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CYCLES AND SEQUENCES OF THE EIGHT TRIGRAMS

ABSTRACT

This article investigates the original Chinese sources for two circular trigram arrangements that have played a crucial role in numerology associated with the Book of Changes (the Yijing 《易經》) since the Song dynasty (960–1279). While attempting to clarify the nature and the origins of these and related diagrams, recent secondary literature on topic is reviewed, especially the influential articles by Schuyler Cammann.

I. THE CHINESE SOURCES

Zhu Xi’s 朱熹 (1130–1200) Zhouyi Benyi 《周易本義》, The Original Meaning of the Zhou Changes, includes two arrangements of the eight trigrams associated with the Yijing 《易經》, The Book of Changes, which have become known as the Houtiantu 《後天圖》, The Later Celestial Diagram, and the Xiantiantu 《先天圖》, The Former Celestial Diagram, respectively [see Fig. 1].

Over the centuries there has been much disagreement among Chinese as well as Western scholars as to how to reproduce these arrangements. To further complicate matters, the two arrangements of the eight trigrams have been related to—or sometimes even identified with—the so-called magic squares known as the Hetu 《河圖》, The [Yellow] River Diagram, and the Luoshu 《洛書》, The Luo [River] Document. Like the trigram arrangements, no graphic representations associated with the names Hetu and Luoshu are known prior to those of the Song dynasty (960–1279). These magic squares are conventionally arranged as groups of black and white dots (connected by lines in

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the traditional manner of stellar diagrams) symbolizing the numbers one through ten and one through nine, respectively [Fig. 2].\textsuperscript{3} The Hetu and Luoshu, in turn, are intricately linked with the \textit{wuxing} 五行, five phases (or elements), and the associated cycles of production and destruction.

In an attempt to disentangle the above-mentioned diagrams, squares, and cycles from some of the confusion that has been generated around them, I shall proceed to evaluate existing Song dynasty sources and then to investigate early references and textual evidence for the diagrams. Thereafter follows an examination of Schuyler Cammann’s works on the origins of these trigram arrangements.\textsuperscript{4}

The two arrangements of the eight trigrams known as the \textit{Houtiantu} and the \textit{Xiantiantu} have from the Song dynasty on traditionally been associated with two cultural heroes: the former is attributed to King Wen 文王 and the latter to Fuxi 伏羲. These attributions may have originated with Chen Tuan 陳摶 (d. 989), who is known for his Daoist affiliation, or Shao Yong 邵雍 (1011–1077), a prominent scholar of the
xiangshu 象數, images and numbers, tradition.⁵ According to Zhu Zhen’s 朱震 (1072–1138) Hanshang Yizhuan 《漢上易傳》, Hanshang’s Commentary on the Changes, which was completed in 1134, the transmission of the Houtiantu and other diagrams may be traced back to Chen Tuan.⁶ A work known as the Yi Long Tu 《易龍圖》, The Dragon Diagram of the Changes, or the Long Tu Yi 《龍圖易》, The Changes of the Dragon Diagram, attributed to Chen Tuan (or his disciples) is said to have contained the diagrams.⁷ According to Zhu Zhen, Chen Tuan transmitted a Xiantiantu through Chong Fang 种放 (d. 1014), Mu Xiu 穆脩 (979–1032), Li Zhicai 李之才 (d. 1045) to Shao Yong, who devised a graphic representation of the progression from the great ultimate (taiji 太極) through the four images (sixiang 四象), to the eight trigrams.

Following another line of transmission the Luoshu and the Hetu were handed down from Chong Fang through Li Gai 李溉 (10th–11th century), Xu Jian 許堅 (fl. 976–984), Fan Echang 范譚昌 (10th–11th century) to Liu Mu 劉牧 (1011–1064), who like Chen Tuan was of Daoist persuasion.⁸ By the time Zhu Xi received the Luoshu and the Hetu some confusion as to the names of the diagrams was realized. Zhu Xi quotes Cai Yuanding 蔡元定 (1135–1198) saying that the diagrams were transmitted from Kong Anguo 孔安國 (ca. 156 BCE–ca. 74 BCE), Liu Xiang 劉向 (79–8 BCE), and Ban Gu 班固 (32–92) who all named them correctly, but Liu Mu considered the diagram with the numbers one through nine to be the Hetu and the one with the numbers one through ten as the Luoshu. Consequently, Zhu Xi changed the names around.⁹ Although the earliest known illustrations occur in the works of Zhu Xi, the great proponents of diagrams and numerology of the early Song are Liu Mu and Shao Yong along with Zhou Dunyi 周敦頤 (1017–1073), who received his famous the Taiji Tu 《太極圖》, Diagram of the Great Ultimate, from Mu Xiu.

The Zhouyi Zhezhong 《周易折中》, Impartial Deliberations on the Zhou Changes, by Li Guangdi 李光地 (1642–1718) published in 1715 contains what is probably the earliest known illustrations of the numbers of the Hetu and Luoshu correlated with the trigram arrangements of the Houtiantu and the Xiantiantu [Fig. 3].¹⁰

For these illustrations Li Guangdi depended on Zhu Xi and Cai Yuanding, who described the relationship between the Xiantiantu and the Luoshu as follows:

The Luo [River] Document is vacuous at the center so it is also the Great Ultimate. [The sums of] both the odd and the even [numbers] are twenty so it is also the two yi (that is, heaven and earth or yin and yang). One, two, three, and four embody nine, eight, seven, and six. Lengthwise and crosswise [they all add up] to fifteen, and together they are seven and eight as well as nine and six so it is also the four
images. The four directions are considered to be Qian, Kun, Li, and Kan. The intermediate points between the four corners are considered to be Dui, Zhen, Xun, and Gen. Thus it is also the eight trigrams.  

