

I. Prolegomena

This book offers, together with the original Chinese text, the first complete philological and annotated English translation of chapters 26 through 33 of the *Ben cao gang mu* 本草綱目, the 16th century Chinese Encyclopedia of *Materia Medica* and Natural History by Li Shizhen 李時珍 (1518 – 1593), devoted to the natural history and pharmaceutical application of what were considered at the time “Vegetables and Fruits.” It opens up an almost two-millennia-long panorama of wide-ranging observations and sophisticated interpretations, ingenious manipulations and practical applications of natural substances for the benefit of human health. As Prof. Zheng Jinsheng 郑金生, the pre-eminent *Ben cao gang mu* expert of present day China, has characterized it:

“Some of the pharmaceutical substances gathered in this book have already left the platform of their clinical application. However, the data associated with them offer abundant material to study the customs of the people and the culture of the past. While he gathered data related to pharmaceutical substances, Li Shizhen never hesitated to extend his investigations and collection to all possible realms. That is, while [the *Ben cao gang mu*] appears to be a book on *materia medica*, it is in fact an encyclopedia of natural science and has become a treasure house for today’s researchers of many fields of science.”¹

I.1 History of Chinese *materia medica* literature

The *Ben cao gang mu* is the culmination of a 1600-year history of Chinese *materia medica* literature. This history began at some time during the Han dynasties when, between the 2nd century BCE and the 2nd century CE, two hitherto in China undocumented genres of medical-therapeutic works appeared. Stimulated by impulses

1 Zheng Jinsheng 郑金生 and Zhang Zhibin 张志斌, *Ben cao gang mu dao du* 本草綱目导读, “Guide to Reading the *Ben cao gang mu*,” Beijing, Ke xue chu ban she 科學出版社, 2016, 35.

whose origin and nature remain enigmatic today, the new therapeutic approach of needling 365 “holes” spread over the human body, on the one hand; and a first detailed description of 365 individual pharmaceutical substances on the other, marked the onset of two traditions of health care. They conceptually remained separate for one thousand years. Why the number of days in a solar year, 365 – rather unusual in the history of Chinese categorization of natural phenomena – was chosen as a starting point of both traditions is unclear.

Needling therapy, or so-called acupuncture, remained an isolated facet of Chinese medical culture until the 11th/12th century. Its seminal texts, the Yellow Thearch classics,² were either lost during the first millennium or survived only through a rather tenuous tradition, supported by a few members of the social elite.³ Apparently, the Yinyang and Five Phases doctrines of systematic correspondences, which legitimated and guided needle therapy from its beginning, failed to achieve the status of a world view widely acknowledged by broad segments of the population. In contrast, pharmaceutical therapy, as evidenced by published recipe collections and works focusing on the description of individual substances, constituted the mainstay of medical practice from the first millennium to the present day.

Since the early 1970s, recipe manuscripts with data on the therapeutic properties of combinations of herbal, mineral and animal substances have been recovered from late Zhou and early Han era tombs.⁴ The list of therapeutic indications and a highly developed pharmaceutical technology outlined in these texts evidence a long development of pharmaceutical therapy prior to the compilation of works with descriptions of the properties of individual substances. The earliest of these works known is the *Shen nong ben cao* 神農本草, “Shen nong’s *materia medica*.” Historians agree that it was written at some time between the 1st century BCE and the 1st century CE.⁵

2 Including the *Huang Di nei jing su wen* 黃帝內經素問, *Huang di nei jing ling shu* 黃帝內經靈樞, and a late sequel, the *Nan jing* 難經. For philological translations of these classics, see Paul U. Unschuld and Hermann Tessenow, *Huang Di Nei Jing Su Wen. An Annotated Translation of Huang Di’s Inner Classic*, 2 vols. University of California Press, Berkeley and Los Angeles, 2011. Paul U. Unschuld, *Huang Di Nei Jing Ling Shu. The Ancient Classic on Needle Therapy*. University of California Press, Oakland, 2016. Paul U. Unschuld, *Nan jing. The Classic of Difficult Issues*. Oakland 2016.

3 Paul U. Unschuld, 2016, 1 – 4.

4 Donald Harper, *Early Chinese Medical Literature. The Marwangdui Medical Manuscripts*. Kegan Paul International, London and New York, 1997.

