. 445-447.

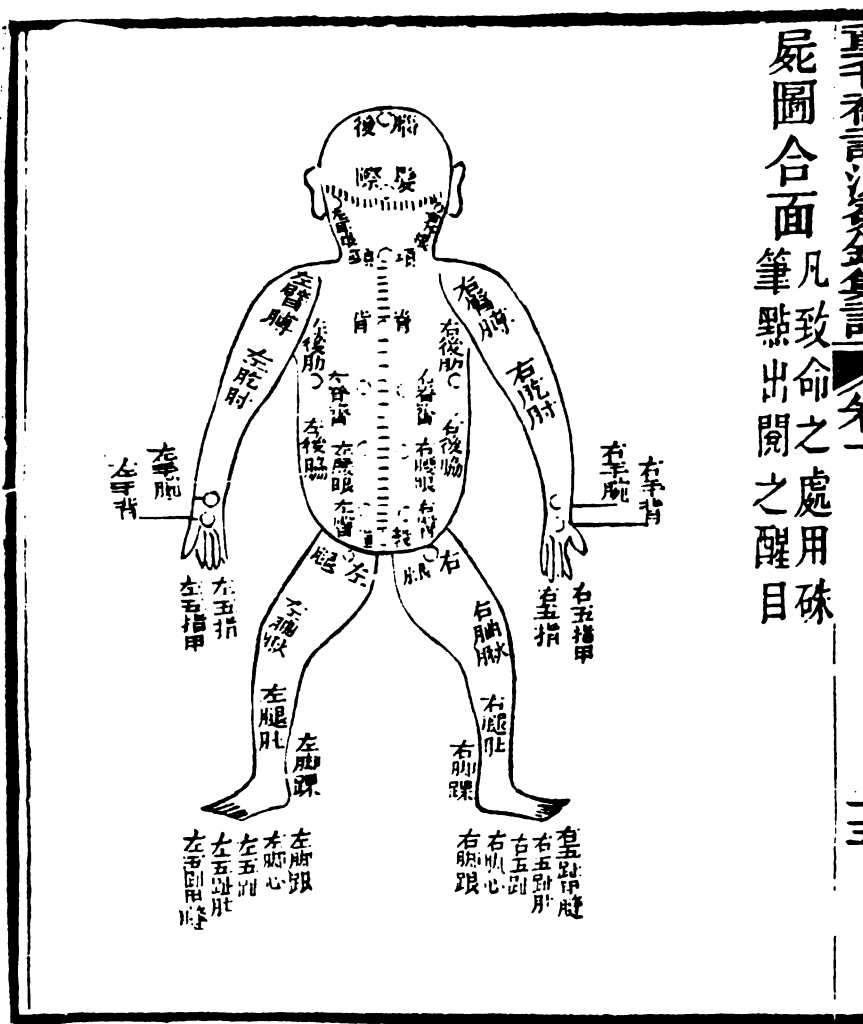


Fig. 18. The dorsal view of the cadaver. The small circles are the fatal points (from the Pu Chu Hsi Yun Lu Chih Tseng 補註洗冤錄集証, 1865 A.D.).

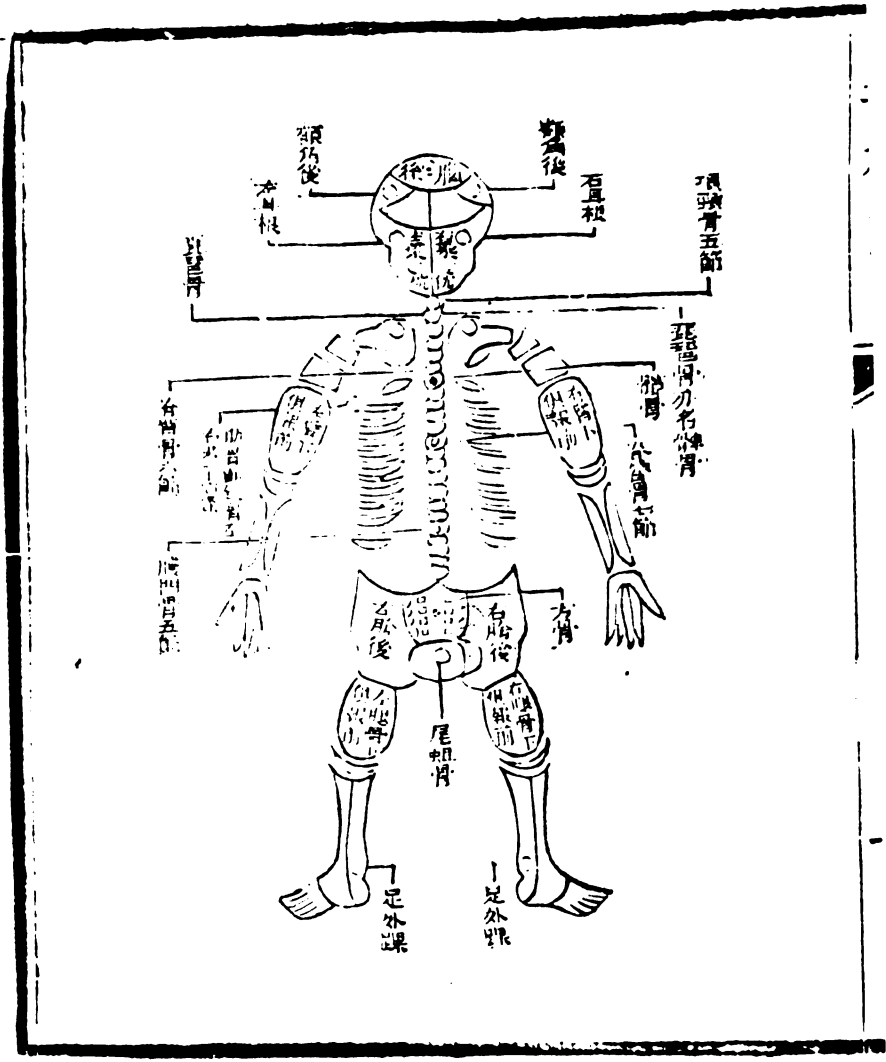


Fig. 20. The dorsal view of the skeletal system (from the Pu Chu Hsi Yun Lu Chih Tseng 補註洗冤錄集証, 1865 A.D.).

side, while the female had fourteen. The vertebral column included one neck bone, ten back bones, seven ridge bones, and six waist bones with the sacrum and the coccyx. The waist bone had eight holes. It noted the structural difference of attachment of the coccyx to the waist bone between the male and the female; in the male, the attachments were concave on both sides and had nine holes; in the female, they were flat and had only six holes. The symphysis splitted at pregnancy. The framework of general skeletal system described was fairly accurate.¹ However, it still revealed some misconceptions.

III Yuan and Ming Dynasties

A sequence of famines and epidemic devastation trampled the whole country following the dominant Mongol expansion in the Yuan dynasty. Medical researches fell into controversies, and four independent medical schools^a manifested in this period. Wang Hao Ku^b, who belonged to one of the four schools, was, probably, the only prominent anatomical writer in this period.

Wang's I Chia Ta Fa^c (great law for physicians) (1234 A.D.) contained viscera-drawings, which later were incorporated into several texts, as the

^aFour independent doctors of Chin Yuan 金元四大家.

^b王好古

^c医家大法

¹Skinsnes, Olaf, K. "Postmortem Examination and Inquest in Old China," A.M.A. Archives of Pathology, vol. 74, 1962, p. 308.

