

Grasping Heaven and Earth (*Qian Kun Zai Wo*): The Body-as-Technology in Classical Chinese Medicine

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Abstract

Shifting focus from the patient's body to the healer's body, this essay focuses on how Chinese physicians instrumentalized their bodies to heal (ie, body-as-technology) and their hands to think with (ie, hand-memory techniques or simply, hand mnemonics). When physicians used their hands to memorize concepts related to clinical practice, calculate with time variables, and carry out ritual gestures intended to reduce risk, improve fortune, and even cure, their hands became extensions of their minds. This essay has three parts that follow the discovery process of the author's research on hand-memory techniques found in Chinese medical texts. The first part "Divination and Revelation" explains the significance of how the author first learned about Chinese divination practices that used hand mnemonics. The second part "Original Frame" introduces the scholarship on arts of memory in Europe that informed interpretations of the earliest hand mnemonics found in Chinese medical texts. The third part "Expanded Frame" deploys some concepts from cognitive science to help situate Chinese medical hand mnemonics more broadly as an example of extended cognition. The essay concludes with an important distinction: sometimes Chinese healers' hands were used separately from their bodies to think through things and sometimes hand and body had to be integrated in order for the healer's body-as-technology to act as a therapeutically effective instrument.

Keywords: Arts of memory; Body-as-technology; Extended cognition; Hand mnemonics

1 Introduction

This essay introduces research that builds upon the central insight that Chinese healers instrumentalized their bodies, especially their hands, in complex ways that augmented their cognitive capacities. These mind-hand techniques sharply contrast with modern society's increasing deputizing of cognitive functions to software on phones and computers that structure our minds as much as dominate our daily lives. The title of this essay, "Grasping Heaven and Earth," refers to the way in which Chinese doctors understood the natural-medical world both bodily, using hand-memory techniques (ie, palm mnemonics), and conceptually, with their minds. Heaven (*Qian* 乾) and Earth (*Kun* 坤)

refer to two of the eight trigrams as well as two of the 64 hexagrams that make up the *Zhou Yi* (《周易》 *The Book of Changes*), arguably the most influential divination manual in Chinese culture. Together *Qian Kun* (Heaven-Earth) metaphorically refers to everything and all transformations in the world.

In particular, this essay focuses on *Zhang Jue* (掌诀) in Chinese medical texts and their broader significance in mind-body connections. In English, *Zhang Jue* (掌诀) has two parts: first, *Zhang* has the straight-forward meaning "palm"; the second term *Jue* is more multi-valent as it refers to various types of technical knowledge and, depending on context, could be translated as "tricks," "methods," "instructions," "rhymes," and "mnemonics." Because in Chinese medical texts, *Zhang Jue* refers to using the hand variously from memorizing and recalling to calculating and carrying out exorcisms, the chosen translation in this essay is "palm mnemonics."

In Latin, the term "dactylomancy," meaning "finger divination," conveys what palm mnemonics were often, although not exclusively, deployed to do. Thus, the English translation "palm mnemonics" captures their memorizing and mnemonic functions, while the Latin translation captures their predictive and divinatory functions. Evidence of Chinese healers using their hands to memorize, think with, divine, and perform exorcisms occurred at least by the 7th century in Buddhist healing rituals and the writings of Sun Simiao (孙思邈).¹

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By the late 11th century, hand mnemonics had appeared in medical texts for doctrines related to the 60-year cycle, seasonal transformations, and predicting epidemics.²

1.1 Body-as-technology

The subtitle of this essay, “The Body-as-technology in Classical Chinese Medicine,” is inspired by Projit Mukharji’s *Doctoring Traditions* about traditional South Asian medicine. In his book, Mukharji discusses how Indian medical practitioners from the 1870s to 1930s adopted small technologies – the pocket watch, organotherapy, the thermometer, and microscope – from Western medicine and integrated them into their native medical traditions. The final chapter of *Doctoring Traditions* focuses on a fifth technology – namely, how the Ayurvedic physicians viewed their bodies as integral to the healing process.

They conceived of the healer’s body as a 2-wheeled chariot with one wheel being their mind of knowledge and the other wheel being their body for practice. For their body-chariot to function effectively, their mind had to be one with their body. Thus, their notion of a physician’s “ritual purity” was integral to healing for an impure healer’s body was considered to be a blunt healing instrument.

“...we will argue that the inseparability of the sociocultural and the therapeutic was engendered by the simple fact that the body of the Ayurvedic physician functioned as a technology in and of itself. To this end we will focus on a single one of Gopalchandra’s injunctions, the one about the evacuation of the physician’s bowels. The reason Gopalchandra was concerned with the physician’s bowl was not simply in order to enforce a social more, but because he and others like him felt that a constipated physician was a blunt instrument that was therapeutically inefficient.”³

This quotation illustrates the practical dimension of the body-as-technology concept. Originally, effective physicians had to be pure in thought as well as in body. Thus, in order to be therapeutically effective in their healing encounter, the Ayurvedic physician needed to evacuate their bowels before seeing a patient. They also had to dress properly and carry themselves in a dignified manner with appropriate comportment.

The Tang-period physician, Sun Simiao, wrote the first essay devoted to medical ethics that expressed comparable ideas. His emphasis, however, was on the physician’s consciousness and moral purification as necessary for effective cures, not bodily purification.

“When a patient suffers from wounds or running bowels so foul that people cannot stand to look at him and he has become an object of disdain, resolve to treat him with regret, pity, and concern. [The great physician] should not hesitate at all; that is my resolve. The great doctor, in embodying [the Way], aspires to purify his consciousness and look inward. Seen from afar, he appears severe, but he is deeply tolerant. He is neither dazzling

nor indistinct. In diagnosis, his attitude is deeply serious; in close examination of the physical signs, he does not ignore the least detail.”⁴

The ideal physician in this summary is thus someone who has compassion and a clear conscience. Someone who is introspective, serious, and detail oriented. But also this ideal physician is someone who is “neither dazzling nor indistinct” which suggests the same concern for dressing properly required of the Ayurvedic physician.

1.2 Time keeping with sound and pulse

Another illustration of the “body-as-technology” concept relates to how healers used their bodies as time-keeping devices. Before adopting the pocket watch to time their patients’ pulses, for example, Indian healers tracked time orally by reciting rhymes. In short, they chanted to demarcate time just as in English some long words are used as placeholders to count seconds: one 100, two 100; or one Mississippi, two Mississippi; or even one potato, two potato, three potato, four.⁵

Similarly, Chinese doctors used their own breath when taking a patient’s pulse. This is described, for example, in a passage from the 1742 medical publication, *Yu Zuan Yi Zong Jin Jian* (《御纂医宗金鉴》 *Imperially Commissioned Golden Mirror of the Medical Tradition*).⁶ Before taking the patient’s pulse, the healer is instructed to first “balance one’s qi” (*Tiao Ting Zi Qi* 调停自气). Then, within one breath, the healer can measure whether the patient has a normal pulse (4–5 beats), slow pulse (3 or less), or fast pulse (6 or more).