These explanations which are based on the numerical progression one-two-three-four mentioned in both the Xici, The Attached Phrases, and the Qianzuodu, Chiseling through to the Regular System of Qian, are based on correlations between the numbers one through nine and the eight trigrams. The earliest known occurrences of correlations between trigrams and numbers are those by Cui Jing of the Tang dynasty (618–907), which have been appended to the commentary of Li Dingzuo’s Zhouryi Jijie, The Collected Explanations of the Zhou Changes. Cai Yuanding says of the numbers of the eight trigrams that one through four are yang and six through nine are yin but this does not tally with Zheng Xuan’s (127–200) definition that odd numbers are yang and even numbers yin. Cai does not explain how a number was correlated to a specific trigram.

In all probability these correlations came about as a result of attempts to integrate the diagrams with the cycles and correlates of the five phases. Like the eight trigrams, the five phases are correlated spatially to the compass points, but whereas the number eight accentuates the four directions and the four intermediate points, the number five commands a stress on the four corners and the center. The phases and trigrams are also correlated to the temporal concepts traditionally associated with the four corners such as the four seasons and the time of the day. When correlated to the five phases, the directions and the seasons often acquire a fifth element; thus the phase soil is correlated to the center, and various ingenious solutions are suggested to match the four seasons with the five phases.

Unlike the spatial arrangements of the five phases and the eight trigrams, the integration of temporal concepts of the seasons requires
considerations on how the phases and trigrams succeed each other in step with the seasons. The five phases are thought to follow each other according to one of two basic principles: The xiangsheng 相勝 or xiangke 相克, the mutual conquest sequence, or the xiangsheng 相生, mutual production sequence, of which the latter follows the course of the seasons [Fig. 4].16

For obvious reasons the correlation between the five phases and the eight trigrams is a difficult one, but leaving out the phase soil makes it possible. Correlations between the five phases and the eight trigrams never played an important role in Chinese cosmology, though.

In Needham’s opinion, the five phases occur among the correlations listed in the Shuogua 《說卦》, Explaining the Trigrams, which has Qian representing metal, Xun representing wood, Kan representing water, and Li representing fire.17 In the eightfold correlation system peculiar to the Yijing cosmology, the eight trigrams are associated with similar concepts, which, especially in the Daxiangzhuan 《大象傳》, The Commentary on the Great Images, have become alternative names for the trigrams: Qian is heaven, Kun is earth, Gen is mountain, Dui is marsh, Zhen is thunder, Xun is wind, Kan is water, and Li is fire.18 Each of the last eight sections of the Shuogua focuses on one trigram and its correlations, and the water and fire of Kan and Li appear to belong to this set of eight natural phenomena and not to the five phases.19

The earliest known textual evidence for a correlation of the phases and the trigrams occurs in the eleventh-century Yishu Gouyintu 《易數拘隱圖》, Outlining the Secret Diagrams of the Numbers of the Changes, by Liu Mu:

As to the five phases becoming numbers, water’s number is six, metal’s number is nine, fire’s number is seven, and wood’s number is eight.20 Water resides in Kan and produces Qian. Metal resides in Dui and produces Kun. Fire resides in Li and produces Xun. Wood resides in Zhen and produces Gen. [Kan, Dui, Li, and Zhen] already reside in the four corners and produce Qian, Kun, Gen, and Xun. Collectively, they make up the eight trigrams.21
This is a description of the *Houtian tu* incorporating the high numbers of the *Hetu*. The correlations of the numbers and the phases are well established in a number of texts of the Han dynasty, and the correlation of the phases and the compass points are among the most basic and never subject to variations.²² Liu Mu’s account puts *Li* on top of the diagram in south, *Kan* at the bottom in north, *Dui* to the right in west, and *Zhen* to the left in east. Located in these four trigrams are the five (i.e., four) phases, which produce *Qian*, *Kun*, *Gen*, and *Xun*. If this production is visualized as a counterclockwise movement, it places *Xun* in the southeast, *Gen* in the northeast, *Qian* in the northwest, and *Kun* in the southwest. The trigrams taking up residence in the four corners are thus correlated to the numbers as follows: *Li* is correlated to seven, *Kan* to six, *Dui* to nine, and *Zhen* to eight. However, these correlations are unique to the combination of the *Houtian tu* and the *Hetu*. The combination of the *Xiantian tu* and the *Luoshu*, for example, gives different correlations between the trigrams and the numbers [Fig. 3], and so do the combinations of the *Houtian tu* and the *Luoshu* as well as those of the *Xiantian tu* and the *Hetu*. Furthermore, the correlations between the phases and the compass points do not match the *Luoshu* [Fig. 5].

Comprehensive discussions of the correlations and sequences of the eight trigrams go back to the Ten Wings (the *Shiyi* 十翼) of the *Yijing*, namely the *Shuogua*, which probably date to the latter half of the third century BCE.²³ In the *Zhouyi Zhengyi* 《周易正義》 edition the *Shuogua* is divided into seventeen sections, which originally seem to have belonged to two different texts.²⁴ The first three sections contain a history of the creation of the Changes (*Yi*) and the diagrams, and these sections closely resemble the *Xici*.²⁵ Sections four and five discuss the sequence of the eight trigrams and its cosmological ramifications. The last twelve sections are lists of the correlations of the

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**Figure 5.**

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M (4) M (9) F (2)
Wo. (3) E (5) F (7)
Wo. (8) Wa. (1) Wa. (6)
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22. For example, see Liu Mu’s account in *Shuogua*, section 3.
23. The *Shuogua* is divided into twelve sections, which are further divided into subsections.
24. The *Shuogua* is divided into three sections, which are further divided into subsections.
25. The *Shuogua* is divided into ten sections, which are further divided into subsections.
eight trigrams; section six correlates the trigrams to conceptual qualities (e.g., adherence, joy), section seven lists the animal correlates, section eight correlates the trigrams to various parts of the body whereas section nine matches the trigrams with the members of the nuclear family, that is, father, mother, sons, and daughters. The remaining eight sections focus on one trigram per section listing between nine and twenty correlates to each trigram.