San Ch'ai T'u Hai^a (1607 A.D.) (universal encyclopaedia) (Fig. 21, Fig. 22), the Lei Ching T'u I^b (1624 A.D.) (Fig. 23), and the Intelligible Illustration of Viscera^c (1636 A.D.) (Fig. 24). Thirteen drawings have been verified by Kōzō, including (1) the complete illustration of internal scenery, diagrams of the (2) lung, (3) heart, (4) pericardium, (5) spleen, (6) liver, (7) kidney, (8) stomach, (9) small intestine, (10) large intestine, (11) gall bladder, (12) urinary bladder, and (13) three burning spaces. From the pictures shown, many of them can be recognized. Being similar to those analogies in old textbooks, they still reflect many characteristics of the traditional Chinese anatomical illustrations; such as Hu Yin's visceral illustrations, the silk organ-models, and the Sung's bronze statues, which have been noted in the paragraphs above.

Anatomical texts and illustrations were widely written in the 15th and 16th centuries A.D., but at that time most physicians concentrated in the study of those ancient anatomical records, also in transcribing the old anatomical ideas along with illustrations into their writings. Only two independent anatomical dissections are known to be performed in the Ming dynasty. In the appendix of the Jen Ching Ching^d (Cannon of Man's Mirror), the author Ch'ien Lei^e noted his investigation on the human urinary bladder. Accordingly, in 1557 A.D. he went to the southerneast coast of China to examine the bodies of Japanese pirates massacred. Through the help of the executioners, Ch'ien made actual investigation and then compared with those previous records. He combined the result of his observation with the old records, and

^a 三才圖會

^d 人鏡經

^b 類經圖翼

^e 錢雷

^c 藏府指掌圖書

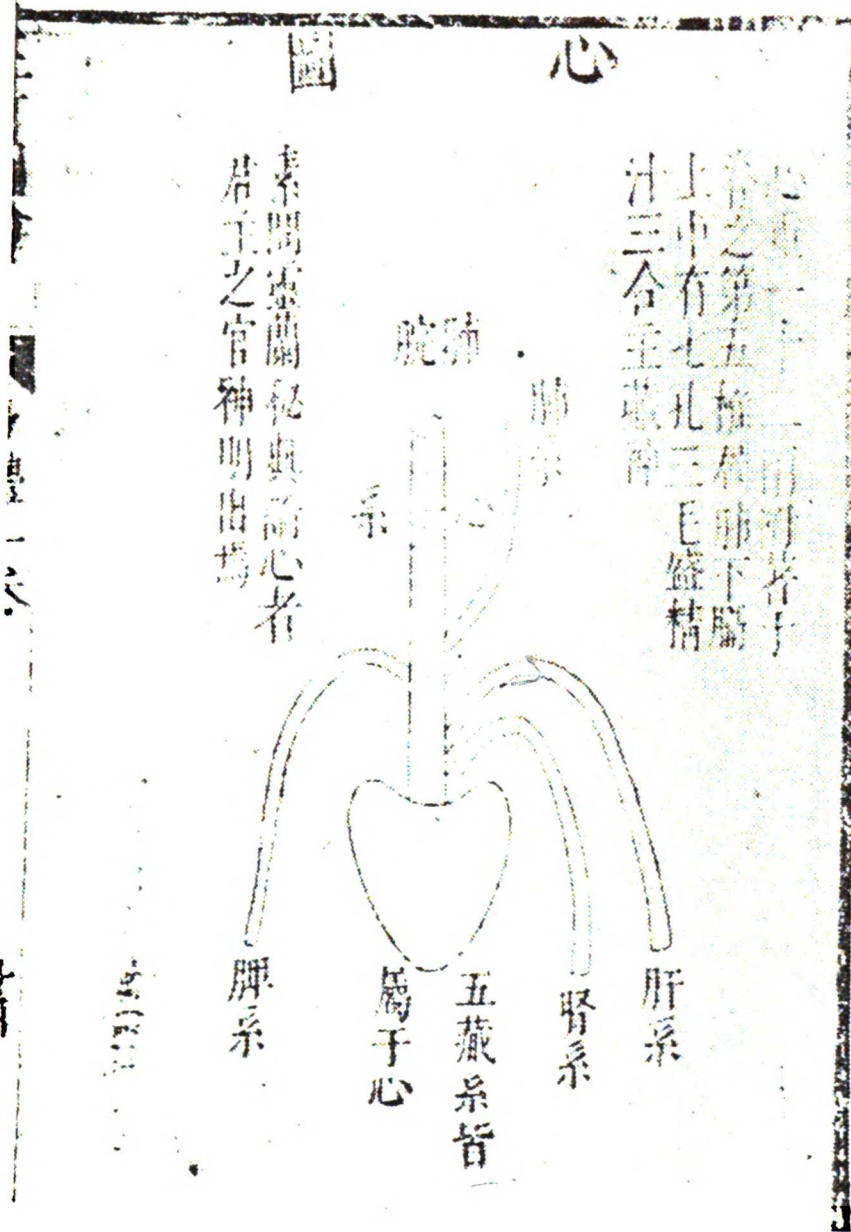


Fig. 21. Diagram of the heart (from Kozō, "General Remark", p. 162 in the San Ch'ai T'u Hai 三才圖會 1607 A.D.)

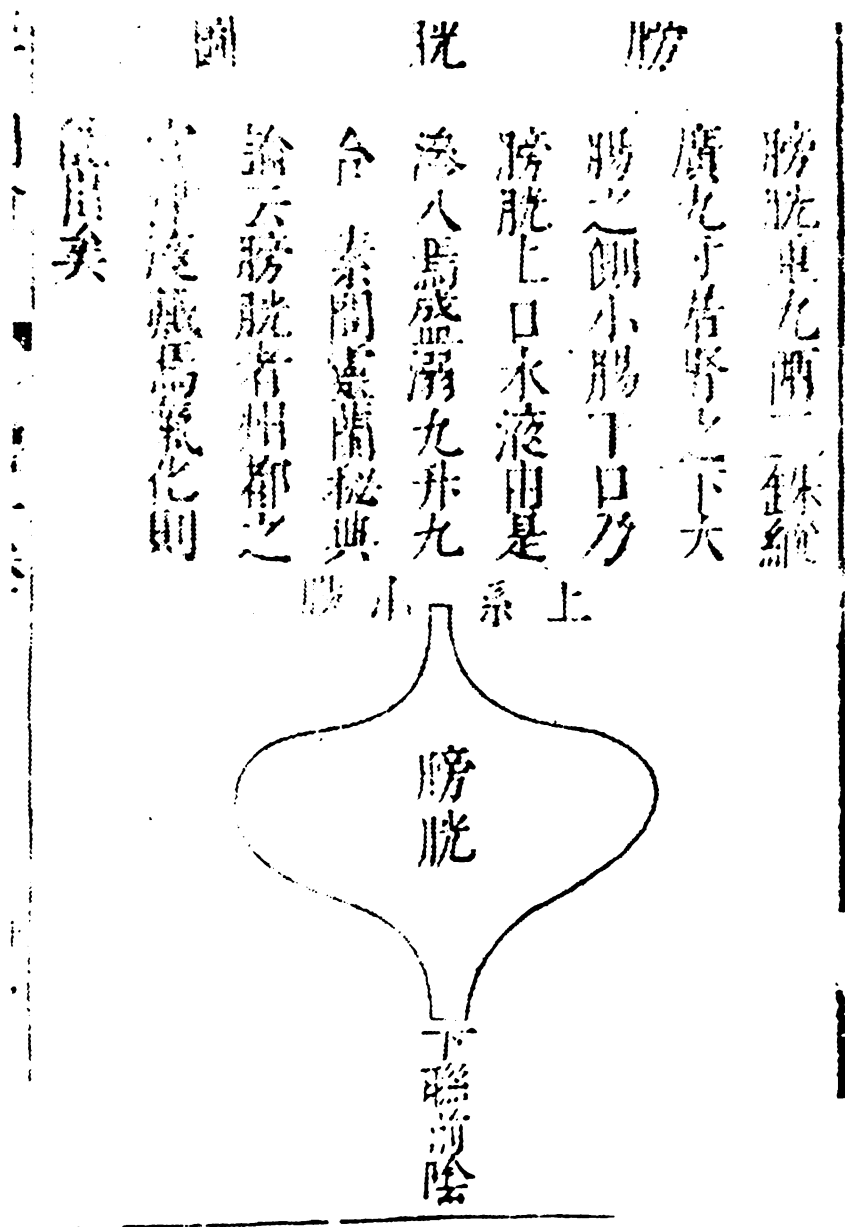
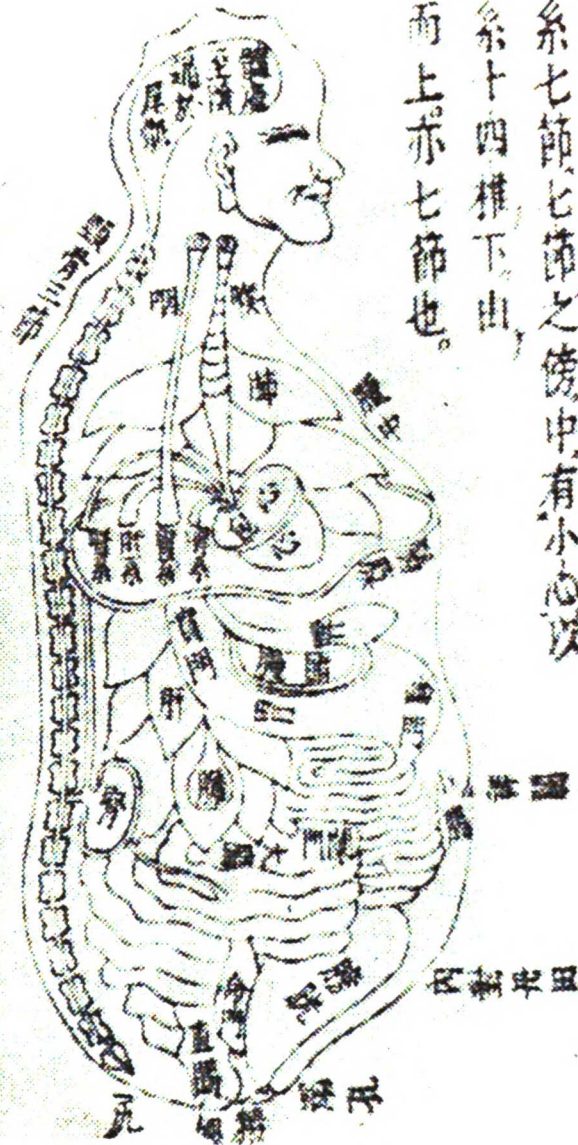


