

# 2000 years of medical exchange

Part 3: The 15th to 19th centuries

**By Gunter Neeb**

**I**N 1578, LI SHI-ZHEN completed the 52 volumes of his *Ben Cao Gang Mu*, which for centuries was the largest book on medical materials in China. It contained 1892 kinds of substances: 1160 illustrations and 11,000 prescriptions, most of which Li had gathered himself throughout China. He classified them according to their evolutionary development into minerals, grasses, fruits, insects, shellfish, scale fish, poultry, animal and human.

During the 16th century, Paracelsus and Vesalius gave new views to medicine in Europe. The height of European herbal medicine was reached in the 16th and 17th centuries, leaving not much for later generations to discover. While Li Shi-Zhen published his materia medica in 1578, in Europe many herbal tomes were published, such as Otto Brunfels' *Contrafeyt Kreutterbuch* and Eucharius Rösslin's *Kreutterbuch* (both in 1533), or Hieronimus Bock's *Neu Kreutterbuch* in 1545, Walther Hermann Ryff's *Reformierte Deutsche Apotheke* in 1573, J.J.T. von Bergzabern's *Neu Kreutterbuch* and Tabernomontanus' *New Herbal Book* (both 1588).

Later, in 1652, Nicholas Culpepper wrote his famous *The English Physician*, quoting many classic sources and classifying herbs according to astrology. Culpepper's ideas were similar to Paracelsus in that he promoted the use of the local language instead of Latin, the use of local

herbs over exotic imports, in his simplification and in his practical approach to the complex theories of ancient scripts. His book became famous in the New World.

The difference to earlier books was that it contained clear colorful drawings, had a large content and included many herbs from non-local places, such as cardamom (*Bai Dou Kou*), Sichuan pepper (*Chuan Jiao*) and Cubeba pepper (*Bi Ba*). Many folk prescriptions were also included:

*For hard lumps and stones of the bowels with a hard belly use half a handful of dry white excrement from a dog and cook it with fig leaves and 1.5 pound wine and some salt for some time. This liquid is then applied with an irrigator into the anus.*

(Bock's *Neu Kreutterbuch*, p. 390)

In the 16th and 17th century many universities in Germany, and later Italy, France and England, began to set up botanical gardens to provide their students with the chance to study these plants alive and compare them to drawings in books.

These books show this was probably the time when Chinese and European traditional medicine were most similar in their philosophy, herbal application and view of sickness. Due to centuries of exchange of medical knowledge and the merging of many medical systems from China and Europe (e.g. Greek, Indian and Persian medicine) the systems became very similar. But from this time on the two systems increasingly diverged.

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## Paracelsus: the beginning of a new medical system after Galen

The 15th and 16th centuries brought the discovery of America and the introduction of new foods, spices and herbs, such as potatoes, tomatoes, tobacco, cocoa, condurago, sarsaparilla, quinine, angostura and rathania, many of which were later used to treat new diseases such as amoebic dysentery and tropical infections like malaria. With the discovery of America by boat and the viewing of space by telescope (thereby proving the Copernican system correct), European thinkers also entered a new era and initiated the reformation of the Church and humanism in philosophy.

The Swiss Paracelsus Theophrastus Bombastus of Hohenheim (1493-1541) initiated a change in medicine. He rejected the Galenic four-element system and stated that it was not the cold, warm, dry or wet quality of a plant that cured a disease, but an inherited inner value or what he called "virtue"; not the material body of the medication, but the spirit it contained. This spirit or virtue was locked in its substantial body like a seed in a nutshell. An alchemical process could extract this inner spirit and make it cure the disease.

Interestingly, his idea was that something insubstantial like the soul from a body (similar to "qi" as understood in China) was freed by alchemy to work as the therapeutic principle. However, later in the development of chemistry the only part considered important was not some spiritual energy contained in the plant but its pure material components. It seems that Paracelsus originally wanted to construct a system of spiritual cures, which ironically led to a purely material view of the curing principle of herbs.