5 For details on the *Shen nong ben cao* and the subsequent history of Chinese *materia medica* literature, see Paul U. Unschuld, *Medicine in China. A History of Pharmaceuticals*. Berkeley, Los Angeles, London, 1986.

Even though at that time Chinese civilization recognized and documented in bibliographies and catalogues individual authorship of literary works, the authors of the seminal texts of both the needling and the pharmaceutical traditions remained anonymous. Their origins were traced to legendary culture heroes, that is, Huang Di 黃帝, the Yellow Thearch, and Shen Nong 神農, the divine husbandman. Shen Nong, also known as Yan Di 炎帝, the Fiery Thearch, was said in the *Huai nan zi* 淮南子 to have pitied the suffering of mankind. Hence he tasted all kinds of herbs and “discovered 100 with poison per day.” From the very beginning, for a natural substance “to have poison” (*you du* 有毒) or “to be nonpoisonous” (*wu du* 無毒) was seen as an important criterion for assessing its acute or long-term therapeutic potential.

The *Shen nong ben cao*, closely associated with the tripartite world view of Dong Zhongshu 董仲舒 (179 – 104) and a political structure antagonistic to the hierarchy of the young empire, distinguished among three “ranks” (*pin* 品) of pharmaceutical substances. The upper rank, associated with heaven, included substances identified as *jun* 君, “rulers.” These were considered nonpoisonous and capable of helping extend life. A lower rank, associated with the earth, was assigned to substances “with poison.” These were given the status of *zuo* 佐 and *shi* 使, that is, “helpers” and “agents,” and they helped eliminate the disease. A middle rank of *chen* 臣, “officials,” associated with mankind, was positioned between the upper and lower ranks. Some of these “officials” were considered “nonpoisonous,” while others were known to “have poison.” They acted as intermediaries between the rulers above and their helpers and agents below. The substances described, arranged according to a preface into groups of 120, 120 and 125 respectively,⁶ were mostly herbal. This may be the reason behind the naming of the first *materia medica* work and henceforth the entire literature genre *ben cao* 本草, which possibly meant “based on herbs.”

Tao Hongjing 陶弘景 (452–536), a Daoist naturalist, was the first author to revise and expand the “original classic,” *Ben jing* 本經, as he called the *Shen nong ben cao*. In a first work, titled *Shen nong ben cao jing* 神農本草經, “Shen nong’s classic on *materia medica*,” he retained the original division into three chapters, but added 365 “additional records [on pharmaceutical substances recorded earlier] by renowned physicians,” *ming yi bie lu* 明醫別錄. In a second work shortly thereafter, the *Shen nong ben cao jing ji zhu* 神農本草經集注, “Various annotations to Shen nong’s classic on *materia medica*,” Tao Hongjing significantly expanded his annotations to the 730 substances listed and divided the text into seven chapters.

6 The *Shen nong ben cao* versions accessible today are based on reconstructions by Chinese and Japanese researchers since the 17th century. They have identified 141 substances as “upper rank,” 111 substances as “middle rank,” and 103 substances as “lower rank,” totaling 365.

Tao Hongjing initiated a “main tradition” of *ben cao* works, which would be continued by subsequent authors until the early 13th century. This tradition was characterized by an expansion of the “original classic” with ever more data on the nature, origin, therapeutic effects and pharmaceutical processing of natural and man-made substances. This data was often adopted from an increasing number of *materia medica* works published outside of the main tradition whose authors did not feel committed to the structure and contents of the *Ben jing*. They focused on regional knowledge, their own experience, substances used as both medication and food, substances enabling survival in times of famine, pharmaceutical processing and other such special aspects of pharmaceutical lore. In the middle of the seventh century, an official named Su Jing 蘇敬 (fl. 657) suggested that the emperor support a new edition of the “original classic” to correct older data regarded since as erroneous, and include more recent knowledge of the therapeutic potential of natural substances. The result, the *Xin xiu ben cao* 新修本草, “Newly revised *materia medica*,” of 659, combining 850 substance entries in 54 chapters, was the first government-sponsored and illustrated *ben cao* work in China.