Fig. 22. Diagram of the urinary bladder (from Kōzō, "General Remark", p. 162 in San Ch'ai T'u Hai 三才圖會 1607 A.D.).

內景圖

心系七節七節之傍中有小心以
 腎系十四椎下出
 下而上亦七節也。



精道循脊背過肛門者甚屬非理而
 且無子宮命門之象皆大失也今改正之。

Fig. 23. Illustration of internal organs (from Kōzō, "General Remark," p. 159, in the Lei Ching T'u I 類經圖翼 1626 A.D.).

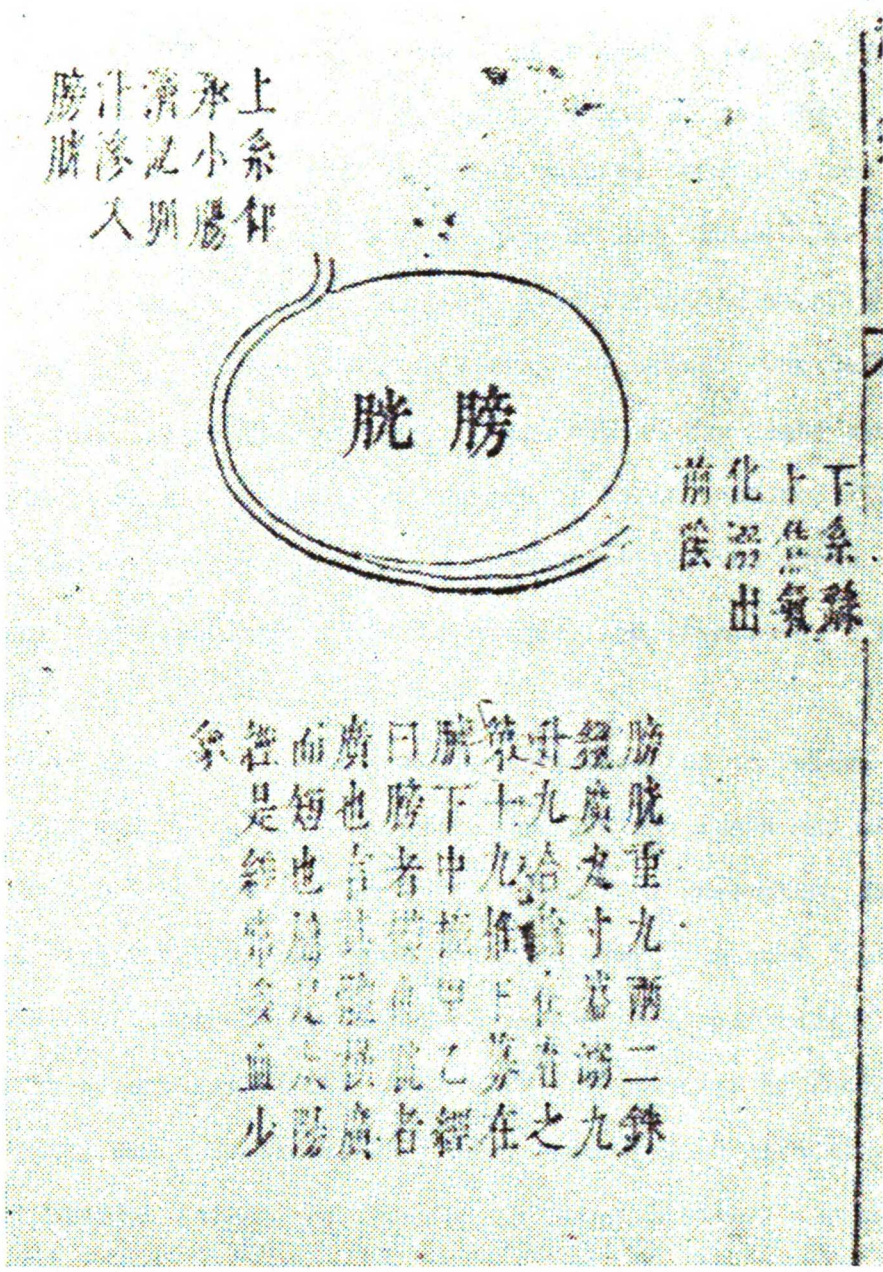


Fig. 24. The diagram of the urinary bladder (from Kōzō, "General Remark", p. 159 in Tsang Fu Chih Chang T'u Shu 藏府指掌圖書 1636 A.D.).

published the text in 1606 A.D. According to Kōzō, only two drawings were based upon his practical observation., Figs. 25 and 26).

In the text, it states that no upper opening exists in the urinary bladder, and no such structure as Pao^a (sea of the blood)^b is seated in the middle of the urinary bladder. Instead, he described a duct, which traveled down to the perineum for excreting the urine. The deferent duct moved along the lumbar vertebrae, detoured at the right side of the rectum, underneath the urethra, with which it later combined (Fig. 27). The connection of the heart and the laryngeal system was wiped out. He described the morphology of the esophagus, and dismissed it from the lung system.¹

The other case of actual dissection was recorded in Volume 11 of the Ch'ih Shui Hsuan Chu^c (the treatise on medical cases and medical decree, 1590 A.D.) by Sun I K'uei^d. Ho I Yang^e, a physician, dissected the enemies caught during his service in the army. He said (to Sun) that the heart of human being with a blunt end is longer than that of the pig. The structures of the intestines were similar to those in pigs. However, man's small intestine had more reddish striped pattern. The urinary bladder formed the chamber for storing urine. At the end, he concluded that most structures under his observation were like those recorded in the text Nan Ching^f.

