

2000 years of medical exchange

Ancient times to the 6th Century

By Gunter Neeb

Western medicine as it has been known for the last 200 years shows basic differences to Chinese medicine. Although anatomical features of the human body have been known since ancient times, modern Western medicine has emphasised these concepts only since the introduction of cellular and microscopic biology. Before that time it had astounding similarities to non-European medical systems such as Egyptian, Chinese, Arabian, and Indian medicines. These similarities were so strong that we must assume our ancestors exchanged medical information despite enormous distances between the continents.

MORE THAN 2700 years ago the origins of disease were described as influences and punishments from gods or demons. In East and West, shaman healers employed ritualistic and hallucinogenic techniques in order to make contact with demons or to drive them out.

Between the 7th and 5th century BC, epilepsy was called a sacred disease in Greece, and said to be the result of divine influences on the ill person. Treatment was attempted inside the temples of Asclepius through prayer, ritual and psychology, but

also through bath- and sleep-therapy, which provided an alternative to the magic techniques of the shamans.

During the Eastern Zhou Dynasty in China the shaman (*wu*) consulted a colleague — the healer (*yi*), who probably applied more mundane therapies such as needles or arrows.

While in the West the different concepts of psyche and soma were both treated inside temples, during the Zhou Dynasty in China a distinction was made not only between body and its corporal soul (*po*) but also the eternal soul (*hun*).

Greece and China developed philosophical backgrounds for medical concepts and their mutual influence, as Unschuld¹ points out, cannot be excluded. During the Warring States period the Hundred Schools (*zhu zi bai jia*) were cropping up in China with ideas such as the Yin-Yang theory, the five phases and the four principles of the *Yi Jing* (Book of Changes) in order to explain connections between nature and disease.

In Greece the pre-Socratics (6th-5th Century) such as Alcmaeon of Crotona developed the concept of the four elements, which became connected with medicine in the 4th Century.

In China “qi” was seen as the primal energy, while the concept of “pneuma”

by Anarimens of Milet bore very similar features. The meaning of “pneuma”, later on also used for “air”, was said to be a basic energy found in all living beings. The four elements fire, water, air and soil were said to combine together in all matter. Their characteristics were warm, moist, cold and dry, and if their balance was disturbed, disease was said to occur.

Zenon of Elea (4th Century) related them to the four-body liquids blood, phlegm, yellow bile and black gall, where blood was said to be warm-wet, yellow bile being warm-dry, black bile cold-dry and phlegm cold-wet. They were also related to the four seasons of spring, summer, fall and winter. This theory become incorporated into the Hippocratic medicine. Other schools such as the School of Heraclitus (5th Century) recognised only three elements: water, earth and fire.

During the 6th and 5th centuries BC, many philosophers existed in the East and West. In China Lao-Zi and Kong-Zi had a great influence on the development of medicine by providing a philosophical background. Their followers contributed to the practical aspect by stating that health preservation was a worthy goal in life and curing disease the duty of parents and society.

At the same time in Greece, the philosophers Socrates and Hippocrates had a strong influence on medicine. Since Hippocratic medicine provided the philosophical background of Western medicine for almost 2000 years, we have to look a little closer at this system.

Hippocratic medicine in Greece

Hippocrates of Cos (460-375 BC) was himself the son of a physician. He spent many years as a travelling physician, gaining experience in different places while also studying the case studies of the Asclepian temples. The scripts of the collection *Corpus Hippocraticum* were definitely not all authored by Hippocrates himself. They also included ideas from the followers of Hippocrates such as members of the School of Cos, as well as of other schools such as the Sicilian and the Cnidian schools.

Hippocrates' basic principle was not to

cure symptoms, but to strengthen the body in order to help it in the process of recovery and in bringing the organism back to its natural balance.²

He rejected the idea that diseases stemmed from supernatural beings.