The main tradition came to a halt in the 13th century for at least two reasons. The lengthy title of one of the final works of this tradition, published in 1249 and describing 1746 substances in 30 chapters, offers a clear indication of one of these reasons: *Chong xiu zheng he jing shi zheng lei bei yong ben cao* 重修正和經史證類備用本草, “Newly revised *materia medica* of the *zheng he* reign period, based on data from the classics and historical annals, based on evidence and ordered on the basis of groups, prepared for clinical application.” The main tradition was stifled by the abundance of its data and the perpetuation of its claim to be merely extending the original classic. The last works were extremely unwieldy. More recent data was added to previous statements, without comments on contradictions or earlier errors. Readers were left abandoned with ever longer sequences of quotes from a wide range of sources of varying quality.

We see a second reason for the end of the main tradition in a completely new genre of *materia medica* texts initiated by Kou Zongshi's 寇宗奭 *Ben cao yan yi* 本草衍意, “Extended ideas on *materia medica*,” in 1119 and exemplified by Wang Haogu's 王好古 *Tang ye ben cao* 湯液本草, “*Materia medica* of decoctions” in the mid 13th century. With the rise of Song Neo-Confucianism, the more than one-millennium-old schism was bridged between the therapeutic approaches of needling and pharmaceutical therapy. Needling, i.e. acupuncture, was based on the Yinyang and Five Phases doctrines of systematic correspondences. *Ben cao* literature and recipe collections were based on empirical knowledge and magic correspondences. The convergence of these two separate approaches resulted in a first pharmacology

of systematic correspondences. Authors committed to this new perspective categorized each pharmaceutical substance according to its presumed association with certain kinds of flavor and qi. As these kinds of flavor and qi were associated, in turn, with certain yin and yang qualities, as well as with the Five Phases, a link appeared possible to pathologies also defined in terms of yin and yang and the Five Phases.

The main tradition was unable to integrate the ideas published by the various authors of the so-called Song-Jin-Yuan epoch of *ben cao* literature. As a result, the publication of comprehensive *materia medica* texts ended. Each of these works claimed to offer all available pharmaceutical knowledge, old and new. It was only three centuries later, in the 16th century, that two authors introduced a new structure to the contents of comprehensive *materia medica* works, leading to a brief revival of the tradition. The first result was the *Yu zhi ben cao pin hui jing yao* 御製本草品彙精要, “*Materia medica*, written on imperial order, containing essential data arranged in systematic order,” in 1505. The second and more successful of these newer *ben cao* works was the *Ben cao gang mu* 本草綱目 of 1593 compiled by Li Shizhen 李時珍 (1518–1593).

1.2 Structure and contents of the *Ben cao gang mu*

It is not known whether Li Shizhen saw the *Yu zhi ben cao pin hui jing yao* before he set out to compile the *Ben cao gang mu*. In his own personal interest, Qiu Jun 邱濬 (1420 – 1495), a scholar official, had devised a scheme to overcome the unwieldy nature of the final texts of the main tradition of *ben cao* literature. By restructuring the individual substance monographs, he removed the decisive obstacle to practical use of the *ben cao* texts. He dismissed the idea that newer *ben cao* works were mere emendations of the “original classic,” with whatever new knowledge had become available being added to the substance of earlier works. Qiu Jun divided each monograph in accordance with 13 characteristics of individual substances that he extracted from former texts.⁷

As a result, a reader interested in the origin, the pharmaceutical processing or the therapeutic indications of a particular substance found relevant data collected under a respective heading. To find the information they sought, users of the new text were no longer required to read through all the historical layers that had accrued among the texts of the main tradition of *ben cao* works. Qiu Jun died when he had finished writing only one chapter. After hectic intrigue and conflicts of interest, Liu Wentai 劉文泰 (fl. 1503), an official in the Imperial Medical Office, and a team of

7 Paul U. Unschuld, 1986, 140–141.

collaborators were ordered by Emperor Xiao zong 孝宗 (1470 – 1505) in 1503 “to prepare a new *ben cao* edition, to simplify the consultation of these works.” They took over the structural proposals of Qiu Jun but expanded the number of subheadings of each substance monograph from 13 to 24.