“Balance one’s *qi*; [one] inhale and [one] exhale determines a breath. Four to five pulse beats [within one’s own breath], is a healthy case. Three or less pulse beats [within one’s own breath], is a slow case that indicates coldness. Six or more pulse beats [within one’s own breath], is rapid, and indicates a hot syndrome.”⁷

Here, the concept of the healer’s body-as-technology usefully focuses one’s attention on how healers used their own pace of breathing to count time and their hand to feel when reading a patient’s pulse.

This essay has three sections. First, it provides an example of a divination technique that directly led to a revelation about an original research topic in Chinese medical history. This revelation added a completely new dimension to the previous research interests. Then, the essay introduces the original frame within which the author worked out how to analyze the original research topic according to this new dimension. Finally, it explains an expanded frame beyond the original one and why it became important for better understanding the primary medical sources the author was working with before being introduced to Chinese divination practices.

2 Part I divination and revelation

2.1 Preparing a paper for a conference

In July 2001, the author was preparing for an academic conference to be held in Paris in September. The conference was titled “From Image to Action: The Dynamics of Visual Representation in Chinese Intellectual and Religious Culture” (Collège de France, September 3–5, 2001). The organizers of this conference eventually published an important book on the relation between graphics and text in Chinese technical knowledge.⁸ At the time, the research focus was on illustrations in traditional Chinese medical texts. In the introduction to the resulting book, Francesca Bray argued that *Tu* (图) – variously “diagrams,” “illustrations,” “images,” “maps,” or “tables” – functioned as both didactic and as visual templates for action. I decided to focus on *Tu* that were used to summarize knowledge considered predictive of epidemics in 60-year cycles. These *Tu* were used to illustrate a medical doctrine called the “five cyclical phases and six climatic configurations of *qi*” (*Wu Yun Liu Qi* 五运六气). The short-hand expression “phase energetics”⁹ succinctly captures the relationship between what the Chinese understood as the five cyclical phases of Heaven and the six energetics of climatic *qi* on Earth.

This research focused on the following three books because they had the most illustrations related to this doctrine. *Gu Jin Yi Tong Da Quan* (《古今医统大全》 *The Complete Compendium of Ancient and Modern Medical Works*), edited by a former imperial physician Xu Chunfu (徐春甫 fl. 1557), contains 33 relevant diagrams. The literati physician Zhang Jiebin (张介宾 1563–1640) published an even larger number of related diagrams in his *Lei Jing Tu Yi* (《类经图翼》 *Pictorial Appendices to “The Classified Classic,”* 1624). Nearly doubling Xu's 33 diagrams, Zhang's 64 diagrams illustrate the full range of how “phase energetics” was applied in both Chinese epidemiology and clinical practice. This was especially the case in pulse reading to determine normal and aberrant pulses depending on “phase energetics.” Finally, the imperially commissioned *Yi Zong Jin Jian* (《医宗金鉴》 *Golden Mirror of the Medical Tradition*, 1742) edited by imperial physician Wu Qian (吴谦) reprinted 23 related diagrams. Many of the circle diagrams used in the 1742 *Golden Mirror* were taken directly from either Xu Chunfu's 1557 compendium or Zhang Jiebin's 1624 compilation. The research question focused on how medical authors used diagrams (*Tu* 图) as well as mnemonic verse (*Ge Yue* 歌曰) to explain the *Wu Yun Liu Qi* (五运六气) doctrines. These doctrines connected cosmological transformations with both society-wide epidemics and individual cases of illness in some currents of classical Chinese medicine since at least the eighth century when it likely first appeared in the edition of *Su Wen* (《素问》 *Basic Questions*), the first part of *Huang Di Nei Jing* (《黄帝内经》 *The Yellow Emperor's Inner Classic*, ca. 1st century BCE), that

included commentary by Wang Bing (ca 710–805) and was presented to the emperor in 762.¹⁰ These doctrines ended up comprising seven chapters (66–71 and 74) of Wang's eighth-century edition of the *Basic Questions* that by the eleventh-century scholars already started to question their classical authenticity and suggested Wang may have interpolated them himself. Phase-energetics doctrines none-the-less became more well-known by the end of the eleventh century and early twelfth century when they were republished in new Song-era medical texts (Note 1).

The main question for the author initially was about how these doctrines became the basis for Chinese epidemiology thereafter and how they were promulgated in Ming and Qing medical texts on epidemics. The “phase-energetics” diagrams and mnemonics were, in fact, effective ways to understand how these complex doctrines worked. Furthermore, each of these three publications addressed their intended audience differently through diagrams, textual explanations, and mnemonic rhymes. But all three medical books used these visual, literary, and versified techniques to make the varied medical applications of “phase-energetics” doctrines more accessible to a broader audience.

Gu Jin Yi Tong Da Quan, *Lei Jing Tu Yi*, and *Yi Zong Jin Jian*, each emphasized different forms of visual, textual, and mnemonic methods to explain classical medical doctrines to a wider audience well beyond Ming-literati physicians. In some medical circles, Han-era medical doctrines had gone out of favor in preference for more recent texts by later medical innovators from the Jin-Yuan period (12–14th centuries). These printed medical diagrams and mnemonic rhymes were key publishing strategies during the late 16th- to mid-18th centuries for some literati physicians to reframe the classical medical texts from Han antiquity in new ways as part of a broader effort after 1600 to “recover antiquity” (*Fu Gu* 复古).¹¹

These were the original working questions: What Chinese medical texts had the most images and diagrams? When were they published, why, and for whom? What work did images do that differed from texts? How did they visually summarize Chinese epidemiology? How did the diagrams relate to clinical actions? Why did “phase energetics” doctrine require so much illustration?

In sum, at that time I was using the three most well-illustrated medical texts over a 200-year period (1557–1742) to understand how diagrams illustrated key doctrines in late imperial Chinese epidemiology. What I had not noticed, however, was that some of these diagrams included those of hands with characters written on them. Without the distinction of “hand diagrams” as something different from circular, tabular, and square diagrams, I did not see them. The next section explains when I was first introduced to hand-divination techniques, how that introduction allowed me to see hand diagrams for the first time in two of the

three medical texts I was reading at that time, and why this encounter changed my research trajectory from then on.