In order to understand his system one must take a look at his life and motivation. His father, a German healer, treated the pilgrims near the monastery and taught him about herbs and their effects. When he was 10, they moved to Austria near a large mining area, where Paracelsus learned about melting, dividing and blending metals into new substances, knowledge important for his alchemical studies. Alchemy, being an old art of blending metals in the search for the "pure substance", was already practised in the distillation and melting of metals in Babylon and Egypt and later on transferred to Greece and Arabia. According to the Chinese historian Wang Ji-Ming, alchemy definitely spread in the 3rd century from the seafaring Arabs to China, and later from China to Europe.

Paracelsus studied medicine in Ferrara, Italy, where his teacher Leoniceco was one of the few daring scholars of this time, who criticised the classical scripts when they were wrong. For Paracelsus the deduction of the disease according to theoretical knowledge was antithetical to the

direct experience of a disease. After his graduation he wandered for years through Europe to cure and to learn from peasants, midwives and simple folk who had no theoretical knowledge but a lot of experience with diseases and their treatment.

Whenever possible, he performed alchemical experiments such as distillation and tried to find out more about the spirits in the substances he used for cures. Instead of the expensive guajak wood from South America he used quicksilver to treat syphilis, a method later applied until the start of the 20th century, and preferred local herbs to imported ones. Thus he angered the mighty trade dynasty of the Foggers, who became quite wealthy through their imports.

He also wrote and thought in German instead of Latin, like his contemporary Martin Luther, since he felt that medicine was no secret science and thus did not need a secret language. When the council of Basel appointed him professor, he publicly proclaimed to revolutionise medicine, which should be "based on experiment, experience and common sense instead of some ancient authorities".

Wherever he went, he did not stay long, although he was called to treat some famous scholars and clerics and was successful in his treatments, but he never got along well with the rules of the authorities. He said about himself: "They drove me out of Latvia, then out of Prussia, then out of Poland. But not enough, I didn't please the Dutch, the universities, neither the Jews nor the monks. But thank God, the sick people always welcomed me."

When he died his last will was to give all his worldly possessions to the poor and needy people. Until the present day his scripts are not completely understood.

The four pillars are the theoretical foundations of his system:

1. Philosophy, meaning no abstract theories, but an understanding of natural laws by reason. "Nature bears the disease and nature bears the cure for the disease." This meant mainly understanding the philosophy of nature and nature's principles, which centuries later became the natural sciences.

2. Astronomy, meaning the understanding of the cosmic principles of time and the relationship between the large and the small ("macrocosmos-microcosmos"). While at this time mainly the sun, the stars and the moon cycles were taken to represent earthly principles, 500 years later the principles of repeated structure were re-discovered as principles of nature.

3. Chemistry, meaning the understanding and applying of natural processes in order to produce effective cures. "Nature is an ideal chemist, we must imitate it." This meant mainly the use of chemical substances (metals and minerals) as an

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Paracelsus

independent principle for treating diseases. This was the basis for regarding a disease no longer as an internal disturbance of the body fluids, but as existing independently outside of the body, and to be treated by an independent medicinal. His view was that many diseases were starting from a chemical imbalance in the body, causing the bowels to become sour. Since many mineral substances neutralised acids, these could be applied to stop the “sour” disease. Starting from this view, the body became separated from the disease, which later on led almost to the ignorance of the body as an involved living system.

4. Virtue, meaning the spiritual principle inherited in every thing, man or medicine.

He also divided all substances into three basic groups:

- a. Sulfur, the fiery principle, as in gasses;
- b. Mercury, the fleeing, moving principle, as in liquids; and
- c. Salt, the ash or earthy principle, as in hard substances.

Virtue was also applied to the physicians themselves, who were strongly criticised by Paracelsus for their lack of ethical virtue. Instead of the greedy and even cheating behaviour of his contemporaries, his principle of virtue meant love towards God, love towards the medical vocation and empathy for the patient. Due to his high ethical values, he even created a new oath, like Hippocrates.

While his contemporaries did not dare to agree openly with his new ideas, his ideas found more and more followers after his death. The idea, that diseases resulted not from inner imbalances of the body fluids, but from wrong chemical processes, that could be treated with chemical substances, was revolutionising medicine. Now it was said that a sour or alkali imbalance could cause diseases, and too much acid in the stomach was balanced with clay and other earthy substances, which were meant to absorb those acids.