The new work was completed only two years later. Pleased, the emperor personally gave it the title “The Essentials of *Materia medica* with the Data on Items Arranged According to their Similar Nature, compiled on Imperial Order.” Soon afterward, the emperor died. The manuscript was never published, possibly because of the exquisite color illustrations added to each entry. No technology was available in the 16th century to print such a work. Several manuscript copies were prepared and a few have ended up in libraries in Japan, Rome and Berlin. In 1701 a revised and amended version without the illustrations was prepared, by order of Emperor Kang xi 康熙. It was published by Shanghai Commercial Press in 1937.⁸

Li Shizhen chose a structure for his *Ben cao gang mu* entries similar to that of the *Yu zhi ben cao pin hui jing yao* substance monographs. However, rather than separating the data of each entry into 24 categories, he decided to limit their subheadings, where required, to the following ten:

1. *xiao zheng* 校正: Corrections of Erroneous Listings of Substances
2. *shi ming* 釋名: Explanation of Names
3. *ji jie* 集解: Collected Explanations
4. *xiu zhi* 脩治: Pharmaceutical Preparation
5. *bian yi* 辯疑: Discussion of Uncertain Issues
6. *zheng wu* 正誤: Correction of Errors
7. *qi wei* 氣味: Qi and Flavor
8. *zhu zhi* 主治: Therapeutic Control
9. *fa ming* 發明: Explication
10. *fu fang* 附方: Added Recipes

Li Shizhen also conceptualized a new order of the entries. The “original classic,” within the three groups of “upper,” “middle,” and “lower rank,” had listed substances following their identification as mineral, herbal, and animal-human – i.e. proceeding from dead and immobile to living and immobile, and on to living and mobile substances. A fourth and final group consisted of victuals. Later works of the main tradition omitted the “upper,” “middle,” and “lower rank” divisions, but retained the mineral, herbal, and animal-human classifications.

8 Ibid., 142-143.

Li Shizhen introduced a different order. Based on the sequence of the Five Phases, he began, after four introductory chapters, the subsequent 48 chapters with a list of waters, followed by fires, soils, and metals, which included salts and minerals (chapters 5-11) and then herbal substances (chapters 12 through 37). Separated by chapter 38, listing “clothes and utensils,” he then devoted chapters 39 through 50 to animals, ranging from “tiny” to “large,” that is, from worms/bugs through fowl to four-legged creatures. Again separated by a chapter on “strange items,” he eventually reached the pinnacle of his scale, human substances suitable for a medicinal application. In all, Li Shizhen wrote down ca. 1.6 million characters to describe 1892 pharmaceutical substances.

The entries in the final 48 chapters were divided into 16 sections, for 13 of which Li Shizhen identified subsections. These serve to point out related items within broader groups such as waters, herbs and worms/bugs. For example, the section on worms/bugs is subdivided into those born from eggs, those generated through transformation, and those originating from moisture. Each section is introduced by a general statement explicating the special nature of the substances grouped in it. Each individual substance is given a heading stating its earliest name documented in pharmaceutical literature and, if this was the “original classic,” the upper, middle or lower rank it had been assigned to.

Where required, Li Shizhen began an entry by pointing out a formerly erroneous listing of the substance in question. Whenever he found identical substances listed in previous *ben cao* works twice under different names, he justified the combination of these names in one entry.

The length of documented Chinese pharmaceutical history, the sheer size of the country with its many regional cultures and languages, and the different kinds of sources quoted by Li Shizhen led him to list and discuss the names of the substances he described. Not infrequently, Li Shizhen saw a need to explain different names in the North and South of China assigned to an identical substance. For example, in chapter 09, he went into an extensive discussion to end an apparently millennia-old confusion concerning the substance gypsum. It was known as *shi gao* 石膏, “stone fat,” *xi li shi* 細理石, “finely structured stone/mineral,” and *han shui shi* 寒水石, “cold water stone/mineral.” Some authors identified it as *fang jie shi* 方解石, “stone/mineral that splits into rectangular pieces,” and as *chang shi* 長石, “lengthy stone/mineral.” But these names had also been applied to other minerals. Li Shizhen brought all relevant quotes together and eventually offered his conclusion.