“In my opinion one disease is no more sacred or god-related than another, but is rather caused by the same factors that are responsible for all other diseases. But in their bewilderment and ignorance the people saw the occurrence and origin of a particular disease as something divine, because it was so different from other diseases.” (*Corpus Hippocraticum: On the Sacred Disease*)

Instead of a fatalistic perception of diseases that were god-sent, Hippocrates tried to relate the philosophical background with practical experience and established the first medical system. Again, it might be a strange coincidence that around the same time the foundations of Chinese medicine, with philosophical ideas as well as practical diagnostic and therapeutic applications, were compiled in the *Huang Di Nei Jing*.

Both books describe diseases as being caused by pathological factors instead of demons or gods, and attempted to explain these factors. In the Hippocratic script, wrong nutrition, exhaustion and lack of relaxation were mentioned, but also environmental influences like water, climate and location.

In both cultures the instrument for diagnosis was considered to be a good perception and the use of all senses. The Cnidian School made use of auscultation when listening to sounds of the lung and heart. Besides asking for symptoms, the diagnostic part included the observation of the body temperature and excrements. This observation and differentiation was one of the features of the Hippocratic School. Based on the collected information a prognosis was made, similar to the process found in the Chinese *Hua Tuo Zhong Zang Jing* (The Central Viscera Classic of Hua Tuo).

In the *Corpus Hippocraticum*, the part called ‘Prognosis, Observation, Questioning and Judgment’ is described as follows: “We have to consider the common nature

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of man and the individual constitution, the disease, the diseased, the prescriptions, the practitioner who prescribed them – since from this we can decide on a better or worse prognosis; also the influences of the climate on health, the expression, behavior, silence (...) the time of worsening, excrements, urine, sputum, vomitus, sweat, shivering, freezing, cough, sneezing and swallowing. From these symptoms we have to conclude what causes them.”

After diagnosis and prognosis, therapy had to follow, and Hippocrates divided this into three areas he called “Dietetics, Pharmaceuticals and Surgery”. The first therapeutic area, “Dietetics” included much more than modern dietetics or nutritional therapy: it also included the correct rhythms of work, such as body movement or sports, as well as correct rest and sleep, cosmetics and sexual hygiene, the use of water and air and macrobiotic measurements that we also find in many Taoist scripts such as the *Huang Ting Jing* (Yellow Palace Classic), the *Su Nü Jing* (Classic of the Plain Girl) and others.

In pharmaceutical therapy, substances included foods like barley, wine, honey, pine seeds, but also spices and herbs or minerals like calomel, oxymel, galbanum, pepper, marjoram, hellebore, lupine and asafetida. They were used for oral application, in ointments, baths and clysters, and were already classified into diuretics, expectorants, emollients etc.

Zhang Zhong Jing wrote extensively in the *Shang Han Za Bing Lun* (Discussion of Cold and Miscellaneous Diseases) about harmful foods and their inappropriate mixing. Hippocrates also listed a few foods such as cheese and garlic and their unhealthy effects in his “Regimen in acute diseases”:

“Cheese produces flatulence and constipation, and heats the other articles of food; and it gives rise to crudities and indigestion, but it is worst of all to eat it along with drink after a full meal.” (*Corpus Hippocratum*)

But this school’s biggest step towards science was the documentation of knowledge in written form rather than following oral tradition. Hippocrates’ chapter on epidemics contains 12 case studies where he described his observations precisely on what seems to be a case of diphtheria:

“The disease of the woman with angina

living next to the house of Aristion began with diffuse speech. The tongue became red and dry. At the first day she felt cold, rather than hot, and at the third day she had shivering, high fever, red swelling, hard areas in the neck and on both sides of the chest, cold bluish hands and feet and difficulty when breathing. What she drank came out again through the nostrils, since she could not swallow it; besides, she was constipated and could not urinate. On the fourth day it became worse. On the fifth day she died.” (*Corpus Hippocratum*)

With the four principles diagnosis, prognosis, treatment and documentation Hippocrates was laying the foundation of Western medicine as it remained almost until the last century.

From OBC to the 6th Century

Greek and Roman schools

The ancient Greek knowledge gradually swept over the growing Roman Empire. The first century AD was a time of compilation of medical knowledge: many encyclopaedic works attempted to sum up the knowledge of their time, such as the famous eight-volume encyclopaedia *De Medica* by Aurelius Celsus. The first volume contains the history of medicine, including all the different Greek schools. In the second volume Celsus describes etiology, symptomatology, prognosis of diseases and the influence of lifestyle and climate on disease.