The most favoured substances were no longer plants, but minerals. Iron (*Sheng Tie Luo*) and its often red-coloured combinations like magnetite (*Ci Shi*) or haematite (*Dai Zhe Shi*) were used to stop bleeding and strengthen the blood, although the connection between both via hemoglobin was not yet known.

Saltpetre (*Xiao Suan Na*) was used for fevers

and later heart pain, laying the foundation for the future use of nitroglycerine for the treatment of angina pectoris.

So alchemy gradually changed from a religious search for the philosophic gold into “iatrochemistry” and a search for the effective substances in medications. This new kind of chemistry tried to rationally understand how matter changed, which matter was elementary and which was a mixture.

The new concepts changed even nutritional habits after the 16th century. Since Galen digestion had been interpreted as a process of maturation. After Paracelsus, digestion was no longer regarded as a process of maturation but one of fermentation, a term which was used in the new science of chemistry: seeds and fruits ferment (change their chemical content) in the ground and on the trees; after harvest they are fermented into bread, beer and wine, and after ingestion are again fermented into useful and useless substances. The useful substances are absorbed, the useless excreted as soil, where they ferment again. This corresponds Wu Jug-Tong’s idea of the San Jiao in his *Wen Bing Tiao Bian* where the upper warmer is like feathers, middle warmer divides food into clear and turbid, up and down, and the lower burner is like a ditch.

While all kinds of food were previously divided into groups according to four elements, they were now mixed according to Paracelsus’ three basic principles (see Table 1).

Not only did the European alchemists like to use heavy metals such as quicksilver, lead and iron and their chemical combinations like Calomelas (*Qing Fen*), Antimony (*Di*), Borax (*Peng Sha*), Sulphur (*Liu Huang*) Minimum (*Qian Dan*), Alumen (*Ming Fan*), Pyrite (*Zi Ran Tong*) and others, the striking similarity of the ideas of salt, the bodily substance, mercury, the moving energy, and sulfur, the fine spirit with the Daoist ideas of Jing, Qi and Shen cannot be coincidence. It was later said in the secret revolutionary societies of the 18th century, that these concepts had not to be taken literally but as symbols for inner powers, exactly as the Nei Dan Daoists of the Tang dynasty perceived it.

Since writings from the Wai Dan and Nei Dan Daoists must by then have reached some European readers, at least via the Jesuits in China, who

## Groupings according to Paracelsus’ principles

TABLE 1

FOODS	MEDICATIONS
Sulfur: oil, butter, grease, cream.	Sulfur: realgar ( <i>Xiong Huang</i> )
Mercury: meat extract, wine, vinegar, fish extract, stock, gelatin	Mercury: cinnabar ( <i>Zhu Sha</i> )

translated many scripts into Latin, it can only be assumed that there was a connection. Another possibility is that on both continents the same sources and secret traditions from the Middle East were applied.

### Studies of anatomy and the influence of physics in medicine

While Paracelsus' ideas broke with the classical view of diseases and the four-element system, the studies of anatomy were the other big influence that radically changed the medical system. Until the 16th or 17th centuries, European medicine was still closely related to other medical systems like the Arabian, Chinese and Indian, but these new concepts caused European and thus Western medicine to gradually diverge from their distant contemporaries.

After the exact drawings of the human body, based on dissections, by the Italian genius Leonardo da Vinci (1452–1519) and the famous painter Michelangelo (1474–1564), the Italians began to teach and study anatomy based on drawings which were, after the German Johannes Gutenberg invented movable metallic typesetting in 1445, now available in books.