2.2 Learning divination from a colleague

Then, in just one day in August, everything changed. It was August 12, 2001. I was supposed to pick up a Chinese colleague at the arrival area by 10:30 AM at Newark airport in New Jersey. I was driving to the airport, when I noticed a strange sound coming from the back of the car. The mechanic at the auto repair shop told me that my damaged tailpipe would fall off in route. It was clear that I had to leave the car with him. This was back in the days before cell phones and text messages; I did not even have a way to communicate by email. I could only hope my colleague would eventually figure out I was stuck, maybe after waiting in vain at baggage claim for an hour. Fortunately, she called me on the phone in my apartment just ten minutes after her scheduled arrival at the Gate at Newark airport. She was able to make the next airport shuttle to Princeton.

The next day in the East Asian Library at Princeton University, I looked over at her across the reading table. Suddenly, I wondered to myself, “Why had she called me so soon upon her arrival?” I would have gone to baggage first and then waited outside on the curb at the arrivals’ pickup location for some time. I would have waited at least an hour, before realizing it was time to call anyone. But she must have called me shortly after exiting the plane. When I asked her about this, she said that indeed she had called me from the gate. When she saw my quiz-zical look, she proceeded to explain: “I calculated on my fingers, landed on *Dàān*, and so I knew that you had not had an accident. But I also knew that you likely had some kind of trouble. So, I called you.”

Utterly mystified, I asked her to explain what she had done again, which she did. Slowly coming out of the fog of incomprehension, I asked her to draw a sketch of what she had just explained, once again, to me (Fig. 1).

She said that there are six possible outcomes – three on the negative side and three on the positive side on a spectrum from bad to good (Table 1). And there are three possible variables related to the lunar calendar – the month, the day, and the hour of the day when she has a question to ask. She had landed on the least good of the three possible positive outcomes (#A *Dàān*). This basically advised her to “stay put.” Although it was not the worst possible outcome, it also was not the best of possibilities either. At that indecisive moment, this simple calculation helped clear her mind enough to call me. She felt she needed to find out what was going on at that moment for me. Since there was a necessary change in our original plan, she adjusted accordingly.

Essentially, what my colleague did is a form of horary astrology (Table 1). Namely, the person attempts to answer a question based on the time (ie, the “hora” or

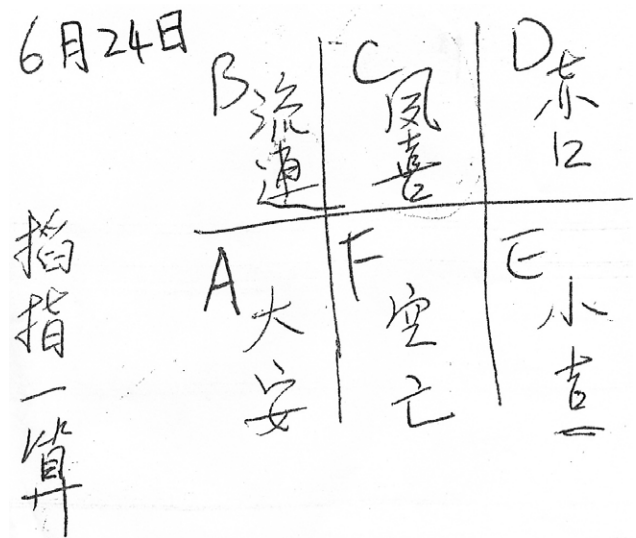


Figure 1 The Post-It Sketch from August 13, 2001 (source from: the author).

Table 1 The six possible prognostications, English translation of Figure 1 by the author

Hand-divination technique		
Index finger	Middle finger	Ring finger
Liúlián 流连 B “Linger” (Patience) The Least Bad	Sùxǐ 夙喜 C “Prompt Joy” (Certain Success) The Best	Chìkǒu 赤口 D “Crimson Mouth” (Bad Luck) Worse (but not The Worst)
Dàān 大安 A “Great Peace” in (Stay put) The Least Good	Kōngwáng 空亡 F “Loss & Death” (Futility in all matters) The Worst	Xiǎojí 小吉 E “Small Fortune” (Good Luck) Better (but not The Best)

“hour”) in the **present** when they asked the question. Natal astrology, by contrast, uses the time in the **past** when a person is born (ie, natal). Electional astrology, however, seeks to find a period of time in the **future** that will result in the preferable outcome for an event being planned in advance.

Hemerology (from the Greek *hēmērā*, meaning “day”), for instance, is a form of electional astrology that determines inauspicious and auspicious days according to calendrical parameters, often well into the future. Illustrating remarkable continuity with the daybooks of Chinese antiquity,¹² modern-day Chinese almanacs contain sections within them that are also hemerological. These sections classify the days, even hours of each day, according to predetermined auspicious or inauspicious periods of time.

Horary astrology, however, differs from both natal and electional types of astrology in that it is temporally situated in the present. Rather than working with past or future time, the temporal variables used are situated at the hour within which the question has been asked or when it has been understood. The version of horary astrology my colleague used was based on the numerology of the Chinese lunar calendar.

The temporal regime for western horary astrology, however, is based on planets, constellations, and the solar calendar. In western horary astrology, the astrologer would therefore construct a horoscope related to planetary positions and houses based on the exact time or hour (thus horary) when the astrologer received and understood the question. For natal astrology, they do the same for the time when someone is born. Houses are determined differently based on the specific question asked or the specific time born.

In Chinese horary astrology, the person selects specific numbers related to the lunar calendar that correlate with the exact time he or she formulated the question.¹³ Although the specific methods for western and Chinese horary astrology differ, they share the common result of placing in a larger temporal frame the person asking the question (that is the querent) and the thing they are asking about (that is the quesited).

2.3 How the hand-divination technique works

My colleague used a calculating method in which there are a total of six possibilities. Three numbers are necessary to determine which one of the six possibilities is relevant for that moment: the lunar month, the day of the month, and the hour of the Chinese twelve-hour day. The third variable is supposed to be one of the twelve Chinese hours (of two hours each) that divide each 24-hour day. But my colleague said that she tailored the divination method to her individual situation by using the number of the strokes in the first Chinese character that came to her mind when she asks the question. She even showed me the pocket calendar she carried with her back then so that she always knows the lunar equivalents to the solar calendar for the first two numbers. Today one can easily download a solar-lunar conversion calendar application on your phone. Or one can access online a Gregorian-Lunar Calendar Conversion Table for any year.¹⁴

She further explained to me that she uses the divisions between the joints of the three central fingers of her right hand as placeholders where she projects in her mind's eye these six possible outcomes. The two lower divisions of her index, middle, and ring fingers are assigned one of the six potential predictions. She used her thumb like a game piece that moves clockwise through the designated positions on her hand based on the three most appropriate numbers for the moment.