Like the Confucians he considered a golden balance (*Zhong yong zhi dao*) to be necessary for a healthy life, be it in regard to eating, drinking, sleeping, sexuality, bathing temperature, living in the city or the countryside – to obtain a moderate balance was to promote health. That the dwelling place was important for health was later seldom emphasised in European books, in contrast to the later Feng Shui schools in China, which were based on this necessity. Even in the 6th century Sun Si Miao had written already about this topic in his *Qian Jin Yi Fang* (Prescriptions Worth a Thousand)

“Although remote areas provide a good environment, the travel is difficult to handle for a single person, and as soon as many people live there, it becomes noisy and complicated again. One should better live near human settlements, with a wide view and

Element	Air	Fire	Earth	Water
Quality	Hot, humid	Hot, dry	Cold, dry	Cold, moist
Season	Spring	Summer	Fall	Winter
Humor (body liquid)	Blood	Yellow Bile	Black bile	Phlegm
Character	Choleric	Sanguine	Melancholic	Phlegmatic
Emotion or disease:	Mania, anger	Overexcitement, exhaustion	Depression, psychosis	Hesitation, slowness

even grounds, mountains behind and water in the front, with the fresh cool air of higher altitudes, fertile ground, and some spring water around. If one can get 10 mu plain land of this kind, one should live there. If someone has the chance to get more, it should not exceed the size of 20 mu. If one owns a larger place, it will lead to some worries, or if it becomes big like a commercial farm, it will lead to some more troubles. If this ground has some mountain ranges to the left and right and lies in between, it is an ideal ground. If the place for living is chosen well, one will live in harmony, and what else does one need?”

In the third and fourth volume of the *De Medica*, Celsus differentiates the known pathology of the body from the head to the feet, part by part. In the following two volumes he describes the *Materia Medica* of his time, the pharmacological knowledge, toxicology and prescriptions. The last two volumes contain detailed knowledge of surgery, like utilization of narcotics, amputations, wound sealing and stitching.

While Celsus was a great compiler with more emphasis on theory, his contemporary Dioscorides of Anazarba (born 70 AD) was a military doctor during the time of the Roman emperor Nero. His five-volume work the *Peri hyles iatrices* (*Materia Medica*) can be compared with the *Shen Nong Ben Cao*, since it also lists 800 medical substances from plants and 100 from animals or mineral sources, combined into about 1000 compound prescriptions. They contain foods and beverages, ointments, medications and even magic amulets. His prescription is so

detailed that its content and exactness was unsurpassed for about 1600 years. It formed the foundation for all later pharmacological books until the newer botanic terminology of Linné was introduced in the 17 Century.

The Greek Pneuma school of the 1st Century developed the concept that everything contains a basic substance, called “pneuma”. This substance is inhaled into the lungs with the air in order to cool the heat of the heart. When it enters the body the clear “pneuma zooticon” becomes transformed into “pneuma psychicon”, mixes with the blood, which is produced in the liver, and streams through the whole body, just as the “qing qi” becomes “zong qi” and guides the blood in Chinese medicine.

Galen, the great pioneer of medicine in the Roman Empire

Galenus of Pergamum (1630-200 AD), the son of a Greek architect, who lived and practised in Rome, combined the “pneuma” theory, Hippocrates’ “humoral quality” concept, and the theory of the four elements into a logical concept, set out in the 15 volumes of his *Ars Medica* (The Art of Medicine):

If the elements or their corresponding humors were not in harmony, a disease could occur, and the aim of the therapist was to restore this balance. But Galen not only included many concepts of his predecessors, he also corrected their inconsistencies into a logical system that was easy to understand.

An example for the logical structure of this theory is his digestion theory:

The first digestion of food and water was said to begin in the stomach where they were



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separated into clear chylus (nourishing liquid) that was sent to the liver, and turbid black bile, excreted via the intestines. In the liver the second digestion continued: here the clear chylus was transformed into black bile, yellow bile and, the purest, into blood. The turbid rest of the chylus was excreted as urine.