Li Shizhen titled the relevant subheading *shi ming* 釋名, “Explanation of Names,” because he went beyond simply enumerating alternative names. Wherever possible he added philological explanations taking into account, for example, local dialects

and the composition of characters. Substances imported from foreign countries often were given names in China transcribing the pronunciation of their original foreign pronunciation. Wherever feasible, Li Shizhen included information on the origin of such names, for example, reflecting a Sanskrit term. Furthermore, many names were written with characters possibly unfamiliar to the *Ben cao gang mu*'s readers. Hence Li Shizhen explained their pronunciation by either adducing homophones or resorting to the split-reading approach. And when he felt at his wits' end, he freely acknowledged his inability to explain a certain name.

While this explanation of names suggests an awareness of certain limits of understanding among future readers and users of the *Ben cao gang mu*, Li Shizhen rarely explained a central feature of each substance described: its therapeutic indications. The quotes on the ability of substances to "control" disease are taken from sources spanning more than 1500 years. The *Ben cao gang mu* lists more than 4500 key disease terms; by the time of Li Shizhen, perhaps most of them were still self-explanatory or could be understood by experts from their context.

In today's China, many of the disease names referred to in these quotes are no longer easily understood. Similarly, for readers of the *Ben cao gang mu* outside China, the therapeutic indications are often given with rather enigmatic disease names written in single, unfamiliar characters or using metaphors that are no longer easily grasped. The first volume of the *Dictionary of the Ben cao gang mu* traces each of the 4500 disease terms to its earliest appearance. It identifies its meaning in that early context and, where applicable, at the time of Li Shizhen.⁹

Another central feature of descriptions of pharmaceutical substances is their place of origin. From early on it was known among Chinese experts that one and the same herb was endowed with different therapeutic powers depending on where it grew in the country. The climate and the nature of the soil varied from North to South and from East to West, and so did the "qi" a plant was exposed to. Hence where considered necessary, substance entries of the *Ben cao gang mu* include related information. This is mostly comparative, that is, Li Shizhen provided a ranking of the substances from different regions in accordance with the presumed strength of their therapeutic effects. All the dynasties that followed each other during the imperial age regularly rearranged administrative structures. As a consequence, place names and the names of administrative structures were assigned new names. Hardly any location kept one and the same name throughout history. Li Shizhen regularly explained the location in his time of places mentioned in an ancient quote under a

9 See Zhang Zhibin and Paul U. Unschuld, *Dictionary of the Ben cao gang mu*. Vol. I: *Chinese Historical Illness Terminology*. University of California Press, Oakland, 2015.

name no longer in use. Today, the current location of even more places can no longer be easily identified by their ancient names.

The second volume of the *Dictionary of the Ben cao gang mu* traces each of the place names and those of administrative structures mentioned in the *Ben cao gang mu* to their current location. More importantly, the *Dictionary* offers the history of each name and each administrative structure so that a quote from a specific time period may be compared to the existence of a name and administrative structure at that time. This is of particular relevance if one identical name was given to different locations in the course of history, or if the borders of an administrative structure were moved to a degree that may have had a significant impact on the climate or nature of soil suggested by its name.¹⁰

No *materia medica* text prior to the *Ben cao gang mu* was based on a comparable range of literary and non-literary material. It should come as no surprise that Li Shizhen exploited the *Zheng he ben cao* 正和本草 of 1249, the final work of the former main tradition of *ben cao* works, as his major source. Apparently, Li Shizhen intended to continue this tradition, but he went far beyond it. In a bibliography at the very beginning of the *Ben cao gang mu*, he listed more than 868 titles he had consulted. The number of titles quoted or mentioned in passing in the main text by far exceeds these 868 texts. Li Shizhen may not have held all of them in original editions in his hands. Many texts were quoted second- or third-hand from quotes in later encyclopedias.

In addition to drawing his data from all kinds of literary genres, Li Shizhen personally travelled to places all over the country where he expected to access data available nowhere else. This way, he also was able to record valuable data on substances not mentioned in *ben cao* literature or publicly documented elsewhere before. For example, *san qi* 三七, identified today as *Panax notoginseng* (Burk.) F.H. Chen, is one of the most common herbs in Chinese medicine. Li Shizhen was the first to learn of its therapeutic potential from “locals,” and introduced it with the following lines:

“This medication was discovered for the first time only recently. The people in the South use it in their military as an important medication for wounds caused by metal objects/weapons. It is said to have an extraordinary [therapeutic] potential. It is also said: For all injuries resulting from flogging and blows, when stagnant blood is set free, it should be chewed until it is pulpy. Once this is applied [to the affected region, the bleeding] ends. Greenish swelling is dissolved.