The relevant paragraphs of *Shuogua* 4, from which the *Houtiantu* is devised, say:26

The divine sovereign brings out [the ten thousand things] in *Zhen*, regulates them in *Xun*, makes them mutually visible in *Li*, causes them to be served in *Kun*, makes them happy in *Dui*, makes them fight in *Qian*, exhausts them in *Kan*, and completes them in *Gen*.28 The ten thousand things are brought out in *Zhen*. *Zhen* is the east. They are regulated in *Xun*. *Xun* is the southeast. As to being ‘regulated,’ it means the ten thousand things are adjusted and made even. As to *Li*, it is brightness. The ten thousand things are made mutually visible. It is the trigram of the south. The sages faced south when they listened to the world (that is, held court), they turned towards the brightness and ruled. It is probably obtained from this. As to *Kun*, it is the earth. The ten thousand things are all nourished by it, therefore it says, “causes them to be served in *Kun*.” *Dui* is midautumn. This is [the time] when the ten thousand things are content. Therefore it says, “makes them happy in *Dui*.” As to “fighting in *Qian*,” *Qian* is the trigram of the northwest. It means yin and yang are combating each other. *Kan* is water. It is the trigram of due north. It is the trigram of fatigue. This is where the ten thousand things return. Therefore it says, “exhausts them in *Kan*.” *Gen* is the trigram of the northeast. This is where the ten thousand things reach the end and the beginning. Therefore it says, “Completes them in *Gen*.”29

In the subcommentary in Kong Yingda’s 孔穎達 (574–648) *Zhouyi Zhengyi*, The Correct Meanings of the Zhou Changes, the explanations of the sequence resort to both the correlations found in the *Shuogua* and to the positions of the handle or spoon (*biao*) of the Dipper, that is, the three stars extending from the box.30 For example, the commentary on the passage, “The ten thousand things are brought out in *Zhen*; *Zhen* is the east,” says, “When the handle of the Dipper points to the east it is springtime, in springtime the ten thousand creatures come forth and give birth.”31 Li Dingzuo quoted Cui Jing who correlated the eight trigrams’ positions in the four corners and the four intermediate points to the beginnings of the four seasons as well as to the summer and winter solstices and the spring and autumnal equinoxes.32 Gao Heng 高亨 (1900–1986) found the passage clear and free from forced logic, and he offered several examples of natural explanations of the development of the cycle, but in the final analysis he found it necessary to have recourse to the
metaphysics of *yin* and *yang* just like the text itself when explaining “the fighting [refers] to *Qian*.“\(^{33}\)

According to Zhu Xi the *Xiantiantu* arrangement originates in *Shuogua* 3 where it says:\(^{34}\)

> The positions of heaven and earth are fixed. In mountains and marshes there are circulating vital material energy (*qi* 氣). Thunder and wind blend together. Water and fire do not\(^{35}\) dislike each other. The eight trigrams alternate with each other. He who enumerates the going (that is, keeps track of the past) is in accord. He who understands the coming is forecasting. Therefore The Changes is both forecasting [the future] and enumerating [the past].\(^{36}\)

The trigrams are listed by their alternative names, the aforementioned natural phenomena which they symbolize. These correlations are fixed and all commentaries agree that this section enumerates the trigrams in pairs of opposites in terms of *yin* and *yang* lines in the following series: *Qian*-Kun, *Gen*-Dui, *Zhen*-Xun, *Kan*-Li ☐ ☩ ☕ ☦ ☘ ☙. Zhu Xi’s commentary on this passage says:

> Master Shao [Yong] says, “These are the positions of Fu Xi’s Eight Trigrams. *Qian* is the south, *Kun* is the north, *Li* is the east, and *Kan* is the west. *Dui* resides in the southeast, *Zhen* resides in the northeast, *Xun* resides in the southwest, and *Gen* resides in the northwest. Thus the eight trigrams interchange with each other and form the sixty-four hexagrams. This is the so-called learning of the Former Heaven [*xiantian zhi xue* 先天之學].” It begins in *Zhen* and passes through *Li* and *Dui* to arrive at *Qian*. These are the trigrams enumerating the existing. From *Xun* it passes through *Kan* and *Gen* to arrive at *Kun*. These trigrams infer what is not yet existing. When the changes produced the trigrams, it was in the order *Qian*, *Dui*, *Li*, *Zhen*, *Xun*, *Kan*, *Gen*, and *Kun*. So there is both forecasting [the future] and enumerating [the past].\(^{37}\)

Significantly, as far as we know, no commentators prior to the Song dynasty interpreted this passage as a description of a trigram cycle.\(^{38}\)

In *Shuogua* 6 the trigrams are enumerated by their more common names in the same pairs but following a different sequence: *Qian*-Kun, *Zhen*-Xun, *Kan*-Li, *Gen*-Dui ☐ ☩ ☘ ☦ ☙ ☘ ☦ ☙. This series is repeated in sections seven through nine, and sections ten through seventeen (each of which deal with a single trigram) follow the same sequence.\(^{39}\) In spite of the recurring use of this series in the *Shuogua*, neither the early commentators nor Zhu Xi seem to have conceptualized it as a circular arrangement of the trigrams.\(^{40}\)

The entire section of *Shuogua* 3 is quoted in (or stems from) the Mawangdui silk manuscript, *Yi zhi Yi* 《易之義》, *The Significance of the Changes*, in a slightly but notably different wording:

> The positions of heaven and earth are fixed. [In mountains and marshes there are circulating *qi*].\(^{41}\) Fire and water dislike each other.
Thunder and wind blend together. The eight trigrams alternate with each other. He who enumerates the going (that is, keeps track of the past) is in accord. He who understands the coming is forecasting. Therefore the Changes is reaching [to the future] and enumerating [the past].