The third digestion was said to take part in the organs and the periphery: the blood, mixed with the body “pneuma” from the lungs, nourished the organs and was digested (used up) when they worked. The skin was said to excrete its metabolic products as sweat.

His idea of disease was that it resulted from accumulation of cold or slimy humors in the body, which gradually blocked the normal flow of healthy humors in the vessels and bowels. These obstructions had to be treated with warm or hot, drying herbs able to resolve and purge these blockages. The origin of the “herbal warming treatment” to treat diseases, known in Chinese medicine, probably originated from Galen’s theory. In the Galenic school pepper, chili, and later ginger, cinnamon and cardamom were preferred herbs to cure diseases, since they were said to be warm and drying. A disease had to be driven out of the body’s openings and there were five possibilities to do this:

1. Purging through the bowels with: Colocynthis (*Ku Xi Gua*), Euphorbia (*Qian Jin Zi*) and later rhubarb root (*Da Huang*) for purging phlegm through the bowels
2. Inducing vomiting with emetic herbs: Hyssops (*Huo Xiang*), Garlic (*Da Suan*), Oregano (*Niu Zhi*) and horse-radish (*Han Cai*) in large amounts
3. Draining moisture through the bladder with diuretic herbs: Parsley, Mint (*Ou Bo He*), Thyme (*She Xiang Cao*), Celery (*Jin Cai*), and Fennel (*Xiao Hui Xiang*).
4. Expelling phlegm with expectorant herbs: Mustard (*Jie Mo*), Tussilago (*Kuan Dong Hua*), bitter and sweet almonds (*Ku Xing Ren* and *Tian Xing Ren*), Pepper (*Jiao*), Pine Resin (*Song Zhi*), Centaurium minus, and later Myrrh (*Mo Yao*) and Olibanum (*Ru Xiang*).
5. Promoting menstruation in order to drive

out bad blood with: Aniseed (*Ba Jiao*), Saffron (*Zang Hong Hua*), Chamomile (*Yang Ju Hua*), Cinnamon (*Rou Gui*), Parsley root (*Yuan Sui Cai*), Juniper (*Du Song*) and Elder (*Jie Gu Mu*).

But not only herbs were used for this treatment. Similar to Chinese medicine, foods were also classified according to this system: salads and many roots were considered purgative, onions (*Cong*) and radish (*Lai Fu*) emetic, melons, apples and cucumbers diuretic, carrots, sesame and pomegranate (*Shi Liu*) expectorant and many warm spices were said to be promoting menstruation.

The therapeutic combination of food became an important part of the Galenic school and dietetic treatment was as important as herbal treatment.

The logical coherence of these theories created the philosophical foundation for medicine for the next 1500 years. It remained unchallenged, since many diseases and their concept of cure could be explained with it, but it was mainly based on anatomical knowledge from animals and it contained many mistakes in human anatomy. Initially Galen was treating gladiators’ injuries and thus had a profound knowledge of the human skeleton, muscles, bones and tendons. Unfortunately he did not know much about the inner organs and took this knowledge from dissected animals. His explanation of blood circulation was fictive: to explain the streaming of blood from the center of the body to the periphery and back he assumed the existence of tiny pores in the wall between the left and right heart ventricle.

Galen did not write much about plants since Dioscurides had already meticulously and extensively written about known plants of his time. He also did not state much about surgery, even though it was practised widely during his time. The 15 volumes of his *Ars medica* contain extensive knowledge on diagnosis. He emphasised pulse diagnosis similar to Wang Shu-He of the same century, but also urine diagnosis, which 1000 years later became one of the main diagnostic methods.