Furthermore, the three relatively positive outcomes form a peak; conversely, the three relatively negative outcomes form a valley. The least bad and least good are to the left; the worse and the better are to the right; and the best and the worst form a pair in the center.

After having drawn the diagram of the finger-calculation method (*Qia Zhi Yi Suan* 掐指一算) on a yellow post-it, my colleague went to request some medical texts from the Gest library's annex. I decided to see if any

of the three medical texts I was reading that summer contained something comparable to what she had just introduced to me.

2.4 Discovery and revelation

Within an hour, I found three diagrams of hands with characters written on the finger phalanges in different patterns. Not only had I just found two medical hand mnemonics in the *Classified Canon* of 1624 and one in the *Golden Mirror* of 1742 but also what was written on the fingers and palms in these three medical hand mnemonics were the very same “phase energetics” doctrines that I was originally working on in the other diagrams that were in the form of squares and circles. Without the distinction of the “finger-divination” (*Qia Zhi Suan Fa* 掐指算法) method my colleague had just explained to me, or even “palm mnemonics” (*Zhang Jue*), which the medical texts titled them, it seems that I could not see them. In other words, my colleague's explanation to me of a Chinese finger-divination method led me to see “hand diagrams” for the first time in the medical texts I had been reading in Princeton's Gest library that same summer.

Upon further reflection, I realized that these medical hand mnemonics were the critical link between “phase energetics” doctrines and clinical practice. Why else create these medical hand mnemonics than to have the doctrines they summarized readily at hand? A physician's hand is like an “image” related to specific “actions” in medical practices. One hand mnemonic in the *Lei Jing Tu Yi* was for working with the 60-year cycle. It was intended to help physicians situate their patients' symptoms into the specific temporal frame of “phase energetics” (see Fig. 2).

The second hand mnemonic in the *Lei Jing Tu Yi* was used to help the physician situate their patient's pulse pattern into the year's seasonal cycle and so thereby determine whether it was aberrant or normal for that time of year (see Fig. 3).

The third hand mnemonic, found in the 1742 *Yi Zong Jin Jian*, developed further upon the first one in the *Lei Jing Tu Yi* by writing more explanatory text on to the palm of the left hand (see Fig. 4).

Similar hand mnemonics were also used earlier in Chinese medicine for prescribing drugs in the Cold Damage tradition¹⁵ as well as for working out point locations in chrono-acupuncture.¹⁶ Zhang Jiebin included an essay explaining hand mnemonics and wrote that they came from yin-yang specialists who used them for divination.¹⁷ Clearly, there was a much broader cultural practice of hand-memory techniques in China.

The title of this essay is inspired by a phrase from Zhang Jiebin's essay that explains the first-hand mnemonic (Fig. 2) from his *Lei Jing Tu Yi*. The phrase *Liao Ran Zai Wo* (燎然在握) uses the same idiom as in English that combines physical “grasping” (*Wo* 握) of something



Figure 2 “Illustration of Pointing to the Palm for Govern-Heaven and In-the-Source [Doctrines],” from *Lei Jing Tu Yi (Pictorial Appendices to “The Classified Classic,”* 1624) (source from: Harvard Medical Library. Online edition [https://iif.lib.harvard.edu/manifests/view/drs:430542884\\$31](https://iif.lib.harvard.edu/manifests/view/drs:430542884$31)).

in one’s hands with “mental comprehension” (*Liao Ran* 燎然) within one’s mind. In *Metaphors We Live By* (1980), the metaphor “understanding is grasping” is classified with the metaphors that place the **known** as down, such as “the matter is settled” or “that observation is well-grounded.” The opposite metaphors place the **unknown** up, such as “that’s up in the air” or “that’s a high-in-the-sky idea.”¹⁸ The experiential basis of knowing as being down and unknowing as being up is coherent with the physical or bodily basis of “understanding is grasping,” as in the expression “I can grasp that explanation.”

Comparable “hand metaphors” related to the metaphor of “understanding is grasping” are also in Chinese medical titles.¹⁹ For example, the two-character phrase *Zhi Nan* (指南 pointing to the south), which came from the use of the southern-pointing compass (*Zhi Nan Zhen* 指南针) by at least 1044 in the Song dynasty, was first metaphorically used in medical text titles to mean a “guidebook” in the first half of the 13th century.²⁰ The phrase *Zhi Zhang* (指掌 pointing to the palm), from Zhang Jiebin’s *Lei Jing Tu Yi*, refers literally to the role of one’s finger to use the hand-memory



Figure 3 “Illustration of Pointing to the Palm for Southern-Northern Governance,” from *Lei Jing Tu Yi (Pictorial Appendices to “The Classified Classic,”* 1624) (source from: Harvard Medical Library. Online edition [https://iif.lib.harvard.edu/manifests/view/drs:430542884\\$47](https://iif.lib.harvard.edu/manifests/view/drs:430542884$47)).

technique. Metaphorically, some medical titles used it to mean “mastery,” as in Zhu Zhenheng’s (朱震亨) *Mai Jue Zhi Zhang Shu* (《脉诀指掌书》 *Pointing-to-the-Palm [ie, Mastering] Writings on Pulse Rhymes*) first published in the mid-13th century.²¹

In fact, such hand metaphors in Chinese medical texts titles are an interesting topic in terms of the global history of the “handbook” as a distinct genre.²² This is precisely because Chinese medical authors used many metaphors other than the hand to express the idea of a “handy” (ie, portable in the hand) and condensed “handbook,” as one might think about the Do-It-Yourself (D.I.Y.) book today. From at least the 4th up through the 14th century, titles of Chinese medical handbooks contain evidence of a wide range of metaphors Chinese authors used to convey portability, conciseness, and accessibility that were similar to the European notion of “handbooks.” These Chinese sources, however, used hand metaphors differently than was the case in Europe to convey both guidebooks, as in “pointing south” (*Zhi Nan*), and mastery of knowledge, as in “pointing to the palm” (*Zhi Zhang*). By the mid-13th century, these “pointing-finger” and not “whole-hand” metaphors became useful terms to more finely differentiate types of medical genres probably