From the description above, Ho often compared his own observation with pig's anatomy. The pig's anatomy seemingly was the common knowledge

^a 胞

^b 血府

^c 赤水玄珠

^d 孫一奎

^e 何一陽

^f 難經

¹ Kōzō, "General Remark", p. 106.

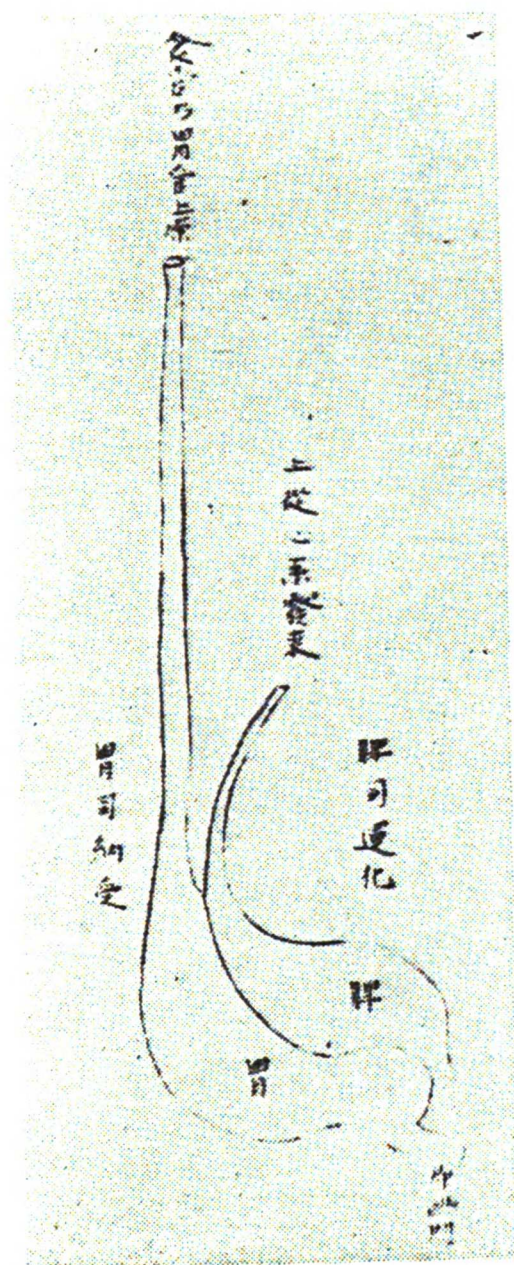


Fig. 25. The spleen and the stomach (from Kōzō, "General Remark", p. 169 in the Jen Ching Ching 人鏡經, 1606 A.D.).

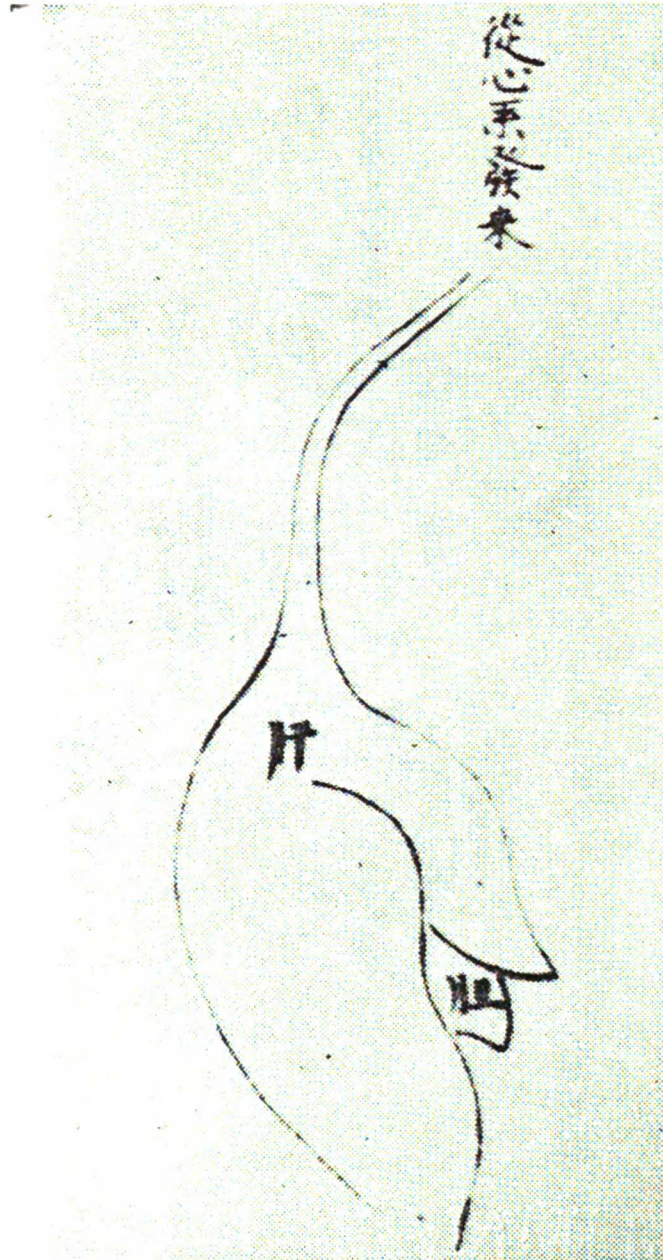


Fig. 26. The liver and the gall bladder (from Kōzō, "General Remark", p. 169 in the Jen Ching Ching 人鏡經 1606 A.D.).

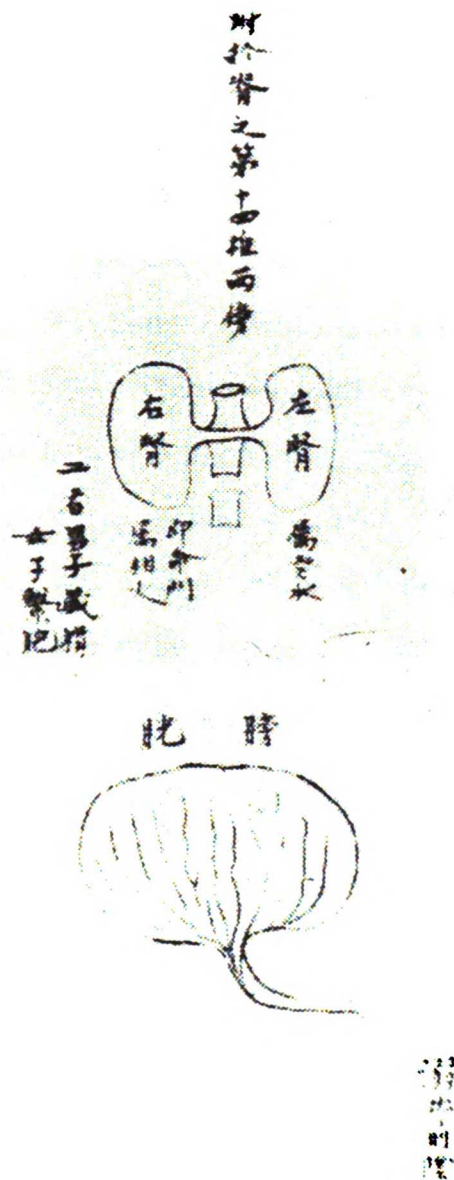


Fig. 27. The diagram of the kidneys and the urinary bladder. (From Kozō, "General Remark," p. 167, in Jen Ching Che'ng 人鏡經 1606 A.D.)

familiar to the physician of his time. It is, therefore, assumed that the animal dissection should have been performed and studied intensely. On the other hand, the anatomical knowledge noted in the classic Nan Ching remained as quite an acceptable source with authority.