One of the most praised books of this time was another German work, *Seven books about the structure of the human body*, written and published in 1542 by Andreas Vesalius (1514–1564). It contained exact drawings as well as descriptions of all anatomical parts of the human body. When he originally wanted to write about Galen's anatomical studies he had discovered that they clearly belonged to animals, and he performed many dissections on every part again. The painter Stephan von Kalkar was standing next to him making over 300 exact drawings. This had an influence on surgery, which was in need of the detailed descriptions of physiology of Vesalius' dissections. This led to the discovery of the blood circulation by William Harvey one century later, and finally to a new view of pathology and disease, which now began to be based solely on the dissection of dead bodies as described by Giovanni Battista (1682–1771). In the 18th century the same diseases were verified by dissection by finding the same diseased organs in sections of bodies with the same symptoms

This trend of relating diseases to anatomy and physiology led to another new idea: the distinction between the diseased and the disease.

The first who recognised general patterns of diseases was the English physician Sydenham (1624–1689) who summed up repeating patterns of the same symptoms into a new entity, independent from the body: the disease itself. He described the patterns of malaria,

scarlet fever, measles, diphtheria, rheumatism, sciatica, ergotism, typhus, gout and tuberculosis of the lung. He also developed the concept that diseases should not be treated according to their symptomatic combination of components, as *zheng hou* (symptoms and signs) are in Chinese medicine, but instead with a fixed combination of herbs for each disease. Some of these principles worked very well, like generally prescribing quinine for each case of malaria. Sydenham was a clinical physician who always tried to deduct his ideas from the practical observations he made. Theories were of no importance to him as long as his therapy worked. But although he always had the approach of treating the body as a whole system, he actually invented what was later to become the medical speciality of "pathology".

William Harvey (1578–1634) discovered by dissection that "blood moves in living beings in a circular movement and is always in motion, which is caused by the pulsation of the heart". He thus completely destroyed the belief in the system of humoral pathology, since his discovery was antithetical to Galen's theory, which already had been doubted after anatomical studies and Paracelsus' criticism. Harvey's discovery moved the famous French philosopher Rene Descartes (1596–1650) in his article about human beings in 1662 to compare the human body with a machine made by God, and the work of a doctor with a mechanic who has to repair the machine. Descartes emphasised that man is the master and owner of nature.

### The birth of orthodox Western medicine

Before the Renaissance in medicine began, medicine according to the Galenic system can be summed up as follows:

All things were divided into four elements, which were represented as the four humours in the body and as the four temperaments in the mind, which have to be in harmony for normal health (*eucrasis*). If they were in disharmony through wrong food, environment, emotions or poor living habits, disease (*dyscrasis*) would result. Diagnosis of the imbalance was made by questioning the patient for symptoms, pulse diagnosis and observation of his discharges, mostly of his urine.

Since all foods and herbs could also be classified into four different degrees of the four principles, the medication had to be chosen opposite to the disease, i.e. a warm drying herb for a cold, humid disease.

A disease was regarded as a part of the body and not as something separate from the outside, thus, treatment of the disease had to achieve balance with food, medication or manual methods



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A further hint (which was probably already evident from the style of language): it is one of the classics.



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like cupping or pricking. This view was strikingly similar to that of other medical systems, which must have exchanged knowledge over centuries.

The major divergence between European or later “Western medicine” and all other systems began in the 16th and 17th century led by:

- Paracelsus and his successors with the search for the chemical ingredients in medications;
- Sydenham, who understood diseases as independent, separate subjects outside the body, which could be treated generally instead of individually;
- Vesalius, Battista and others who changed the understanding of the body’s organs and the verification of disease by finding the same diseased organs in dissections of bodies with the same symptoms; and
- Finally by William Harvey’s discovery of the circulation and the re-interpretation of the body through mechanic and chemical principles.

This destruction of the old Galenic system led to a big change in medicine, a change so extreme that thereafter medicine interpreted the body only according to the newly discovered laws of physics and chemistry.

### China encounters by European travellers

In the 13th century, traders like Marco Polo and many others before and after him contributed to an exchange of medical knowledge. From the 16th to the 19th centuries the religious and political attempts by Western nations to gain ground in Asia contributed further to this exchange.

Matteo Ricci (1552-1610), Johann Schreck (1576-1630), Franz Xavier (1552), Johannes Grueber (1623-1664) and Adam Schall von Bell (1622-1666) were sent out by the Pope to work as missionaries. All received a high education, mostly by Jesuits, and some of them, like Ricci and Schall, were also able to speak and read the Chinese language fairly well and translated the Bible into Chinese.