This passage indicates a series of opposing pairs as follows: Qian-Kun, [Gen-Dui], Li-Kan, Zhen-Xun ☐️ ☐️ ☐️ ☐️ ☐️ ☐️ ☐️ ☐️. Thus, there are so far three different series of opposing pairs associated with the Shuogua. In addition to that, there is the order of the lower trigrams in the Mawangdui manuscript Liushisu gua 六十四卦, The Sixty-Four Hexagrams, which is identical with the Yi zhi yi series except for Kan and Li being reversed.

The only characteristic feature of Zhu Xi’s Xiantiantu arrangement is that the trigrams are paired according to the pang tıng 旁通, laterally linked, principle, which means the yang lines in the first trigram of a pair turns into a yin line in the second trigram and vice versa. The two trigrams are then placed opposite each other on the circle. There is therefore no compelling logic or other obvious reasons why one of the four series mentioned above should be preferred to the others.

As a pair the Hetu and the Luoshu occur in Xici 1: 11, which may be as late as the early second century BCE. There are some earlier references to the Hetu but the Luoshu seems to be a later invention. A Hetu is mentioned in conjunction with regalia of jade and ceremonial weapons in the chapter “Guming (顧命),” The Testamentary Mandate, of the Shujing 《書經}, The Book of Documents, but it is uncertain what the term refers to in this context. In his commentary to Ban Gu’s Dian Yin 《典引}, Extending the Canon, which is included in the Wenxuan 《文選}, Selections of Literature, Cai Yong 蔡邕 (133–192) cites a passage from the Shujing mentioning both the Hetu and the Luoshu but this is not to be found in any surviving editions.

In a famous passage in the Lunyu 《論語}, Analects, in the chapter “Zi Han 子罕,” The Master Rarely, Confucius is supposed to have exclaimed in despair, “The Feng-bird does not arrive, the [Yellow] River does not bring forth a diagram, I am finished!” Sima Qian (ca. 145–ca. 86 BCE) in the chapter “Kongzi Shijia (孔子世家),” The House of Confucius, of the Shiji 《史記}, Records of the Historian, cites Confucius’ outcry: “The [Yellow] River does not bring forth a diagram, the Luo [River] does not bring forth a document, I am finished!” This is a good example of how a reference to a Hetu in a pre-Han text is reinterpreted to tally with the prevailing dual concepts of the Han dynasty and therefore paired up with the Luoshu. Another pre-Han occurrence of Hetu may be found in the chapter “Feigong (非攻),” Against Aggressive Warfare, of the Mozi 《墨子}, Master Mo. The earliest reference to the Luoshu probably occurs in the
chapter “Tianyun (天運),” The Turning of Heaven, of the Zhuangzi 《莊子》, Master Zhuang, which most likely dates to the beginning of the Han dynasty.51

Texts containing pre-Han material but edited during the Han dynasty often cast the Hetu as part of a larger scheme of parallel phenomena. For example, in the chapter “Liyun (禮運),” Conveyance of Rituals, of the Liji 《禮記》, The Records of Rituals, it is stated, “Therefore heaven sends down fertilizing dew, the earth brings forth sweet springs, the hills bring forth [materials for] utensils and vehicles, and the [Yellow] River brings forth a horse [with] a diagram.”52 The chapter “Xiao Kuang (小匡),” Small Regulations, of the Guanzi 《管子》 says, “When the ancients received the Mandate, the dragon and the tortoise appeared. The [Yellow] River brought forth a diagram, the Luo [River] brought forth a document, and earth brought forth a yellow chariot.”53 In the Da Dai Liji 《大戴禮記》, The Records of Rituals of the Elder Dai, which is the latest of the ritual texts containing pre-Han material to have found its present form,54 the “he chu tu” 河出圖 is paralleled by “luo chu fu” 雒出符. According to Wang Pinzhen’s 王聘珍 (eighteenth century) commentary fu 符 should be fu 符,55 literally “tally,” which is but one of many alternative names used for these magic texts or diagrams.56

During the Han dynasty the dual concepts of the Hetu and the Luoshu are fully developed as was seen in the quotations from the Xici and the Shiji above. The Huainanzi 《淮南子》, The Huainan Masters, states that the Luo River brings forth a red document and the Yellow River brings forth a green diagram.57 In the Chen Wei 《讖緯》, Apocrypha, a tradition arises that these diagrams emerge from the rivers assisted by a tortoise and a dragon (or a dragon-horse), respectively.58 However, as the lore unfolds, the exact nature of the Hetu and the Luoshu is still in dispute. According to Li Dingzuo’s Zhouyi Jijie, some of the commentators of the Han dynasty referred to the Hetu and the Luoshu as texts while others identified them with the eight trigrams.59 The passage from Xici 1: 11 is quoted in the chapter “Wuxing (五行),” The Five Phases, of the Hanshu 《漢書》, The Documents of the Han, which records Liu Xin’s 劉歆’s (46 BCE–23 CE) opinion that Fu Xi received the Hetu from which he copied and drafted the eight trigrams while the cultural hero Yu 禹 was given the Luoshu from which he devised the Hongfan 《洪範》, The Great Plan, detailed in a chapter by that name in the Shujing.60 The Hanshu also quotes the outline of the nine points of the Hongfan saying that this is the original text of the Luoshu which heaven bestowed on Yu and which the rest of the “Hongfan” chapter is an elaboration of. In conclusion, the Hetu and the Luoshu are compared to the warp and the woof, the eight trigrams and the nine sections being like the
outside and the inside of the same thing. In spite of different opinions on the nature of the relationships between the trigram arrangements and the magic squares, the idea of a connection between them has persisted to this day.