It is true that the solution to the controversies risen among the anatomists was mostly sited in the old texts with authority. The pieces of research based on the observations performed in different periods were a body of isolated works. The knowledge was not yet ready forming a systematic discipline. Therefore, the traditional anatomical records remained as the general reliable guide.

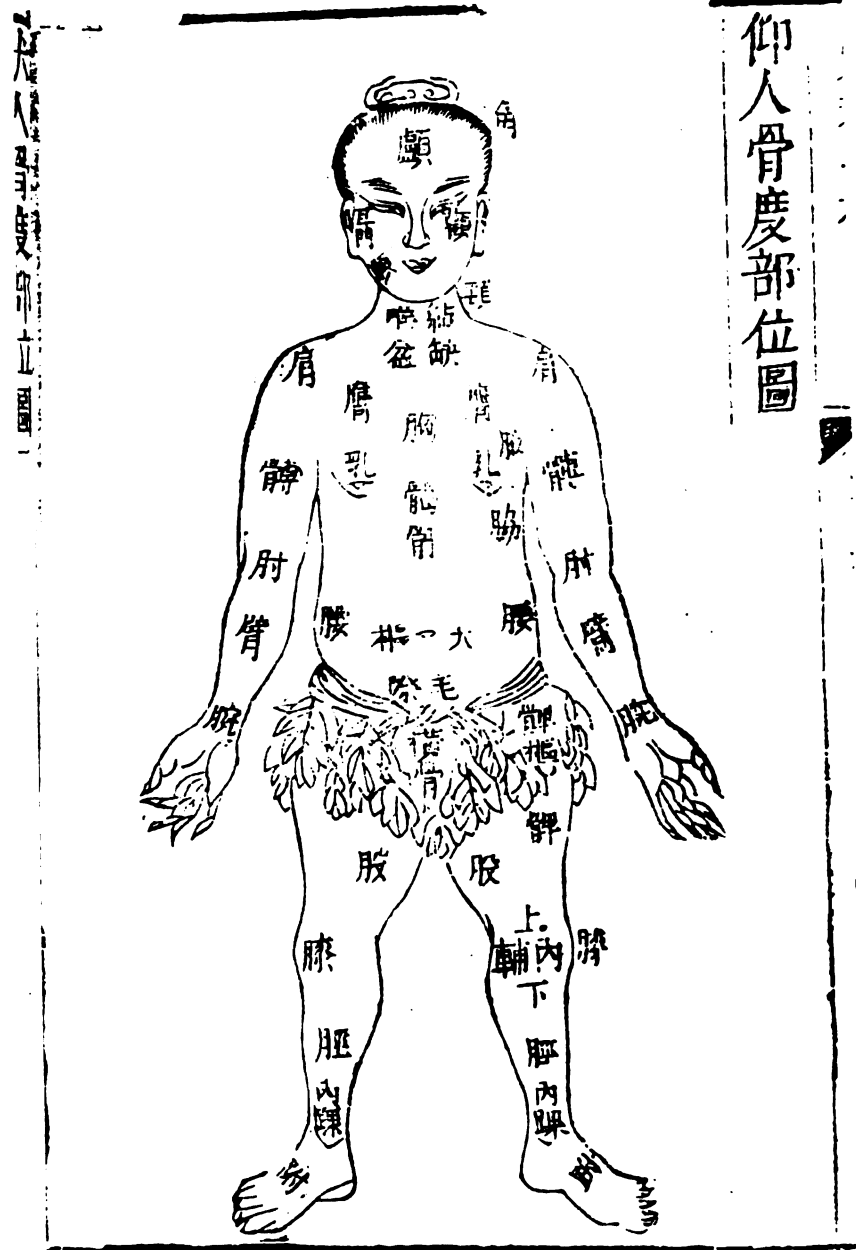
The bone measurement had been known since the Nei Ching period, however, osteological figures were seldom noticed. Here, we only present two osteological diagrams in full body length contained in the text Lei Ching T'u I^a written by Chang Chieh Pin^b in 1624 A.D., the osteological terms were noted at the specific positions on the bone. However, no skeletal system was shown (Fig. 28, 29). On the acupuncture charts (Fig. 30, 31, 32), the bone structures were drawn down and noticed in order to point out accurately each acupuncture point and its relative position with the bone underneath. The practitioners did search for some aid to express the increasing accuracy required in anatomical idea which probably had been permeated into Chinese medicine from the western anatomical ideas and drawings.

Western anatomical textbooks were translated into Chinese and appeared at the turn of the Ming^c and Ch'in^d dynasties. But this

a 類經圖翼
d 清

b 張介賓

c 明



仰人骨度部位圖

仰人骨度部位圖

Fig. 28. The frontal view of bone measurement. Osteological term were marked on the specific positions, (from the Lei Ching T'u I 類經 圖翼 1799 A.D.).



Fig. 30. The lateral view of the channel system and acupuncture points. The skeletal structure was used as a reference (from the Lei Ching T'u I 類經圖翼 1799 A.D.).

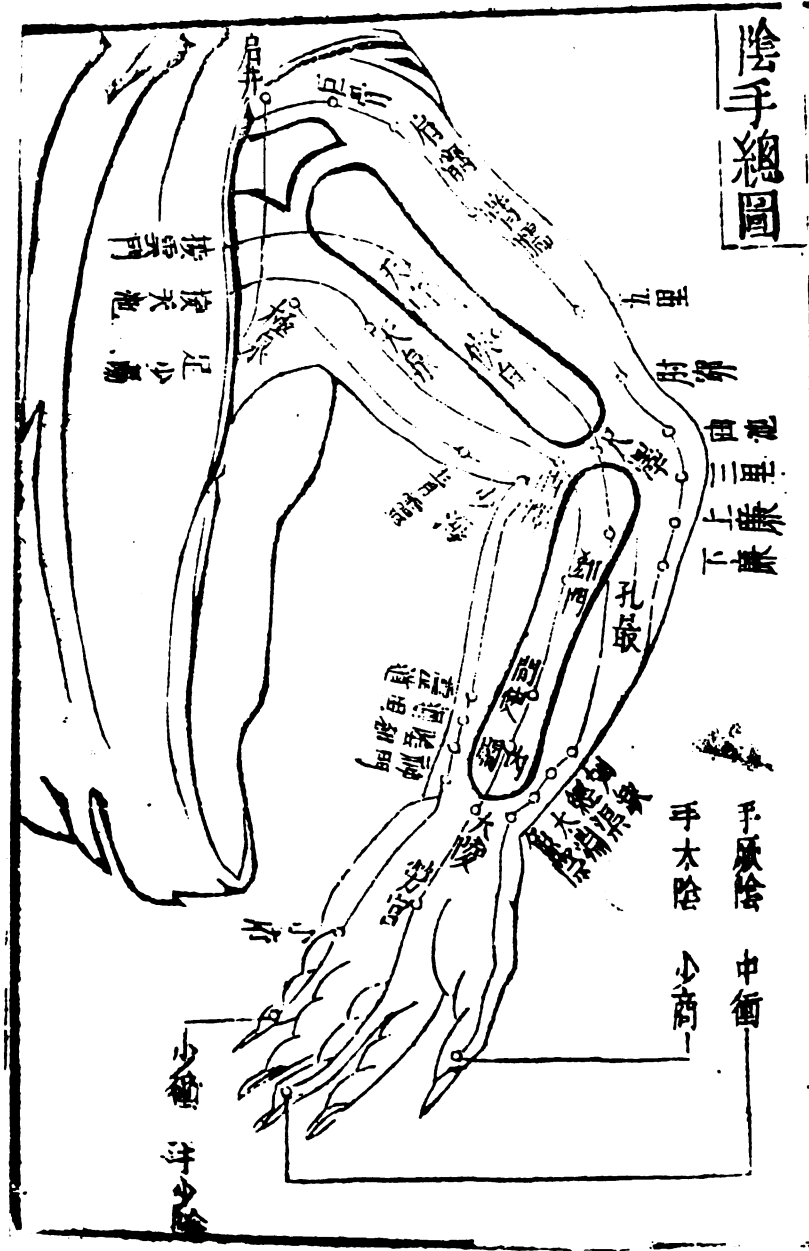


Fig. 31. The Yin channel of the upper limb (from the Lei Ching T'u I 類經圖翼 1799 A.D.).