¹⁰ See Hua Linfu, Paul D. Buell and Paul U. Unschuld, *Dictionary of the Ben cao gang mu*. Vol. II: *Geographical and Administrative Designations*. University of California Press, Oakland, 2017.

If one is to be flogged, let him ingest beforehand one or two *qian* and his blood will not rush to his heart. After a flogging it is even more advisable to ingest it. To ingest it after a birth is good, too. Generally speaking, this medication has warm qi and a sweet and slightly bitter flavor. Hence it is a medication for the blood section of the yang brilliance and ceasing yin [conduits] and can serve to cure all kinds of blood diseases, similar to *qi lin jie* (*Daemonorops draco* Bl.) and shellac.¹¹

In this manner the *Ben cao gang mu* refers to hundreds of texts and their authors, in addition to individuals (including Li Shizhen's own extended family) unassociated with any literary genre.

Many of the persons quoted or referred to as authors, patients, healers or actors in some anecdote have remained nameless to posterity. In bibliographical and biographical reference works today's readers of the *Ben cao gang mu* may easily find the more prominent book titles, authors and historical personalities encountered in the *Ben cao gang mu*. But an identification of numerous titles and many more persons requires extensive research. It is here that one wonders how many collaborators Li Shizhen may have had. Wang Shizhen, the author of a preface to the first edition of the *Ben cao gang mu*, quotes Li Shizhen verbatim with a statement that he had rewritten the entire manuscript three times.¹² A question arises here whether he had failed to notice numerous inconsistencies in the references to book titles and authors quoted. Not infrequently, one book is quoted with either its complete title or several different abbreviations. Similarly, one identical author is quoted by his full name, by his first or last name, by his style, or other possible designations. Such diversity appears plausible if one imagines a larger team around Li Shizhen supplying him with data without prior agreement on how to quote a text or refer to a person. If this diversity makes it difficult enough for readers to immediately identify a text or author quoted, the hardship is further aggravated by numerous quotes misleadingly ascribed to source texts they were never part of.

Not much later, Zhao Xuemin 趙學敏 (ca. 1730 – 1805), author of the *Ben cao gang mu shi yi* 本草綱目拾遺, suggested with the title of his book “to make up for omissions in the *Ben cao gang mu*” not only his intention to list pharmaceutically useful substances Li Shizhen had failed to include. He was also the first to point out 30 substantial errors in the description of substances recorded. In recent years, with a steep rise in *Ben cao gang mu* research, many more such errors and misleading

11 *Ben cao gang mu*, chapter 09, entry 09. See also, Zheng Jinsheng 郑金生 and Zhang Zhibin 张志斌, *Ben cao gang mu dao du* 本草綱目导读, 2016, 175 - 177.

12 See below p. 29

data have been identified, as for instance in Mei Quanxi's 梅全喜 (1962 -) *Ben cao gang mu bu zheng* 本草綱目補正, "Supplementing omissions and correcting errors of the *Ben cao gang mu*."¹³ A comparison of numerous quotes in the *Ben cao gang mu* with their original sources often enough shows significant divergence. It is not always clear whether these are intentional modifications, perhaps adapting an ancient wording to usages preferred at the time of Li Shizhen, or errors due to careless copying.

The third volume of the *Dictionary of the Ben cao gang mu*, devoted to "Persons and Literary Sources," offers biographical and bibliographical data on all the texts and persons encountered in Li Shizhen's encyclopedia, with a few exceptions for sources and people that appear undocumented elsewhere. This volume of the *Dictionary* includes the different versions of titles and names assigned by Li Shizhen or his collaborators to quotes and anecdotes. It also points out where quotes ascribed in the *Ben cao gang mu* to a specific text or author originated, in fact, elsewhere.¹⁴