The Hetu numbers from one through ten are usually identified with a passage in Xici 1: 10 which assigns the odd numbers one through nine to heaven and the even numbers two through ten to earth. Rick-ett points to an essay physically assuming the shape of a calendar chart resembling Zhu Xi’s arrangement of the Hetu numbers in the chapter “You Guan (幼官)” of the Guanzi (管子), Master Guan. Rickett concludes that this “provides us with our earliest reliable evidence that Chu Hsi’s River Chart did actually go back to Former Han times.

The earliest evidence of a square arrangement of the numbers one through nine is found in the Da Dai Liji which explains the layout of the divisions of the Ming Tang (明堂, The Bright Hall, in terms of the numbers two-nine-four-seven-five-three-six-one-eight. When these numbers are arranged horizontally from right to left in a three-by-three grid, they constitute a magic square in which any three numbers added horizontally, vertically, or diagonally result in fifteen (Fig. 6). This arrangement supposedly represents the Luoshu.
2. This may be illustrated by the fact that even a recent comprehensive reference work on the Yijing representing the combined efforts of sixty-three scholars did not get the diagrams right. The article on houtian bagua 后天八卦, the later celestial eight trigrams, states that this is also known as the eight trigrams of King Wen while the caption to the illustration of that arrangement says it shows King Wen's former celestial eight trigrams, see Zhang Qicheng 張棋成, Yixue Dacidian 《易學大辭典》(The Great Encyclopedia of Studies of the Changes) (Beijing: Huaxia Chubanshe, 1992), 461. The illustration is a correct representation of the generally accepted layout of the Houtiantu, whereas the illustration of the Xiantiantu on page 459 has been rotated ninety degrees clockwise so the trigram Li 離 corresponding to east is on top where Qian 乾 corresponding to south should rightly be. The cover of the 1968 reprint of Granet's La Pensée Chinoise (1934; reprint, Paris: Editions Albin Michel, 1968). See also Schuyler Cammann, “The Eight Trigrams.”

3. There are references to layouts of these diagrams in mathematical texts prior to the Song, see Joseph Needham, Science and Civilisation in China (Cambridge: Cambridge University Press, 1959), vol. 3, 58f.

4. Schuyler Cammann (1912–1991) was an American anthropologist who for over thirty years has written most extensively on the subject of magic squares and trigram arrangements. Cammann's most important essays are “The Evolution of Magic Squares in China,” Journal of the American Oriental Society 80, no. 1 (1960): 116–24, “The Magic Square of Three in Old Chinese Philosophy and Religion,” History of Religions 1, no. 1 (1961): 37–80, “Old Chinese Magic Squares,” Sinologia 7 (1963): 14–53, “Some Early Chinese Symbols of Duality,” History of Religions 24, no. 3 (1985): 215–54, and “The Origin of the Trigram Circles in Ancient China,” Bulletin of the Museum of Far Eastern Antiquities 62 (1990): 187–212. His contributions, despite increasingly suffering from uncorroborated creativity, have been valuable in clearing up some of the confusion regarding the reproductions of the two trigram arrangements. With his two articles of 1985 and 1990, Cammann almost completely discarded textual and material support for his ideas and mainly referred to his own earlier articles. One example will suffice to give an idea of Cammann’s reasoning (my italics): “If this proposed early circle of trigrams had indeed been closely connected with the Shang Diamond Plan, when the latter was reversed—by rotating it—the circle would have been rotated too,” “Some Early,” 238. As to the so-called “Shang Diamond Plan,” Cammann explained (my italics again): “It has been suggested that both diagrams have been derived from a larger cosmic diagram of thirteen digits, which was probably known to the people of the Shang dynasty . . .,” “Some Early,” 223. See also Cammann’s notes 28 and 42 for Bart Jordan, “the scholarly musician” who suggested this, and who “believes that the Shang people used circles of trigrams to express planetary motions and to represent a music scale derived from Western Asia,” “Some Early,” 236, note 59. In his dissertation on the Luoshu Berglund, having examined Cammann’s articles, has this to say:

Even though we may find Cammann’s theories interesting, particularly his conclusions, they are nothing but products of his own imagination. Therefore, his whole evolutionary theory should be examined with the utmost caution. It is necessary to make a clear distinction between personal interpretations and historical facts, which are confirmed by literary and other sources. Without any scientific proof, Cammann draws the conclusion that the Ba Gua were invented before the Luo Shu. However, I believe that the Luo Shu presupposes the Ba Gua and not vice versa. Lars Berglund, The Secret of Luo Shu: Numerology in Chinese Art and Architecture (Lund: Lund University Press), 1990, 170. Notwithstanding the obvious slip of the pen in his last sentence, I certainly agree with Berglund on this issue but.