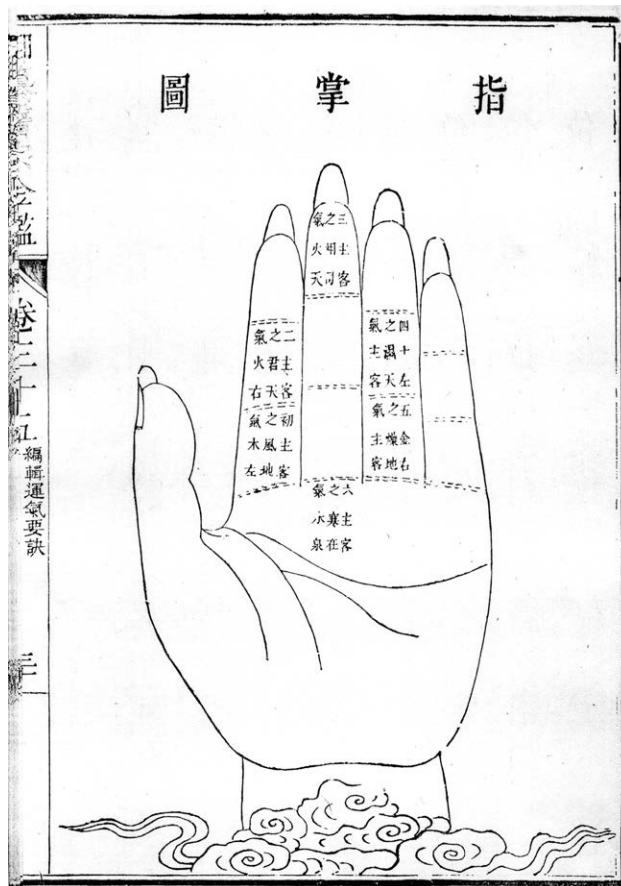


Figure 4 Golden Mirror of the Medical Tradition (Yi Zong Jin Jian, 1742) (source from: Oxford University Library).

because they also resonated with how people were actually using their fingers in hand mnemonics at that time.²³

3 Part II original frame

Back in 2001, however, the original frame for understanding the Chinese phenomenon of “palm mnemonics” (*Zhang Jue*) was only within the field of “arts of memory.” This topic was well developed in European history from Greco-Roman antiquity to the early modern period.²⁴ The European emphasis on visual-architectural mnemonics even influenced what the Italian Jesuit Matteo Ricci (1552–1610) chose to translate in his *Xi Guo Ji Fa* (《西国记法》 *Western Methods of Memory Techniques*).²⁵ The Chinese, however, found these “western methods of memory techniques” far more complicated than the simple Chinese characters that Ricci had used to illustrate them, and so his book was not successful.²⁶

The European literature on “arts of memory” has mostly focused on visual, oral, and auditory forms of mnemonics,²⁷ including literary²⁸ and iconographic images.²⁹ But Chinese “palm mnemonics” exemplify a broader phenomenon of bodily arts of memory. For example, a modern-day example of a hand mnemonic would be how people use the knuckles on their fists to

remember how many days there are in each month of a year.³⁰ Like the above Xu Chunfu example (see Fig. 1) of mnemonic verse beside images, the knuckle-memory technique is also accompanied by mnemonic verse, thus combining auditory with visual memory.³¹ There are even hand mnemonics for modern physics. The nineteenth-century English physicist, John Ambrose Fleming, created a left-hand rule for left-handed mechanics and another right hand for electric generators.³²

One’s hand can also be imagined as a telephone keypad by using the three longest middle fingers to tap out numbers physically, such as people’s phone numbers or even airline flight and gate numbers. By using the telephone-keypad hand mnemonic one may even no longer need to check a printed-out boarding pass or the airline app on one’s phone because the act of touching locations on one’s “handy keypad” thereby reinforces memory corporeally, spatially, and visually.

Medieval and early modern European history also has ample evidence of people using their hands to help them memorize, meditate, and calculate. A catalog titled *Writing on Hands*, from an exhibition held at the Folgers Shakespeare Library in Washington DC in 2000, includes many European examples. These range from 12th-century musical notation for church choirs and 15th-century Catholic religious lessons to 17th-century Jesuit meditation practices.³³

Early modern European print culture also preserves images of the entire human body being enumerated in a specific order to help memorize any range of things, as seen in one late 16th-century woodcut from the *Treasure of Wisdom* (*Plutosofia*, 1592).³³ One of the most compelling examples in European history of using the entire body to organize the order of things is the Zodiac Man an insight I owe to European medieval historian Stephano Rapisarda.³⁴ From head to toe, the order of the western zodiac is clearly drawn on, for example, a 15th-century Welsh manuscript.³⁵ The conventional explanation of European Zodiac Man charts is that they represent the idea in European medical astrology that the 12 zodiac signs rule over each body part. For example, such books advised that surgeons should not cauterize, do cupping, or do bloodletting on the body part when the moon is in the body part’s zodiac sign. This is because the celestial forces will draw out more blood than the surgeon intends, creating a worse humoral imbalance.³⁶

However, they also appear to have functioned mnemonically. That is, people may have used the 12 positions on the human body to help remember the zodiac-sign order, as in an image called the “man of the Signs” (*Homo Signorum*).³⁷ In fact, it is much easier to learn the order of the 12 zodiac signs by using the late medieval “Zodiac Man” as a bodily mnemonic technique.³⁸

Please indulge the writer of this article for a moment and stand up and carry out the following instructions. Touch the top of your head where Aries the ram lies. Then go to your ears where the horns of the bull Taurus

replicate your own ears. Then stretch out your arms like as if the Gemini twins rested along your own arms. Then put your hands on the top of your ribs where the Cancer Crab's claws replicate your ribcage. Then place your hand on your heart where Leo the lion resides. Move it to your belly below, where for women the uterus is located and where Virgo the Virgin is drawn. Whereas the balance for Libra replicates the hip bones, the long tail of the Scorpion's tale for Scorpio stands in for male genitalia. The great Archer-Centaur Sagittarius secures his hooves along each of one's thighs. The Goat of Capricorn below spreads across one's kneecaps. Finally, the shape of one's calves resembles the Greco-Roman amphora vessels turned upside down and the Pisces Fish rest on each foot.

Later images clarify this water-vessel reference by placing a small man with an amphora on his shoulders between the Zodiac Man's legs; other versions have the Zodiac Man standing on the Pisces fish and some have the man pouring water out of an amphora onto two Pisces fish next to the Zodiac Man's feet. Now try to go through this same order from Head-Aries to Feet-Pisces without reading this text to test what you have retained.