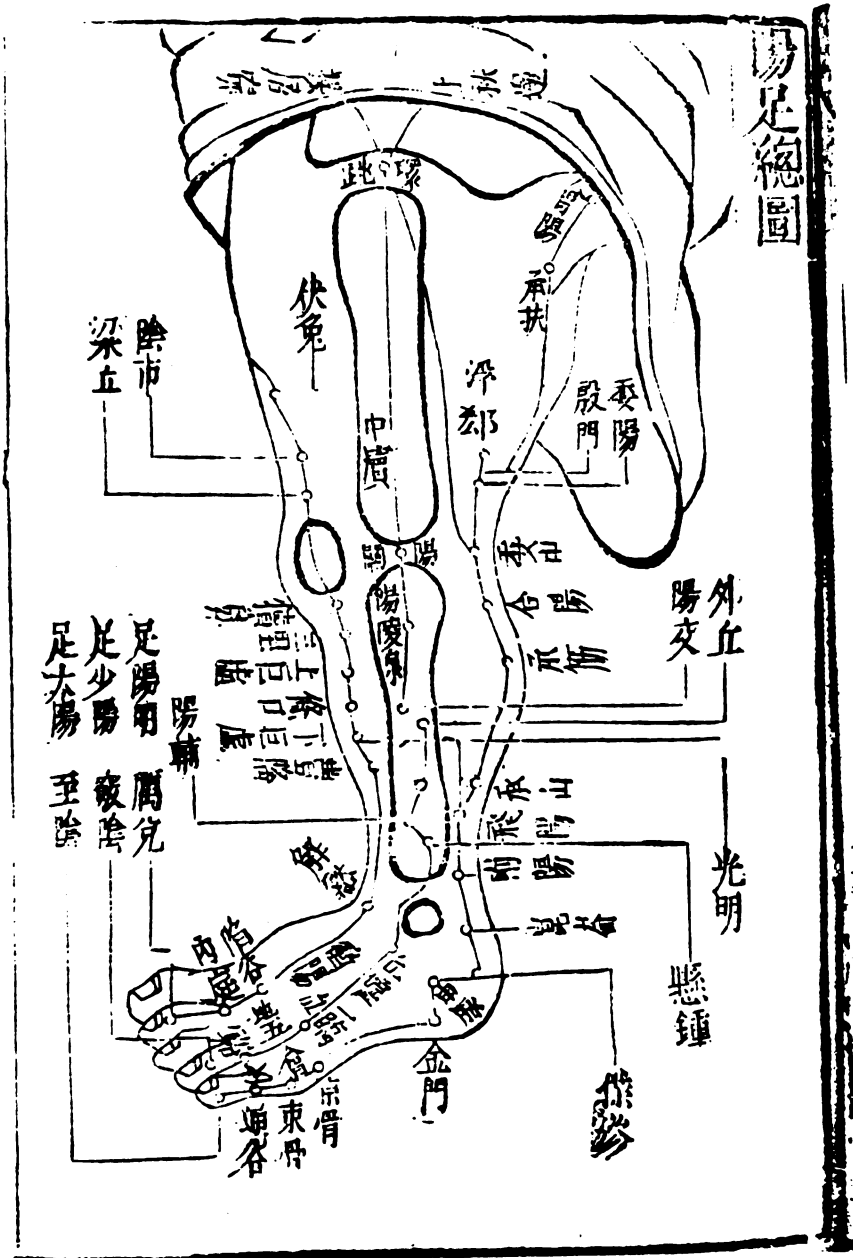


Fig. 32. The Yang channel of the lower limb (from the Lei Ching T'u I 類經圖翼 1799 A.D.).

western influence on Chinese anatomy has never been attempted. Since most material, we are concerned about, is not available at the present, further discourse will not be allowed.

v

The Transitional Period

Europeans arrived the shores of China at the beginning of the 16th century A.D. After the coming of the Jesuits (the Society of Jesus founded by Ignatius Loyola in 1540 A.D.) at the end of the 16th century A.D., the liaisons between the east and the west were begun. The Jesuits not only aroused the Chinese elite's interest in science and technology, they also encouraged the learned to translate as well.¹ Therefore, the Jen Shen Kai Shuo^a (an outline of human body), the work based on the western anatomy by Ten Yu Han^b, or Jean Terrenz, a missionary in China (1576-1630 A.D.), was produced.² Moreover, the emperor K'ang Hsi^c of the Ch'in dynasty (1662-1722 A.D.) commanded the Jesuit Dominique Parrenin to edit an anatomical text in the Tungus language of the Manchus, which was based upon Pierre Dionis' anatomical book and Thomas Bartholin's anatomical illustration. However, this book, the Lien Ting Ke T'i Chuan Lu^d (records of the examination of the human body) was banned in the imperial palace and never revealed to the public.³ Meanwhile, Chinese physicians somehow hesitated to merge their mind to the anatomical knowledge developed in the west.

^a 人身概說

^b 鄧玉函

^c 康熙

^d 欽定格體全錄

¹ Needham, Science and Civilization, vol. I, pp. 148-149.

² Ma, Kan Wen 馬堪溫, "Tzu kou ch'in tai chieh ch'u te i hsueh chia Wang Ch'in Jen 祖国清代杰出的医学家王清任," Ko Hsueh Chih Chi Kan 科学史集刊, vol. 6, Oct. 1963, p. 66.

³ Kōzō, "General Remark," p. 174 ~ 175.

There were also anatomical texts, such as the Book on Human body^a by Sun Hsing Yen^b and the Book on Osteology^c by Shen T'ung^d, both mainly dealing with the review and commentary on the anatomical description recorded in the Nei Ching. The A Guide to the Investigation^e (1829 A.D.) has even mentioned the model of human skeleton in its preface.

Wang Chin Jen^f, (1768-1831 A.D) a practitioner published the anatomical text, the I Lin Kai Ts'o^g in 1830 A.D. As he said, physicians used to write medical texts, or gave treatments, without learning the correct morphology of the organ. He also had opinions which were different from the authorized anatomical drawings referred by the ancestors in the past (Fig. 33).

He began the first investigation on the dead body which was thirty years old. In the small town, Tao Ti^h, children, who died in epidemics, used to be discarded in the field or buried roughly in earth. He took the opportunity to observe the body exposed. Thirty of them were examined, and he found that the structures were not exactly what had been shown in old texts. He decided to draw down what revealed to him in terms of his interpretation (Fig. 34). The female and male adult bodies were later examined. He sometimes consulted the physician of his contemporary, such as Li Chi Juiⁱ and Heng Ching Kung^j, who had the experience in the body investigation. Besides, Wang also performed animal dissection in order to test the old anatomical records. Among the discoveries he made, some are summarised in the following:

^a 釋人体

^b 孫星衍

^c 釋骨

^d 沈彤

^e 檢驗合參書

^f 王清任

^g 医林改錯

^h 稻地

ⁱ 李志鏡

^j 恒敬公

^l Ma, "Tzu kou chin tai chieh, 祖国清代的 " p. 67.