5. See Needham, vol. 4, pt. 1, 296, note b, and vol. 5, pt. 5, 52. Fu Xi and King Wen were also intimately associated with the traditional genesis of the hexagrams and the
lated texts, and Fu Xi’s alleged discovery of the trigrams were sometimes described
the Apocrypha in relation to diagrams revealed by or on the backs of mythical
beasts usually coming out of rivers, see for example, fragments of the Shangshu
Zhonghou 《尚書中候》 (The Central Five-Day Period According to the Hallowed
Documents) and Shangshu Zhonghou Wohei 《尚書中候握河妃》 (The Records of
Controlling the River of the Central Five-Day Period According to the Hallowed
Documents) in Yasui Ko’zan 安謝喜山 and Nakamura Sho’hachi 中村鍬八, Icho Shu’ sei 《禪書集成》 (Tokyo: Kabushiki-gaisha Shuppansha, 1971–1985), vol. 2, 73 and
91.
6. The Hanshang Yizhuan is quoted as the Hanshang Yijie 《漢上易解} (Hanshang’s
Explanations of the Changes) in the Songshi 《宋史》 (History of the Song Dynasty),
comp. Tuotuo 脫otto et al. (1345: reprint, Beijing: Zhonghua Shuju, 1977), vol. 37,
12908. Zhu Zhen, whose zi is Zifa 子發, was known as Mr. Hanshang 漢上先生 among
his followers. For Chen Tuan’s biography, see the Songshi, vol. 38, 13420ff. Smith and
Wyatt think that “[t]he diagrams’ ultimate provenance may well have been Ch’en
T’uan . . .” see Kidder Smith, et al., Sung Dynasty Uses of the I Ching (Princeton:
Princeton University Press, 1990), 110, n. 43. See also Xu Qinting 徐芹庭, Yixue Yuanliu
《易學源流》 (The Origins and Developments of Studies of the Changes), (Taipei: Guo-li Bianshiyou, 1987), vol. 1, 662f.
7. See Liao Mingchun 劉名春, Kang Xuewei 姜學偉, and Liang Weixian 梁維弦, Zhouyi
Yanjushi 《周易燕璽史》 (The History of Studies of the Changes of Zhou), 212ff,
and W. Allyn Rickett, Guanzhi: Political, Economic, and Philosophical Essays from
宋儒河圖洛書之學” (On the Song Confucians Studies of the Yellow River Diagram
and the Luo River Document), Kong Meng Xuebao 《孔孟學報》(The Journal of
135, Fung Yu-lan, History of Chinese Philosophy, trans. Derk Bodde (Princeton:
Princeton University Press, 1952–1953), vol. 2, 440, and Angus C. Graham, Two Chi-
inese Philosophers: Ch’eng Ming-tao and Ch’eng Yi-ch’uan (London: Lund Humphre-
9. See Zhu Xi, Yixue Qimeng 《學與解蒙》 (Instructing the Youth in the Studies of
the Changes) in Zhu Xi, Zhuzi Yishu 《朱子遺書》 (The Posthumous Papers of Master
Zhu), (Taipei: Yiwen Yinshuguan, 1969), vol. 12, 3B. See also Rickett, 155, and
10. See Li Guangdi 李光地, Zhouyi Zhezhong 《周易折中》 (Impartial Deliberations on
the Zhou Changes) in YYJC, vol. 82, 1954ff., and Richard Smith, Fathoming the Cos-
mos and Ordering the World: The Yijing (I Ching, or Classic of Changes) and Its Evolu-
tion in China (Charlottesville: University of Virginia Press, 2008), 177ff.
11. Zhu Xi, Yixue Qimeng in Zhu Xi, Zhuzi Yishu, vol. 12, 7A. Although this famous
work is commonly attributed to Zhu Xi, the first draft was made by his friend and col-
league Cai Yuanding, see Bent Nielsen, A Companion to Yi jing Numerology and
Consomology: Chinese Studies of Images and Numbers from Han 漢 (202 BCE–220 CE) to
13. In the commentary on the Qianzuodu attributed to him, Yasui and Nakamura, vol. 1,
pt. 1, 40.
14. It seems that the association between the compass points and the seasons predates
the correlation system of the five phases, and Eberhard called these members of original
pre-five phases correlation systems Urgelichenungen. East is associated with spring,
south with summer, west with fall, and north with winter, see Wolfram Eberhard,
“Beiträge zur kosmologischen Spekulation Chinas der Han-Zeit,” Baessler-Archiv
16, nos. 1–2 (1933): 1–100, 53.
15. Some schemes correlate soil to a fifth season, a midsummer, others divide the
year into five periods of seventy-two days, and sometimes soil is simply left out of the
equation, see, for example, Eberhard, 48, Gao You 高詠, Huainanzi 《淮南子》 (The
Huainian Masters) in Yang Lianggong 楊亮功, Zhongguo Yixue Zhuzi Jicheng 《中國子
學名家集成》 (A Grand Compendium of Chinese Masters’ Famous

16. See, for example, Needham, vol. 2, 253ff. Eberhard has a table of attested occurrences of five phase-sequences and concludes they all share certain regularities such as being based on solar (clockwise) or lunar (counterclockwise) movements. Thus, the mutual production sequence corresponds to the sun’s movement during the course of a day while the mutual conquest sequence corresponds to the moon’s movement during the course of a month, see Eberhard, 45ff. Both terms occur in chapter names (58 and 59, respectively) in Dong Zhongshu’s Chunqiu Fanlu (Luxuriant Dew on the Springs and Autumns), see Sun Kuang (1543–1613), Chunqiu Fanlu in ZZMJ, vol. 27, 321 and 325. The two chapters in question occur in a cluster of seven chapters on the five phases which may have been added to the work at a later stage, see Michael Loewe, Dong Zhongshu: A “Confucian” Heritage and the Chunqiu Fanlu (Leiden: Brill, 2011), 267. According to Loewe the mutual conquest sequence is the older of the two; the mutual production sequence originated during the Western Han dynasty (202 BCE –9 CE), Michael Loewe, “Water, Earth and Fire: The Symbols of the Han Dynasty,” Nachrichten der Gesellschaft für Natur- und Völkerkunde Ostasiens/Hamburg 125 (1979): 63–68, 65. In Loewe’s opinion, these sequences of the five phases only gained political importance in the second half of the first century BCE, see Michael Loewe, Dong Zhongshu, 265. Both principles attempt to give a natural explanation of how the phases succeed each other. The rationale behind the mutual production order may be understood as wood produces fire because wood is consumed by fire, fire produces soil because fire opens access to the soil by clearing forests (the slash-and-burn method), soil produces metal because metallic ores are mined in the soil, and metal produces water because metal has the “property of liquefying,” see Needham, vol. 2, 255. The mutual conquest sequence is explained by water putting out fire, fire melting metal, metal cutting wood, wood penetrating the soil, and the soil damming up water.