There are also comparable examples in Chinese history of the entire human body used mnemonically but, of course, with varying content for different ends. In Chinese antiquity, for example, some excavated manuscripts of Qin-Han daybooks from the Shuihudi site preserve evidence of human-body "Birth charts" on which the 12 branches (*Di Zhi* 地支) and four seasons were written as a means to predict auspicious and inauspicious fortunes for a newborn.^{39,40} An excavated manuscript from the Mawangdui site called *Tai Chan Shu* (《胎产书》 *Book of the Generation of the Fetus*) contains two similar human-body charts around which the 12 branches are written and used as means for a comparable divinatory end.⁴¹ Another example of a whole-body mnemonic in ancient China projects the eight trigrams from the *Book of Changes* onto different parts of the body.⁴² Today the trigrams are projected on to the hands as an eight-trigram hand mnemonic (*Ba Gua Zhi Zhang* 八卦指掌).⁴³

There are many examples of different types of hand mnemonics in Chinese culture, from religious rituals⁴⁴ to understanding Chinese tonal notation⁴⁵ and doing basic divination techniques and mathematical procedures.⁴⁶ In *Chinese Mathematical Astrology*, historian of Chinese science Ho Peng Yoke described hand mnemonics that were used to make calculations for the purpose of divining using the three cosmic boards.⁴⁷ Initially, therefore this research on Chinese medical hand mnemonics was framed within the existing scholarship on "arts of memory." It both emphasized a bodily dimension to the well-studied visual, oral, and auditory dimensions of European arts of memory and charted new territory on "arts of memory" in Chinese history.

4 Part III expanded frame

Now I would like to transition to the third part of this essay on how I expanded my frame for understanding the phenomenon of hand mnemonics in Chinese medicine, and more broadly in Chinese, European, and other cultures up to the present, by reading the writings of some cognitive scientists who developed new ways of conceptualizing cognition operating outside the narrow confines of the physical human brain.

4.1 The extended-mind hypothesis

In 1998, two cognitive scientists Andy Clark and David Chalmers published an influential article on their hypothesis of "the extended mind."⁴⁸ They made the case that cognitive functions do not reside solely within our mind. Rather many cognitive functions occur externally to our mind. To explain this, they used a hypothetical case of a man named Otto, who has Alzheimer's disease, and of a woman named Olga, who does not. Both hypothetical people wanted to go to the museum. Olga either reads how to go there or remembers how to go there from having been there before. She does not need to write it down. Otto cannot remember how to get there, even if he had been there before. He uses his notebook to write down instructions to help him get there. They both get to the museum. The point is that Otto's use of the notebook to arrive successfully at the museum exemplifies "the extended mind" hypothesis that Clark and Chalmers put forth in their 1998 article.

Furthermore, in *Supersizing the Mind*, Andy Clark argued that gestures are also a means for thinking and reasoning. They are a form of embodied cognition in that they are bodily expressions of thought and reasoning but also an example of the extended mind, not in a notebook but in terms of how people use their bodies to communicate.⁴⁹ Both hands are often combined with facial expressions to communicate very different kinds of thoughts, experiences, and emotions.⁵⁰ The whole body can function similarly to even stand in for verbal expressions, such as "this one" or greeting someone "hello" or a sense of doubt "hmm" or even to encourage someone to "calm down" or state the affirmative "yes" or disappointment "Oh no" or even joy "Woo hoo" and despair "God, please."⁵¹

In the same 2008 book, Andy Clark considered the significance of the difference between the "incorporation" of a tool or device and the "use" of a tool or device. He studied examples where the brain recalibrated so as "to automatically take account of new bodily and sensory opportunities..."⁵⁰ For example, a monkey is "incorporating" the stick he is using to extract insects through his fingers to his mind. Similarly, one can consider the brush in the art of Chinese calligraphy, the needle in Chinese acupuncture, and the moxa stick in Chinese moxibustion therapy as examples of Clark's way of understanding bodily incorporation of instruments.



Figure 5 A diviner rests his right hand on the desk while using his left hand to calculate (source from: Oxford University, Bodleian Library, Sinica 119).

4.2 The mind in hand

In light of the “extended mind” hypothesis and bodily incorporation in modern cognitive science, Chinese hand mnemonics start to contain even broader implications. In an illustration of a 1662 edition of the Chinese encyclopedia *Miao Jin Wan Bao Quan Shu* (《妙锦万宝全书》 *Myriad Treasures*), a diviner sits at his desk flanked by his assistant to the left and a client to his right⁵² (see Fig. 5).

With his right hand on the table beside what looks like counting rods to the left, he uses his left hand to “touch fingers to count” (*Qia Zhi Yi Suan*). A similar situation of a diviner seated at a table is depicted in a Republican-period copy of a mid-19th-century printed almanac *Yu Xia Ji* (《玉匣记》 *Jade-Casket Records*), which included two hand mnemonics with explanations of how prospective diviners should use the two finger-divination methods.⁵³

Using Andy Clark’s analysis of “thinking with the body” and recognition of how our body is our brain’s partner in cognition, one can argue that what the diviner is doing in this image with his left hand exemplifies the “extended mind” hypothesis. The diviner uses his hand in

a way similar to how Otto, the hypothetical Alzheimer’s patient, used his notebook. His hands, like Otto’s pen, are incorporated with his mind. Both actions extend the mind by facilitating thinking via pen or hands.

In the history of the science field, two noted historians of science, Ann Blair and Lorraine Daston, have written about note-taking as not only an art of transmission of knowledge in the early modern period (as much as today)⁵⁴ but also as an essential means for “taking note” and so an integral part of the process of knowing not just memorization.⁵⁵

In sum, what Chinese do when they carry out *Liu Ren* (六壬 finger divination) is to seek one response out of six possibilities to a question they have asked in a moment of indecision. This calculating hand ritual helps them decide in their mind what, at that moment, they should do next for the best outcome for their or their client’s immediate future. The ritual itself provided time for reflection; the result facilitated that reflection to move from inaction to action.

This divination process is analogous to what Chinese physicians do when they take the pulse of a patient and, based on a fixed set of possibilities, determine what, at that moment, ails the patient. Pulse-taking methods were sometimes also linked to the temporal variables of the lunar calendar in a comparable move to place the individual within a larger temporal-cosmological frame (see Figs. 3–5). Based on the outcome from a limited set of possibilities, the healer can then evaluate what is, at that moment, the best therapeutic response. In divination as in medicine, the fundamental goal is to reduce the realm of infinite possibilities to a finite set of options and then, based on the outcome of the inquiry at that moment, decide what to do next.