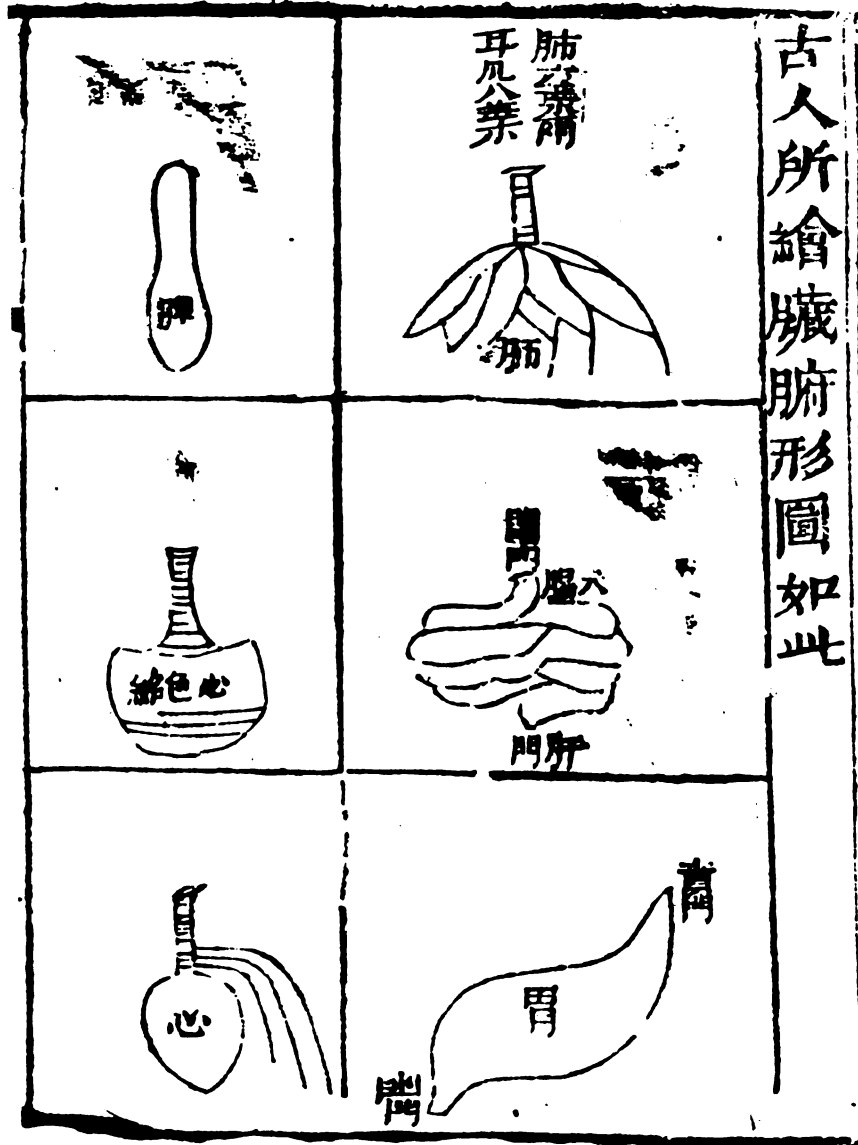


Fig. 33. The ancient illustrations of viscera (from top: lung, large intestine, stomach (right); Spleen, pericardium, and heart (left) (from Wang Ch'in Jen's I Lin Kai Ts'o, 1884 A.D.).

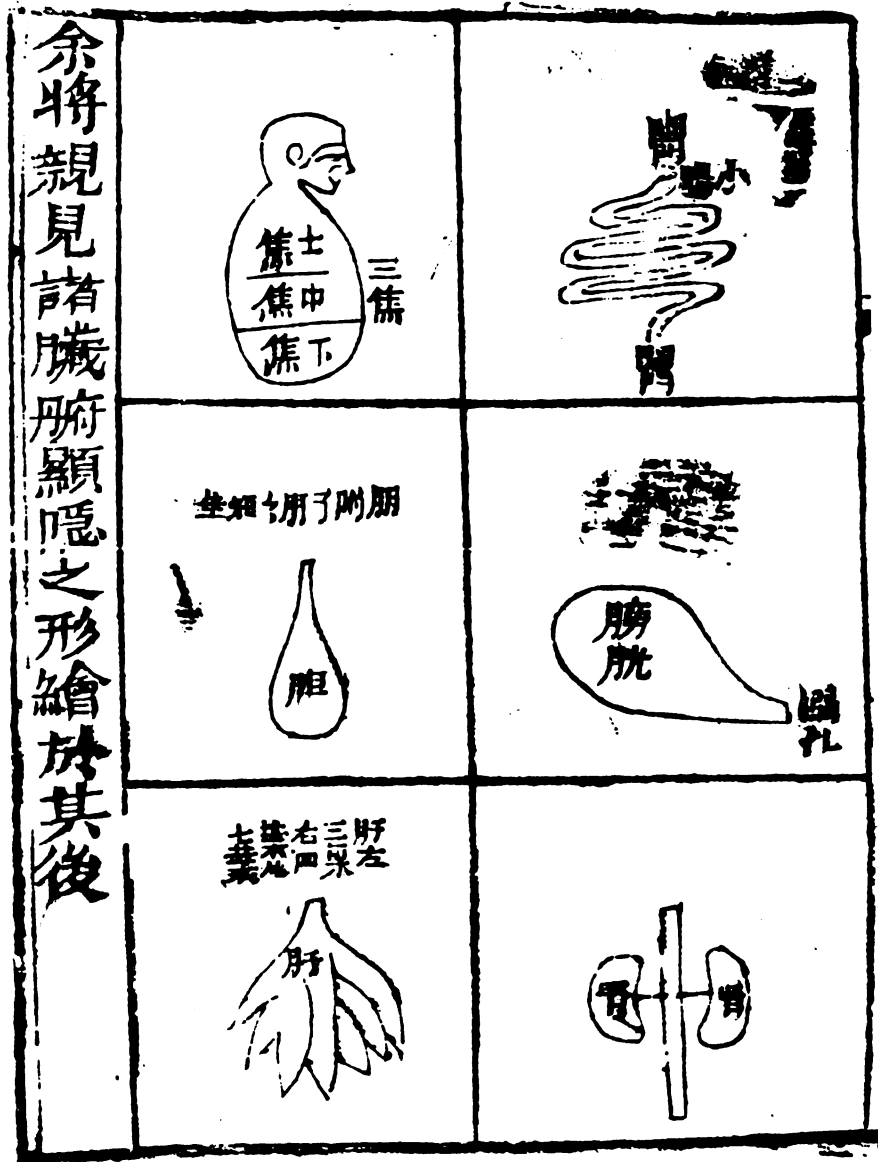


Fig. 34. The illustration of viscera drawn by Wang Ch'in Jen based on actual investigation (from top: smaller intestine, urinary bladder, and kidneys (right): the three burning spaces, gall bladder, and liver (left) (from I Lin Kai Ts'io, 1884 A.D.).

1. the distribution of arteries and veins (Fig. 35), the Ch'i Men^a (the left and right carotid arteries, Fig. 37b) combine the lung tubes, and become the common arteries. The main (artery) which arises from the left part of the heart, joins the common (arteries), then turns in a bow shape, and extends into two tubes (subclavical arteries). The descending tube (Wei Tsung Kuan^b, or Yao Kuan^c, the descending thoracic aorta and the lumbar tube) evolves eleven tubes (intercostal arteries) to the ribs. It also evolves two tubes into the kidneys (the right and left renal arteries (Fig. 38a), and two tubes into two lower limbs (Fig. 35). The Jung Tsung Kuan^d (inferior vena cava) connects with Hsieh Fu^e (right atrium). There are two tubes at the right side of the Jung Tsung Kuan; one (superior mesentery artery) continues to Ch'i Fu^f (superior mesenteries) (Fig. 36a), the other one (inferior mesentery artery) to the deferent duct (Fig. 38a). Since in the postmortem examination the arteries were often running out of blood, Wang thought these tubes (arteries) carried air rather blood functionally. But Wang is the first anatomist in Chinese history to notice and describe the route and distribution of these Kuan^g (tube, blood vessel).