17. See, for example, Li Dingzuo 李鼎祚, Zhouyi Jijie (The Collected Explanations of the Zhou Changes) in YJJC, vol. 10, 843, 851, 855, and 860. See also the tabulation in Needham, vol. 2, 313, where Needham lists the “associated element” taken from the last eight sections of the Shuogua, which he refers to as “ch. 11 of App. 8,” ibid., 312.


19. In the case of Xun the Shuogua says: “Xun is wood, it is wind,” Li Dingzuo in YJJC, vol. 10, 851. Metal is not mentioned at all, and the correlate to Kun is said to be earth, which is a translation of di 地 and not tu 土, soil, of the five phases. Needham’s tabulation lacks textual basis, and there are several weak points in his Column 7: The correlate to Zhen is said to be wood but the closest the text comes to that is “green bamboo shoot” (ibid., 848). The correlate to Gen is also said to be wood but the text only mentions “fruit of trees and other plants” (ibid., 863), and “as to its (Gen’s) relationship to trees, it is those with many joints” (ibid., 865). Finally, Needham indicates that both water and metal are correlated to Dui but there is absolutely nothing in the text that may warrant such a claim. It is significant that none of the Han dynasty commentators cited by Li Dingzuo sees a connection between the five phases and these or any other sections of the Shuogua.

20. Here, as in many other cases, the fifth phase, soil, is left out making the correlations more convenient.

21. See Liu Mu, Yishi Gouyintu (Outlining the Secret Diagrams of the Numbers of the Changes) in YJJC, vol. 143, 20). Note that these correlations differ from those Needham claimed to have found in the Shuogua.

22. The Guanzi, the Huainanzi, and the Chunqiu fanlu to mention a few, see, for example, Eberhard, 51.
23. Nielsen, 214f.
25. The first three sections comprise the first text or part one in Shchutskii’s and Shaughnessy’s divisions, see Shchutskii, 159f., and Shaughnessy, “I Ching,” 220. In the silk manuscripts unearthed at Mawangdui these three sections are included in a different text, which modern scholars refer to as the Yi zhi Yi 《易之義》(The Significance of the Changes), see Deng Qiubai 鄧球柏, Boshu Zhouyi Jiaoshi 《帛書周易校釋》(A Critical Edition of the Silk Manuscript of the Changes of Zhou) (Changsha: Hunan Renmin Chubanshe, 2002), 548ff.
26. The section begins with a passage that seems to be unrelated to the Houtiantu: “The thunder moves them (that is, the ten thousand things), the wind scatters them, the rain moistens them, and the sun dries them. Gen stops them, Dui makes them joyous, Qian rules them, and Kun stores them,” see Li Dingzuo in YJJC, vol. 10, 824. The trigrams are enumerated in a series that has more in common with those to be mentioned below in the discussion of the Xiantiantu arrangement that with the Houtiantu sequence. It is very tempting to rearrange sections three and four so as to include this passage in section three. Gao Heng 高亨 (1900–1986) thought that the last thirteen characters of section three belong to section two instead, see Gao Heng, Zhouyi Dazhuan Jinzhu 《周易大專今注》(Modern Annotations to the Great Commentary of the Changes of Zhou), (1970; rev. ed., Jinan: Qi Lu Shushe, 1980), 611. With these sentences out of the way the above passage would fit nicely in section three both compositionally and with regard to the order of the trigram series.
27. Following Gao Heng reading 伐 for 說 and 畿 for 言, see Gao Heng, 611ff.
28. Reading 伐 for 説, see previous note.
30. See, for example, Needham, vol. 3, 232f. The position of the Dipper within the Houtiantu circle is probably the most significant feature of the so-called diviner’s boards, see, for example, Donald J. Harper, “The Han Cosmic Board (Shih 式),” Early China 4 (1978–79): 1–10.
31. Kong Yingda in YJJC, vol. 6, 836.
33. Gao Heng, 613f.
34. Another explanation is that it originates in the Xici 1: 11: “So for the Yi there is the great ultimate. This produces the two yi (yin and yang). The two yi produce the four images. The four images produce the eight trigrams.” Li Dingzuo in YJJC, vol. 10, 711. See also Shen Diemin 沈德民, “Xian Hou Tian Shiyi 先後天釋疑” (Explaining the Confusion Regarding Preceding and Succeeding Heaven) in Zhouyi Yanjiu Lunwenji 《周易研究論文集》(A Collection of Essays on Studies of the Changes of the Zhou), ed. Huang Shouqi 黃壽祺 and Zhang Shanwen 張善文 (Beijing: Beijing Shifan Daxue Chubanshe, 1990), vol. 3, 181–98, 186f.
35. Gao Heng thinks that the character 不 is superfluous, Gao Heng, 610. In the corresponding passage in the silk manuscript Yi zhi Yi, the character 不 does not occur, see Deng Qiubai, 2002), 553f.
36. My translation follows Kong Yingda in YJJC, vol. 4, 438f., and vol. 6, 834f., and Gao Heng, 611. However, see also Li Dingzuo in YJJC, vol. 10, 824, who quotes Yu Fan’s
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37. See Zhu Xi in YJJC, vol. 28, 495f. See also Legge’s note, 424f., and Wilhelm’s comments, 265ff., which are clearly influenced by Zhu Xi’s commentary.