4.3 Hand mnemonics as analogous to scientific instruments

Hand-divination methods in Chinese culture⁵⁶ as well as the many hand mnemonics that exist in Chinese sources for other ends, are arguably analogous to scientific instruments in one essential way. The telescope⁵⁷ and microscope⁵⁸ extended the possible scope of visual experience. The stethoscope,⁵⁹ and later hearing aids and cochlear implants, extend the possibility of hearing.⁶⁰ Similarly, divination technologies, such as the simple hand-divination method described above, extend the mind’s possibility of cognitive reasoning. In all cases, these instruments – the telescope, microscope, and stethoscope – are constitutive of the optical and auditory input that they facilitate, augment, and extend. Analogously, when used as mnemonic aid, calculating device, or divining tool, the hand can also facilitate, augment, and extend cognitive processes

When one uses one’s hand to work through the variables of a hand-divination method, one’s mind must be engaged first in trying to learn the system. Once the

outcomes and their locations are memorized and the variables determined, the hand-divination method then becomes a bodily means to help the mind find a path to greater clarity. When the healer or diviner uses a hand mnemonic, their hand becomes one with their mind in that it facilitates processing some kind of algorithm. What matters in the divination method may not in fact be the remainder, or the result itself, but rather whatever that result inspires in the querent's mind. The new thought stimulated by the ritual then informs the decision for the next step.

More broadly, divination methods like this one can be understood as rituals that are integral to a larger decision-making process. A quotation from Nathan Sivin's work on diviners in Khublai Khan's court sheds light on how court diviners themselves could be understood as extending the mind of their rulers. They did so with their divining techniques by both broadening and focusing their discussion with the Great Khan.

“When we study the uses of divination, it becomes obvious that the point was not which kind always came true. Competing forecasts could not dictate decisions to the Great Khan, but provided a diverse set of options to discuss, and ritual for both broadening and focusing discussion. One might indeed say that prognosticators divined the intentions of their masters, not future events.”⁶¹

More than a millennium before we moderns increasingly deputized many cognitive functions to the myriad technologies that structure our minds as well as dominate our daily lives – such as the simple wristwatch, the hand-held calculator, the old palm pilots and newer androids and iPhones, and, of course, our computers – Chinese healers instrumentalized their bodies in complex ways that fundamentally augmented their cognitive capacities as well. Originally, I framed my understanding of the widespread phenomena of hand mnemonics in Chinese culture within the comparative history of arts of memory. Now I have expanded this frame to encompass cognitive science arguments related to the extended-mind hypothesis and embodied cognition because the evidence in Chinese sources demonstrates that hand mnemonics facilitated cognitive processing well beyond just memorization.

4.4 The body-as-technology in healing rituals

Now this essay returns full circle back to its beginning. Projit Mukharji's concept of the body-as-technology from his final chapter in *Doctoring Traditions* on how Ayurvedic physicians viewed the role of their own bodies as healing instruments helps elucidate one more dimension of some hand mnemonics used in Chinese healing rituals. When the practitioner's (singular) entire body is enrolled along with their hands in the healing process their using their body-as-technology. When healers purified themselves to safeguard that their healing

interventions would be effective, their bodies performed as healing instruments.

In a Buddhist text attributed as well to the 7th century, for example, not only are the healer's hands integral to the healing ritual, but also their own mental attitude toward talismans was inseparable from their efficacy.¹ There are also palm mnemonics used in healing rituals recorded in the early 12th-century *Zheng He Sheng Ji Zong Lu* (《政和圣济总录》 *Encyclopedia of Sagely Benefaction of the Zhenghe Reign*). Similarly, the concept body-as-technology helps clarify why the text informs the ritualist that to ensure an efficacious healing ritual, they must ritually purify themselves, manifest disciplined conduct, and embody virtue.⁶² (see right side of Fig. 6).

But other times the body of the practitioner is completely irrelevant to their use of medical hand mnemonics. The earliest known evidence of hand mnemonics in literate Chinese medicine, for example, were used for the doctrines that make up “phase energetics” (*Wu Yun Liu Qi*). These two hand mnemonics were included at the beginning of *Su Wen Ru Shi Yun Qi Lun Ao* (《素问入式运气论奥》 *On the Arcana of the Patterns of Phase Energetics in Basic Questions [of the Yellow Emperor's Inner Classic]*), a medical text presented to the northern Song emperor in 1099 by the author, Liu Wenshu (刘温舒, late-11th century).² In contrast with the previous illustrations of the body-as-technology concept from a Tang Buddhist text and a Song imperial medical text, Liu did not specify anywhere in *Su Wen Ru Shi Yun Qi Lun Ao* that physicians needed to carry out purifying rituals, conduct themselves in a disciplined way, or even, for that matter, embody virtue.

Rather we return to the earliest example of how Chinese physicians used their hands to extend their minds for “grasping Heaven and Earth.” Both of the Song medical hand mnemonics used the temporal concepts of the ten heavenly stems and the twelve earthly branches. In fact, these two Song-era medical hand mnemonics from *On the Arcana* are the earliest versions of the hand mnemonics Zhang Jiebin included in his 1624 *Lei Jing Tu Yi* that this essay introduced in the beginning (see Figs. 2 and 3).

5 Conclusion

To be a superlative physician, however, one had to not only memorize heavenly-earthly transformations but also train one's ability to see, to listen, to inquire, and to examine. A passage from the 1742 *Golden Mirror* illustrates well how the analytical concept of the body-as-technology is useful to think about instructions in medical books toward what is required of healers distinct from what they need to know about their patients. What did it take to be a good physician in classical Chinese medicine? It required the healer to use their full range of senses and instrumentalize their own bodies in myriad ways.