Some of these scholars exchanged ideas with Chinese doctors, as quoted in Ming Shi’s *Li Ma Te Zhuan* (Ming-History, about Mateo Ricci):

*These countrymen from the West were all bright scholars who came to spread their religion without egoistic motives. The books they wrote contained much knowledge unheard of in China and caused curiosity about their difference, so that many great scholars like Xu Guang-Qi, Li Zhi-Zao and others spoke very well of them.*

The famous physician Wang Ken-Tang (1549-1613) who wrote the large medical encyclopedic work *Zheng Zhi Zhun Shi*, said about his talk with Ricci: “I met the European Ricci from the

West who showed me his book. Its paper was white like a silk cocoon and although thin, opaque enough that one could write on both sides of the page without shining through, so I wondered how it was made. Ricci told me it was produced by stomping cloth into small pieces. There I remembered that Chai Lun produced paper in this way from fishnets. (...) Ricci also told me that the sun was larger than the earth, but if people did not believe this, he explained it in a very convincing way.”

Yet, the cultural gap for those who lived in China for only a short time was hard to overcome. Things they encountered were described precisely in their reports but often misunderstood. On his eight-year journey to China and back, Father Johannes Grueber wrote about Chinese medicine:

*The physicians are so outstanding that they can recognise a disease already by the pulse. Concerning the medications, they have the same success as everybody else by guessing the right ones or by selecting them by chance. I can tell this by experience, since I fell sick on the way the last month before reaching Beijing. After my arrival in Beijing a physician of the king called by Father Adam Schall visited me.*

*As soon as he entered the room, he ordered me to sit down, take a rest, and, after having freed both arms from clothes, to sit at a table. He touched my pulse on both arms by pressing them once strongly, once touching only slightly the arteries, while not touching the artery of the other arm. Sometimes he pressed one while only slightly touching the other one. Once he touched the pulse very long then again for just a moment, having me to form a fist and some time from a straight hand. Finally there was no position of arms and hands where he had not felt the pulse.*

*This pulse touching took about half an hour. After all this time I thought of telling the doctor my disease complaints, but Father Schall asked me to be silent, since the doctor would know it better than me. After he had sat down he stated with significance, even larger than the Oracle of Delphi, the length of my disease with all symptoms, while telling exactly how long they lasted and all other details of my disease with such a precision that I was very surprised.*

*He prescribed some juices for me, but from their mild effects I could tell that it was easier to recognise my disease than to find the suitable cure for it.*

*But concerning their medicine, one has to know that they never use the bleeding method, but instead use the cupping method at the shoulders. They can treat syphilis very well with herbal decoctions. But it is not as dangerous in these areas*



*The physicians are so outstanding that they can recognise a disease already by the pulse. Concerning the medications, they have the same success as everybody else by guessing the right ones or by selecting them by chance...*

Father Johannes Grueber



as in Turkey, Persia and some East-Indian zones.

Among their medications they have a famous root called "Tiger-milk" coming from their province of Sichuan. They say that this plant grows only at places, where the milk of a tigress dropped when she is angered by the trail of hunters. It is true that the smell of this plant reminds strongly of milk, and it also is white like milk. The Chinese say that this root, if prepared in a certain way will cause strong sweating. I have seen it, but not noticed the effect which it is said to have.

The first medical travelers in Asia were mainly from Holland, which had seized Java, Malacca, Taiwan and Deshima in Japan from the Portuguese between 1596 and 1641.

Jacob de Bondt (1598-1631), a Dutch doctor, encountered Chinese and Japanese medicals and mentioned briefly a therapy by needle in his work. More was listed in 1686 by Bernhardt Valentini (1657-1729) in his overview on acupuncture and moxibustion. A real storm of interest in Chinese medicine was raised in 1683 by the Dutchman Wilhelm Ten Rhines' (1647-1700) work on arthritis and acupuncture. He was probably the first to use this word, and described that a disturbance of the circle of energy "qi" was causing the disease. He also wrote about the pulse diagnosis, the Wu Xing (five phases) and Zang Fu (Organ) System, stated that the points of acupuncture did not need to be identical with the pain or disease, but described heat- and cold-diseases from the view of Galenic medicine.