Ever since Tao Hongjing's *Shen nong ben cao jing ji zhu* of 500 CE and throughout the history of the main tradition, authors introduced their *materia medica* works not only with at least one preface to inform readers of their motives, aims and (where relevant) the history of their texts. They also offered more general information associated with the origin, gathering, pharmaceutical processing, contra-indications, synergies and applications of pharmaceutical substances. Here, too, Li Shizhen extended the introductory sections to four voluminous chapters occupying one eighth of the entire text. In chapter one he enumerated 40 earlier *ben cao* works with brief commentaries by other authors and himself. This list is followed by another, already mentioned above, of all the literary sources he had taken into account, divided into two groups: 277 older and more recently published medical and pharmaceutical works, and 591 classics, historical annals and others. Next, Li Shizhen went into more detail informing readers of all earlier *ben cao* works he had taken drug descriptions from. Li Shizhen paid homage to the beginning of the main tradition by quoting the preliminary sections of the "original classic," including commentaries by Tao Hongjing and others.

He eventually switched to the Song-Jin-Yuan understanding of health and pharmaceutical therapy by first quoting a passage from the *Huang Di nei jing su wen* 黃帝內經素問 concerning the influence of climatic factors on drugs. This is followed by a section on "The seven ways of compiling a recipe," with commentaries by the

13 Zheng Jinsheng and Zhang Zhibin, 2016, 70.

14 Zheng Jinsheng, Nalini Kirk, Paul D. Buell and Paul U. Unschuld, *Dictionary of the Ben cao gang mu*, Vol. III: *Persons and Literary Sources*, University of California Press, Oakland, 2018.

legendary Qi Bo 岐伯, the 8th century commentator of the *Su wen* Wang Bing 王冰, and various Song-Jin-Yuan authors. Next is a section on “The effects of the ten kinds of recipes,” with commentaries by Xu Zhicai 徐之才 (ca. 510 – 590), several Song-Jin-Yuan authors again and Li Shizhen himself. The first chapter ends with ten treatises on the medical-theoretical teachings of the Song-Jin-Yuan period.

Chapter 2 begins with an enumeration of pharmaceutical substances known by up to five alternative names. It continues with an enumeration of pharmaceutical substances according to their reciprocal, synergistic effects when ingested together, an enumeration of foods whose consumption is forbidden during an ingestion of specific pharmaceutical substances, an enumeration of substances that must not be taken by pregnant women, and an enumeration of beverages and foods that must not be consumed together. Also in chapter 2, Li Shizhen quoted from Li Gao 李杲 (1180 – 1251), one of the main authors and theoreticians of the Song-Jin-Yuan era, whose treatise acknowledged that the treatment of certain illnesses escaped theorization. Hence he simply listed certain pathological signs and the pharmaceutical substances suitable for their treatment – without reference to the Yin-Yang and Five Phases doctrines of systematic correspondences.

Similarly, the next treatise is an “enumeration of all pharmaceutical substances that, according to Chen Cangqi 陳藏器 (8th century), are used in the treatment of depletions.” From another core theoretician of the Song-Jin-Yuan era, Zhang Zihe 張子和 (1156-1228), Li Shizhen took over the treatise “The three processes of sweating, vomiting and purging.” Chapter 2 ends with a section from a *Yao dui* 藥對, a work allegedly predating the “original classic,” and the tables of contents of the *Ben jing* and the *Jing shi zheng lei bei ji ben cao* 經史證類備急本草 by Tang Shenwei 唐慎微 (fl.1082), one of the final works of the main tradition, written between 1080 and 1107.

Chapters 3 and 4 of the *Ben cao gang mu* include lists of all diseases, and where necessary a detailed description of their pathological conditions, with the appropriate pharmaceutical substances and information concerning their pharmacological function, preparation and administration.

Despite their prominence in chapter 2, the references to the Song-Jin-Yuan doctrines of pharmacology appear isolated. Further hints at their relevance for pharmaceutical therapy are rarely encountered in the *Ben cao gang mu*. Li Shizhen may have felt it suitable to pay lip service to a development that had lost its creative momentum prior to his lifetime. By the end of the Song-Jin-Yuan era, several authors had suggested combinations of empirical pharmaceutical knowledge with the Yinyang doctrines of systematic correspondences without reaching an agreement on one pharmacology accepted by all. Too many contradictions remained between the as-