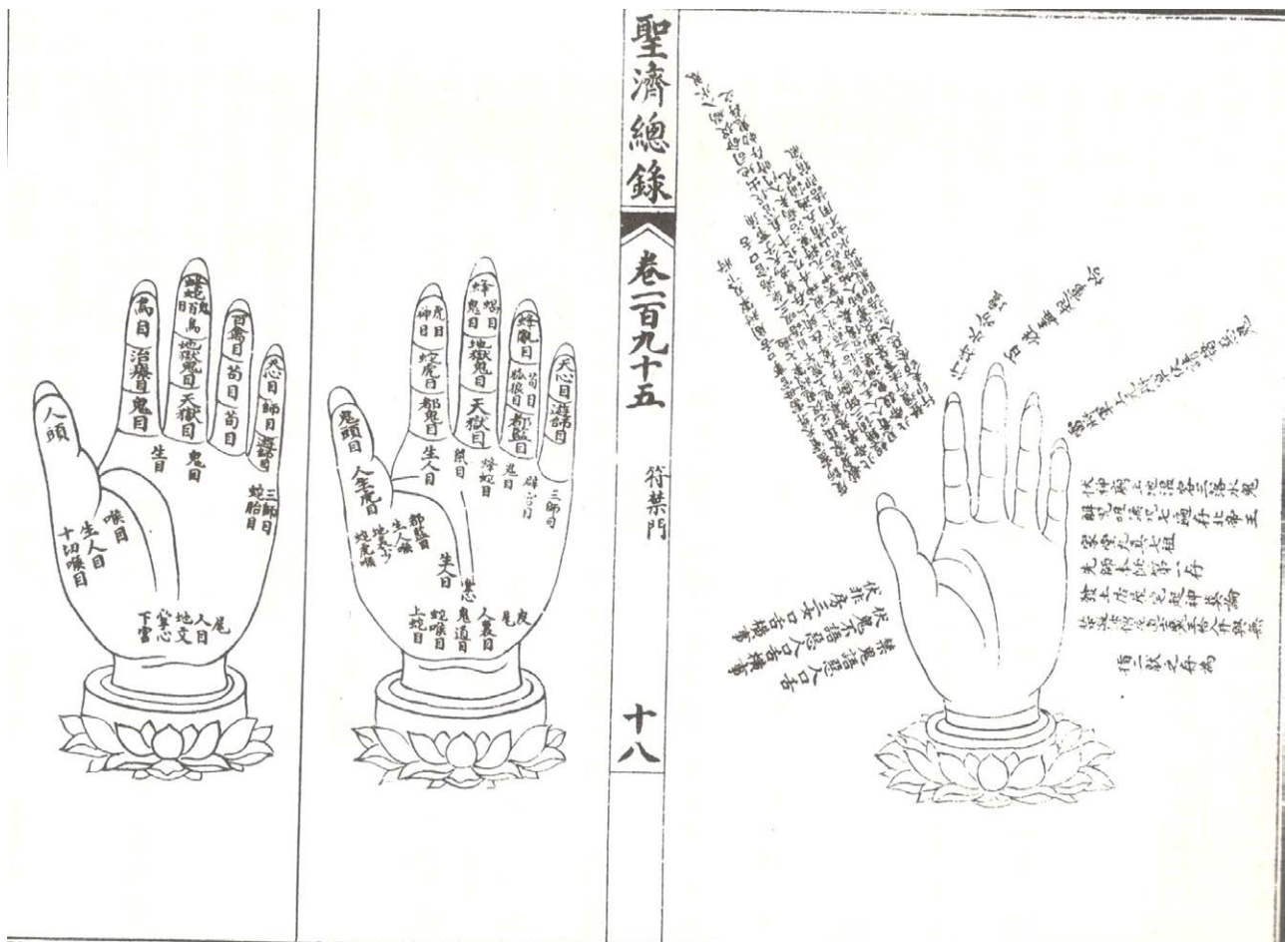


Figure 6 Palm mnemonics used in Zheng He Sheng Ji Zong Lu (Encyclopedia of Sagely Benefaction of the Zhenghe Reign, ca 1111–1117), Vol. 195, 18ab (source from: Reprint Taipei: Shin Wen Feng Print Co.; 1998).

“Looking uses the eyes to examine; listening uses the ears to divine; speaking uses words to inquire; palpitating uses fingers to examine. Clarify these diagnostic ways; understand illnesses’ origins; enable combining hues & pulses; and thereby [make one] sure-fire.” Commentary: “This [passage] clarifies that the essentials of knowing illness by looking, listening, asking, and palpitating, is the way. To understand by looking is called of the **spirit**, that is using the eyes to examine the five colors. To understand by listening is called [the diagnostic technique] of the **sage**, that is using the ears to understand the five sounds. To understand by asking is called [the diagnostic technique] of the **laborer**, that is to use speech to examine the five illnesses. To understand by palpitating is called [the diagnostic technique] of the **artisan**, that is to use the fingers to differentiated the five pulses. The [diagnostic techniques of] the **spirit**, the **sage**, the **laborer**, and **artisan**, are therefore the essential ways of examining illness. Physicians understand this and therefore are able to combine them in examinations in order to understand the myriad illnesses’ roots and origins in order to treat them. In all cases [then one] will be all capable.”⁶³

This passage presents a clear hierarchy of the sensory organs with first the eyes as equal to the spirit and then the ears as analogous to the sage. Next in this hierarchy

is speaking or inquiring, which is compared to laborers. Finally, feeling via pulse taking is made analogous to artisans. But mastery of medicine required physicians master all four faculties of sight, hearing, inquiring, and palpitating.

Finally, this essay concludes with some examples of the healer’s body-as-technology in the 1742 *Yi Zong Jin Jian*. These technologies range from the hand mnemonic already introduced (Fig. 5) to the “relative inch” (*Cun 寸*) of the use of the healer’s middle finger to measure distances along acupuncture channels on the patient’s body.⁶⁴ They also vary from how to hold a needle for variolation against smallpox⁶⁵ to making things for the injured⁶⁶ and adjusting physician-made apparatuses intended to reposition their patients’ dislocated bones.⁶⁷ In order to help straighten out someone suffering from being hunched over due to injury to their midriff, one image even shows a patient who stands on stacked bricks and grabs hold of two ropes attached to a horizontal pole while a physician adroitly supports him from behind with two hands.⁶⁸ (see Fig. 7).

In contrast to prolific illustrations of patients and their illnesses in Chinese medical texts, healers are



Figure 7 “Illustration of how to use the method of reach ropes and stacked bricks” from *Yu Zuan Yi Zong Jin Jian* (Imperially Commissioned Golden Mirror of the Medical Tradition) Vol. 87, 9a (source from: *Yi Zong Jin Jian*, Beijing: People’s Medical Publishing House; 1990).

rarely depicted.⁶⁹ Yet, despite rare visual depictions of doctors in the process of healing (as seen above), premodern Chinese medical texts preserve rich textual discussions focused not only on how physicians could use their hands “to grasp Heaven and Earth” as well as to intervene in the healing process but also how to use their entire body as an effective therapeutic instrument.

Paying closer attention to these kinds of textualization of hand mnemonics, hand-centered therapeutic skills, and the healer’s body-as-technology in the history of Chinese medicine has, in fact, turned out to be the most significant gift my Chinese colleague gave me when she taught me over 20 years ago a simple hand-divination technique for helping one cope with the immediate future.

Notes

1. For example, “phase energetics” were prominently featured in *Zheng He Sheng Ji Zong Lu* (《政和圣济总录》 *Encyclopedia of Sagely Benefaction of the ZhengheReign*, ca 1111–1117).

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Ethical approval

This study does not contain any studies with human or animal subjects performed by the author.

Author contributions

Marta Hanson drafted and reviewed the manuscript.

Conflicts of interest

The author declares no financial or other conflicts of interest.

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