Around 1610, ginseng arrived again in Holland, sold for eight times the price of gold, and this time described correctly as coming from east of Beijing.

An unknown French missionary who had lived in Canton between 1665 and 1668 published the first work on Chinese pulse diagnosis in 1671 in Grenoble, followed by the Hungarian Father Michael Boym (1612-1659) in 1681 and by Du Halde who, in 1749, published the famous book *Pulse Secret*, a translation of the *Mai Jue* from the Song-dynasty. Sir John Floyer (1649-1734) used the English translation as a base for his own pulse diagnosis book, *Physician's Pulse Watch*.

Father Michael Boym and others also translated Zhang Jing-yue's *Lei Jing* in the 17th century.

Father Amiot (1718-1793) wrote comments on Dao Yin and Daoist calisthenics, while

translations about herbal medicine came mainly from the French: Du Halde and Mogriac de Maillac mention herbs in 1779 and quote from Li Shi-Zhen's *Ben Cao Gang Mu*, while the part on mineral medicine of the *Ben Cao* was translated by Jacques Francois Vandermonde, who practised in Macao around 1720 to 1731. The first dissertation about Chinese tongue diagnosis was written 1813 by the French physician Jean Pierre Abel Remusat (1788-1832).

But while the 18th century Europeans were fond of this "exotic" knowledge, the influence of Newton's mechanic laws and Descartes' ideas made it more and more difficult for Chinese medicine to be accepted in the West. Even the Chinese court passed a law in 1822, which prohibited the Emperor's family from receiving acupuncture treatments, in order to keep their bodies intact.

While the scholars and religious teachers of the 16th to 18th century had the intention to spread their religion, the imperialistic approaches of seafaring nations became more aggressive in the 19th century, and the establishment of western hospitals on Chinese ground also often had political motives.

Religious missions had been banned before the opium wars from 1840-1842, after which European military violently forced their way into China and annexed part of the country. Thomas College (Gao Lei Shun), an Englishman, set up a clinic in Macao, which became the first missionary hospital in China. Peter Parker (Bo Jia, 1804-1888) was sent from the USA as pastor and doctor to set up an ophthalmologic hospital. From 1828 to 1949, foreign countries established altogether 340 of such missionary hospitals. Schools and colleges were established to teach Western language and medicine.

Since the influence of Western medicine grew after the translation of many medical books into Chinese, such as *Nei Ke Xin Lun*, *Fu Er Xin Lun* and others by the English Hersey (He Xin) in 1851-58, the Qing Court did not want to leave medicine to the Westerners and established its own Chinese medical school in Tianjin in 1888, named *Beiyang Yi Xue Yuan*, which later became Bei Yang University and then today's Tianjin Daxue. For the same reason a medical college was added to Jing Shi University in Beijing in 1903.

But it was not a one-way street; not only did Western medicine come to China, some also tried to introduce Chinese medicine

to Europe. The French ambassador in Shanghai, Georges Soulie de Morant (1878-1955), who lived in Shanghai from 1898-1917, practised Chinese medicine and acupuncture as a doctor in China, speaking and reading the language fluently. When he returned to France in the early 20th century, his promotion of Chinese acupuncture caused his friends to nominate him for the Nobel Prize, but caused the orthodox medicos of his time to slander his ideas and prevent his Nobel nomination, thus supporting the Western medicine of this time and rejecting the concepts of Chinese medicine.

### The new medicine in the age of enlightenment

The age of enlightenment of the 18th century was based on humanism, thus placing man in the centre and rejecting God as the ultimate power. The ideals of this time were reason, the courage to be critical, freedom of thought and religious beliefs and tolerance between races and classes. The Englishman Francis Bacon (1561-1626) founded the basics of modern natural sciences by stating that only systematic experiment could prove a theory to be right or wrong. He stated that only inductive conclusions after reproducible experiments could lead to the truth. No ancient authority was untouchable.