In Galen’s pulse diagnosis the four

elements correspond to four phases of the pulse. He also distinguished 27 different pulse forms, the same number Li Shi-Zhen reported in his *Bin Hu Mai Xue* (Pulse Studies of Bin Hu). As major groups, he distinguished large, small, fast, slow and strong and weak pulses. In Chinese pulse diagnosis this was slightly different with “biao and li,” while shuo, chi, shi and xu” were put in the same group. Some pulses are so similar that this cannot be a coincidence, either:

In pathology, Galen developed the concept of inflammation with the four signs “rubor, dolor, calor and tumor” and added a fifth, the “functio laesa” – “loss of function”. He emphasised correct lifestyle, balanced diet and preventive medicine similar to Daoist physicians such as Sun Si-Miao.

His therapeutic techniques were also similar to those of his contemporary colleagues in China: He used cupping, vessel pricking with needles, as well as purgative, emetic and diaphoretic herbs, and even induced sneezing as a technique to rid the body of pathogenic substances. His students had to study books and case studies of his own patients with him, and were in this way gaining practical experience.

Besides his main work, other works also contain articles on research and animal experiments he conducted in order to understand physiology and nature (*On Natural Faculties*, Book 1, chapter 55).

This made him, next to Hippocrates, the most important medical pioneer of ancient times. His complete works consisted of 200,000 printed pages.

Post-Galenic Roman and Byzantine medicine in the first 500 years AD

Medical study in the first 500 years of the millennium consisted of mathematics, astrology, history, rhetoric as well as the

study of anatomy, animals, pharmacology, surgical practice and case studies.

Medicine was differentiated according to teaching authorities or schools rather than patients (such as women, children, traumatic or internal medicine patients). The first teaching book about gynaecology was written in the 1st Century of the Roman Empire, based on the knowledge of the Greek midwives and female doctors who had specialised in gynaecology and obstetrics as early as the 4th century BC.

In the last few centuries of the Roman Empire a “bathing culture” had developed within the cities. Public baths with warm thermal springs opened up, with some brothels nearby, as such providing everything for the Roman maxim: “Balnea, Vina, Venus” (bathing, wining and dining and amorous pleasures), said to be good for a healthy body.

Due to internal fights and external attacks by German tribes the Roman Empire was gradually split into the western and eastern part. Now Greece was becoming an important part of the eastern empire.

Around this time more encyclopaedic works were compiled in the Eastern Roman capital, and the surgical arts were refined. These became an important part of Arabian medicine when the former Greek city of Alexandria was conquered in 642. After this event, Christians of the Nestorian order emigrated into Syria, Persia and other Arabian countries, even to China, where they formed a Christian minority for many centuries. Most likely, they brought some medical knowledge from the 5th or 6th centuries with them.

Around this time some groups in China were sent away to India to search of Buddhist scripts, where they also must have introduced medical knowledge from China. It appears that although travelling was slow,

Galen's pulses	Li Shi-Zhen's pulses
Pulsus nervosus, a bowstring like pulse	Xian mai, a qing-string like pulse
Pulsus undosus, a surging pulse	Hong mai, a flooding pulse
Pulsus vibrans, a vibrating pulse	Jin mai, a tight vibrating pulse



the cultural exchange was nevertheless very lively during these times.

While compilation of works and surgery flourished in the East, the western part of the Roman Empire adopted influences from the Germanic tribes, mainly knowledge of local herbs and prescriptions, as well as some folk medicine.

Germanic medicine was related to religion and contained many prayers, curses and bans. The mistletoe, for example, was a holy plant, allowed to be harvested only by the Germanic priests, the Druids.

Among the local herbs were juniper (*Juniperus communis*), a strong diuretic, the calming and relaxing St John's wort (*Hypericum officinalis*), ground ivy (*Glechoma herderacea*), whose mucolytic effect was used for cough, and sloe or blackthorn (*Prunus spinosa*) whose flowers were purgative and its fruits anti-rheumatic.

Whether early Germanic medicine had systematic therapy concepts or was only empiric is, due to the lack of written records, not known.

■ Parts 2, 3 and 4 of this article will appear in the next editions of *The Lantern*.

References or Notes

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 Unschuld P. (1985). *Medicine in China. A History of Ideas*. University of California Press, Berkeley.

Footnotes

¹ Medicine in China, History of Ideas, chapter 3.1.2.

² Deichfelder, p. 12