38. See, for example, Harvard-Yenching Institute Sinological Index Series: A Concordance to Yi Ching (1935; reprint, Taipei: Chinese Materials and Research Aids Service Center, 1966), 50ff. for a general view of these sections.

39. The sentence in brackets is based on the received edition of Shuogua 3.

40. See Li Dingzuo in YJJC, vol. 10, 716, and Han Zhongmin, Bo Yi Shuoluè 《易易説略》 (Beijing: Beijing Shifan Daxue Chubanshe, 1992), 205.

41. The translation is based on the emendations suggested by Chen and Liao. See also Yu Haoliang 于豪亮, “Boshu Zhouyi 綿書周易” (The Silk Manuscript Changes of the Zhou), Wenwu 《文物》 3 (1984): 14–24, 17, who has the same emendations.

42. See Nielsenh, 185ff.

43. See, for example, Li Dingzuo in YJJC, vol. 10, 716, and Han Zhongmin, Bo Yi Shuoluè 《易易説略》 (Beijing: Beijing Shifan Daxue Chubanshe, 1992), 205.

44. See Zhu Xi in YJJC, vol. 28, 495f. See also Legge’s note, 424f., and Wilhelm’s comments, 265ff., which are clearly influenced by Zhu Xi’s commentary.


50. See Zhang Chunyi 張純一, Mozi Jiüe 《墨子集解》 (Collected Explanations of Master Mo) (1931; reprint, Taibei: Wenshizhe Chubanshe, 1982), 199.


52. Ruan Yuan, Shisian Jing, vol. 2, 1427.

53. See Ling Rheng 江汝亭, Guanzi jiping 《管子輯評》 (Collected Comments on Master Guan) in ZZMJ, vol. 69, 314.


57. See Gao You in ZZMJ, vol. 85, 83. See also Zhu Yizun, vol. 7, Juan 264, 1A.

58. See, for example, the Shileimu 《石勒墓》, Yasui and Nakamura, vol. 1, Part 2, 99, and the Qianziudou, Yasui and Nakamura, vol. 1, 60. This tradition may have been influenced by the authors/editors of the Guanzi and the Liji as the above quotations thereof may suggest.

59. The commentary mentions that the Hetu has nine chapters and the Luoshu six chapters, see Li Dingzuo in YYJC, vol. 10, 716. Note the numbers nine and six, which clearly refer to the numbers associated with the yang and yin lines of the hexagrams. Fragments of some sixty texts with titles including Hetu and/or Luoshu have indeed been transmitted from the Han dynasty on, see Isho, vol. 6. Traditionally, these fragments have been included in collections of Apocrypha. The most thorough studies of these fragments are those by Chen Pan published in Zhongyang Yanjiuyuan Lishi Yanjiusuo Jikan 《中央研究院歷史語言研究所集刊》 in the period 1948–1975. Among the Han dynasty commentators the explanation of Kong Anguo 孔安國 (ca. 156–ca. 74 BCE) figures prominently and may have influenced Liu Xin 劉歆 (50 BCE–23 CE), see below. Kong Anguo said, “The He tu is the eight trigrams and the Luo shu is the nine divisions [of the Great Plan of the Shuijing],” Li Dingzuo in YYJC, vol. 10, 716. See also Li Weitai, 133.


61. Hanshu, vol. 5, 1316. See also Henderson, 84ff.


63. See Rickett, Guanzi, 150ff., and “An Early Chinese Calendar Chart: Kuan-tzu, III, 8 (Yu kuan 幼官),” T'oung Pao 68 (1960): 195–251, 201ff. Rickett dates the final
redaction of this chapter to about 26 BCE, ibid., 225. See also Rickett, Guanzi, 148f., for the many different interpretations of the title of the chapter, which literally translates as “office in charge of youth.”


65. See Wang Pinzhen, 150. The Ming tang was a ritual hall with nine main rooms where the emperor conducted ceremonies in accordance with the monthly commands (yue ling 月令), which follow yin yang and the five phases and their correlations to the seasons, colors, etc., see, for example, Granet, 150ff. Remnants of a ritual hall dating to 56 CE matching the descriptions of the written sources have been excavated south of the Eastern Han capital near Luoyang, see Wang Zhongshu, Han Civilization, trans. K. C. Chang et al. (New Haven: Yale University Press, 1982), 39. A similar spatial division into nine parts can be traced back to the chapter “Yu Gong 禹貢,” Tribute of Yu, of the Shujing (Ruan Yuan, vol. 1, 146f.), and to Zou Yan 鄒衍 (305–ca. 240 BCE), the alleged founder of the yinyang wuxing philosophy, see John S. Major, “The Five Phases, Magic Squares, and Schematic Cosmography;” in Explorations in Early Chinese Cosmology, ed. Henry Rosemont, Jr. (Chico: Scholars Press, 1984), 133–6, 133ff. See also Cammann, “Magic Square;” 43f., and “The Evolution,” 117ff.

66. In the Zhouyi Zhezhong, which has diagrams using actual numerals in stead of dots, these numerals are arranged in a circle, see YJJC, vol. 82, 1954ff.