The German philosophers Lessing, Kant and Fichte were paving the way to a distinction between empirical perception and rational thought, leading to changes in philosophy and thus later in politics. Immanuel Kant (1724-1804) summed it up this way: "When Galileo experimented with balls on a slanted surface or Torricelli measured the air by water ... all natural scientists became enlightened: they understood ... that nature must be forced to answer their questions, instead of having her leading the way by a string."

So after getting rid of the authorities God and nature, humans began to control their environment by reason and logic, substituting the laws of religion for the laws of science.

Medicine progressed with science and its new inventions, and it began to measure and weigh everything with a thermometer and stethoscope; gynecology and surgery separated from internal medicine and developed independently, while the hygienic situation of hospitals began to improve, since the governments now took care of them and saw medicine as an important tool for public



health.

Although William Harvey had discovered the blood circulation, it was still not known how the blood changed from the arteries to the veins. Marcello Malpighi used the microscope that had been invented by his countryman Galileo in order to discover the anatomy of small parts. In 1661, he discovered that the capillaries served as a bridge between arterial and venous circulation, as well as many other small features of the body.

The first microscopes had a magnification of 200 times, and also enabled the Dutch Antoine van Leeuwenhoek (1632-1723) to see bacteria.

century did variolation and vaccination against pox start with Edward Jenner (1749-1823), although this method was already being used in West Africa and the Orient. For example, Ge Hong (4th century), after he was bitten by a rabid dog, recommended to kill it and apply its brain to the surface of the wound in order to cure the poison with the same poison. He also described the smallpox in his book. And while in 1884 Wu Rong-Lun wrote in a book about vaccination (*Niu Dou Xin Shu*) that this method had started already in the 17th century, in Europe immunisation was not completely accepted until the 20th century, because critics saw it as poisoning the blood.

Besides the discoveries of many more anatomical details and finer tissue, chemical substances, foods and drugs were analysed by chemists to determine how their working principles could be used in medicine. Examples are Vitamin C in fruits for scurvy (1747), sodium salicylic acid in willow bark (1763) for pain, the glycosides in convallaria and digitoxin (1785) in aconite for edema by heart insufficiency, morphine from opium (1805), caffeine from coffee (1820), nicotine from tobacco (1828), codeine from opium (1832), theobromin from

cocoa (1841), ephedrine from *Ma Huang* (1887) and many more. In the second half of the 19th century, the synthetic production of medications began with ether, chloroform and aspirin.

But while chemistry and physics described the human body as a mechanical machine, some famous doctors began to concentrate on the immaterial part of man instead of the body.

The roots of rediscovering the soul were probably laid by Georg Ernst Stahl (1659-1734) whose “animism” theory postulated that the soul was the living principle of being in the corporal body. In his view a physical disease was the expression of a diseased soul, which must be cured. His ideas were developed into “vitalism”, the theory of life force as the power behind all processes of life. Another German doctor Christoph Wilhelm Hufeland (1762-1836) supported this view. He saw life force in a very similar way to the early Taoists, who saw the qi as a power behind all life. Disease was for him a disturbance of this natural life force, which the body tried to cure by regaining balance. The doctor’s work was to help the patient with natural methods to regain this balance. Instead of attacking the disease, the therapist had to strengthen the life force in the patient in order to cure them.

He emphasised hygiene, preventative medicine, dietetics, and natural cures with water and wrote a book on the prolongation of life, which also seems to remind us of the Taoists. His ideas influenced Hahnemann, who invented homeopathy at the beginning of the 19th century.

Another searcher for the spirit was the Austrian Franz Anton Mesmer (1734-1815), who discovered hypnosis as a way to cure diseases, and although criticised and doubted in his views of the human psyche, laid the foundation for Sigmund Freud’s psychology at the end of the 19th century.

When the age of revolution began in Europe, with political turmoil and industrial revolution, many ideas existed next to each other: conservatives, socialists, liberals and democrats were looking for changes in politics; industry began to develop alongside farming, and in medicine analysis of the body and search for the soul were also struggling for the lead, thus driving on medical progress.

■ Part four of this series will appear in the next issue of *The Lantern*.



Only at the end of the 18th