^a氣門

^d營總管

^g管

^b衛總管

^e血府

^c腰管

^f氣府

2. The morphology of the lung: there were two branches arising from the Fei Kuan^a (the lung tube, trachea), which were believed to extend into the heart. The ends of these smaller branches were shaped in the form of sealed-leaves, instead of holed-structures. The lung is enveloped in a classed membrane, however, no holes were observed. (Fig. 37d)
3. The liver has four leaves. It is seated beyond the stomach with its posterior side attaching to the vertebrae. The gall bladder is seated on the second leaf of the liver. (Fig. 37c)
4. The opening of the bile duct, Chin Men^b (gate of juice) is described. The bile duct, Chin Kuan^c (the duct of juice) is divided into three ducts (the main pancreatic duct, the common hepatic duct and the bile duct). (Fig. 3b)
5. The optic nerves, which receives the image from the brain, are like two thread arising from the brain.
6. The epiglottis is a white pieced-structure behind the tongue. It prohibits the food to go into the throat and the tube (artery). (Fig. 38c)
7. The diaphragm divides the trunk into two parts. The upper part contains the lung and the heart. The lower part includes the rest of the internal organ. (Fig. 37a)
8. The embryo is nourished by the mother's blood, which is carried by means of the umbilical cord composing of two layers.

^a 肺管

^b 津門

^c 津管

Although some of his statements were full of misconceptions in some cases, he stood as the most influential anatomist in the history of Chinese anatomy. In 1851 A.D. the first complete western anatomical book was translated by Benjamin Hobson^a, the Chuan T'i Hsin Lun^b (Outline of Anatomy and Physiology). After sixty-two years, the first code for medical dissection was promulgated by the government in 1913 A.D., and the anatomical dissection was practised for the first time in Chian Su^c Medical School in the same year.

^a 合信氏

^b 全体新論

^c 江蘇

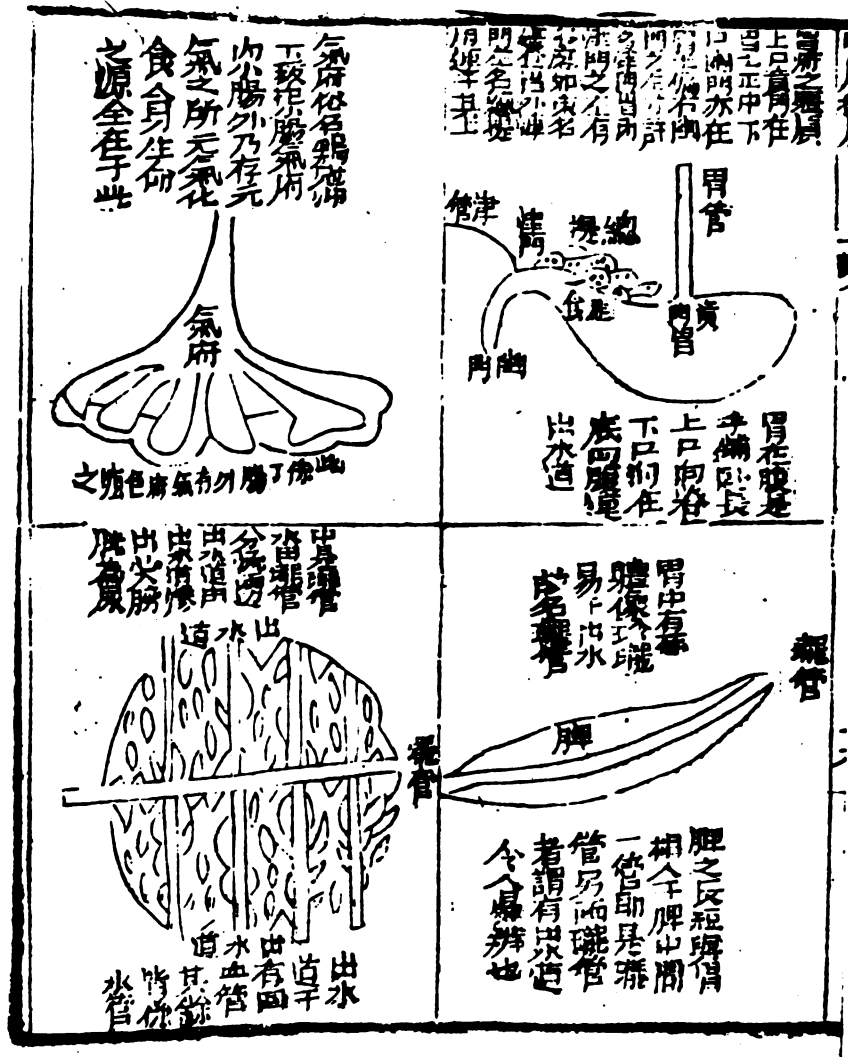


Fig. 36. a. The Ch'i Fu (air agency, the superior mesenteries) b. The morphology of the stomach and the Chin Kuan (the bile duct). c. The excreting ducts of the kidney and blood vessels at the surrounding. d. The morphology of the spleen and its secreting duct (from I Lin Kai Ts'o 医林改錯 1884 A.D.)



Fig. 37. a. The diaphragm b. The right and left Ch'i Men (carotid arteries) c. The liver and the gall bladder d. The lung and lung tubes (trachea) (from the I Lin Kai Ts'o 医林改錯 1884 A.D.).

IV

Conclusion

Each path that had moved in the history of Chinese anatomy was cumulated in each specific past, as confident as that in the western anatomy. From those independent observations, independent, that is, of any text, good or bad, a schematic knowledge of the human body has been gradually demonstrated.

In the western anatomical research, the practice and observation of the human dissection, since it was first applied in public in the Sixteenth century, has won eminence as the requisite ceremony for the basic medical training. Today, anatomy, in modern scientific interpretation, is characterized as an independent science among the medical disciplines. It not only presents the research accomplished in the previous scholastic age, but also hopefully leads to the content of a future discovery at a much detailed level.

Before the western medicine first came to China in the Seventeenth century, the Chinese physician inherited their systematic knowledge, mostly, through those old medical texts, and through ancient manuscripts accompanying with illustrations. Chinese anatomy, which was based on the Chinese anatomical idea, however, never became the basic discipline required in the traditional medical training. As marked by Morse, the Chinese anatomy remained as "a fair knowledge of the subject in regard to position, relation, and function of some of the main organs and tissues."¹ Although according to historical documents, the practice of dissection had been known since the first century B.C., the observations recorded

¹Morse, William R. Chinese Medicine, (New York, 1934), p. 54.

were mainly based on the investigation of the body of the criminal executed in a manner chosen by the physicians. Unfortunately this kind of postmortem examination could hardly be considered as an independent discipline serving as an scholastic aid in the medical field. But the Chinese, as we have known, did establish a systematic anatomical knowledge in terms of their interpretation.

It is ⁱⁿ ~~at~~ the Seventeenth century A.D., when ^{the} western anatomy came to China, the path of Chinese anatomy became ^{stagnant} ~~stagnating~~ and its contribution was then considered as of historical significance, rather ~~than~~ of scientific value. Scholars often consider the body of Chinese anatomy lacking rational evidence, accuracy, and logical systematization in terms of western methodology. However, the achievement developed in Chinese anatomy, such as the description of the internal organs, the measurements of internal organ, and of bone are certainly enough to answer the interpellation held by the westerners. As a matter of fact, most of the anatomical content existed in Chinese medicine are the necessary guide in various practical treatments including acupuncture, although, at the present time, some descriptions are still hard to ~~be~~ understood ^{and} in terms of western anatomical terminology. Therefore, further studies on this subject definitely needs to be developed and will be greatly anticipated in the future.

VII

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