



ARTICLES

THE HAN COSMIC BOARD (SHIH 式)

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The Warring States and Ch'in-Han periods witnessed not only an efflorescence of cosmological speculation but along with it the growth of intricate systems of divination, astrology, geomancy, and magic. The internal structure of the cosmos, elaborated in terms of Yin-Yang and Five Phase theories, was treated as something which could be manipulated to the advantage of a person who was initiated into the secret operations of the universe. Thus the Yin-Yang and Five Phase cycles, the trigrams of the Book of Changes, the sexagenary cycle of Celestial Stems and Earthly Branches, as well as various calendrical and astronomical observations, all served as the raw material for a diverse array of esoteric arts.

In the present study I plan to concentrate on one of these esoteric arts which flourished during the Han period; the use of a special kind of divining board known as the shih 式. On the basis of specimens recovered from Han tombs we know that the board itself consists of two pieces (see Fig. 1). The top piece is a round disc engraved around the circumference with the names of the twenty-eight lunar mansions and the twelve months, both of which are enumerated in a counterclockwise direction on the disc. The seven stars of the Big Dipper (known in China as the Northern Dipper, pei tou 北斗) are arranged across the center of the disc. The stars are shown as large dots connected by lines, a method of drawing constellations which became standard in Chinese astronomy no later than the second century B.C.¹ In later textual sources this is known as the heaven plate (t'ien p'an 天盤). The heaven plate is mounted on a larger square board, the earth plate (ti p'an 地盤).² The earth plate is marked with the Stem and Branch symbols for the compass directions and sometimes with additional trigrams at the corners of the board. These are enumerated in a clockwise direction around the four sides of the square. The lunar mansions ring the outer edge of the earth plate, in a counterclockwise sequence as on the heaven plate, and are distributed along the four sides in conformity with the Chinese astronomical theories associating the lunar mansions with the four cardinal directions.³ A pin attaching the heaven plate to the earth plate runs through the center of both pieces, making it possible to rotate

the heaven plate to various positions on the earth plate. Because the board is so obviously a mechanistic model of the cosmos itself, I have decided to render the word shih as cosmic board.

In volume IV.1 of Science and Civilization in China, Joseph Needham has devoted considerable attention to the ancient cosmic board, in particular to its ancestral role in the historical evolution of the magnetic compass in China. Following the hypothesis first put forward by Wang Chen-to, Needham argues that the representation of the Big Dipper on the heaven plate inspired the first true compass – a Latter Han device, alluded to in the Lun Heng, in which a ladle carved from naturally magnetic lodestone (a facsimile of the celestial Dipper) was mounted on a pin in the center of a board inscribed with compass directions. When spun, the handle of the ladle would come to rest facing towards the south.⁴

As Needham himself indicates, the stars in the handle of the Big Dipper functioned as a celestial pointer in ancient Chinese astronomical observations.⁵ Hence its prominent position on the cosmic board. And in his analysis of the cosmic board, Needham emphasizes the technological significance of the Big Dipper on the heaven plate. He states that the Big Dipper "may be unhesitatingly denominated the most ancient of all pointer-readings, and in its transference to the heaven plate of the diviner's board [shih], we are witnessing the first step on the road to all dials and self-registering meters."⁶

At the time when Needham wrote on the cosmic board the only example of the device in Han times was a reconstruction based on fragments excavated from Latter Han tombs in Korea.⁷ A cosmic board from the Six Dynasties period had also been found but the Big Dipper is not represented on its heaven plate.⁸ However in the last decade archeologists in China have discovered at least three Han cosmic boards in near-perfect condition. In March of 1972 a cosmic board made of lacquer was discovered in a tomb in Kansu which archeologists date to the Wang Mang interregnum.⁹ Another cosmic board, this one made of bronze, is presently on display in the Kansu Provincial Museum and is said to date to the Latter Han.¹⁰ The most ancient of the cosmic boards

was discovered in Anhui in the spring of 1977. Made of lacquer, it was excavated from the first of a pair of tombs which archeologists date to approximately 165 B.C.¹¹ This same burial also yielded another previously unknown astrological device with the Big Dipper engraved on it (see Fig. 2). From its construction it is clear that this latter object served as the prototype for the heaven plate of the cosmic board.¹²

With these new discoveries, the time is right for a review of the more technical aspects of the cosmic board. There have been certain errors of fact and interpretation regarding the construction of the cosmic board which can now be corrected. More importantly, the cosmological ideas which led to the development of the cosmic board need to be explored. This is especially true for the Big Dipper. This constellation plays a primordial role in Chinese cosmology and its appearance on the cosmic board is no mere technological innovation. By reconstructing the cosmological significance of the Big Dipper in Han times as well as the magical function of the Dipper on the cosmic board, we may perceive more clearly how a perception of the cosmos has been translated into a material object, an instrument for divination, and how, in turn, the cosmic board served as the basis for a wide range of beliefs and practices in ancient Chinese astrology and religion.

For men of Han times heaven radiated out from the axis formed by a linkage between the polestar and the Big Dipper. The term tou chi 斗極 (Dipper and Culmen), denoting the Big Dipper and the polestar, occurs first in the Huai Nan Tzu and from this locus classicus the compound became a standard term used to refer to the cosmic axis.¹³ It has been demonstrated that for observational purposes the north pole during the Han was placed near a small star known as Knot Star (niu hsing 紐星) or Pivot of Heaven (t'ien shu 天樞).¹⁴ However, the presiding stellar deity of the polar region was unquestionably the bright reddish star Kochab, located in the little Dipper. Titled Thearch (ti 帝) or Grand Monad (t'ai i 太一), this star lay at the world nexus according to Han cosmological belief.¹⁵

The astronomical treatise of the Huai Nan Tzu states that, "the Purple Palace [the domain of the Grand Monad], gripping the Dipper revolves to the left."¹⁶ In the Shih Chi, Ssu-ma Ch'ien likens the Dipper to the conveyance (or perhaps better, the agent) of the god of heaven whose residence is the polestar:

The Dipper is the Thearch's carriage. It revolves around the central point and majestically regulates the four realms. The distribution of Yin and Yang, the fixing of the Four Seasons, the coordination of the Five Phases, the progression of rotational measurements, and the determining of all celestial markers – all of these are linked to the Dipper.¹⁷

The polestar remains immobile at the center of heaven while its active agent, the Dipper, marks off the divisions of time and space as it rotates around the circumpolar region of the sky.¹⁸

Complete descriptions of the displacement of the Big Dipper's handle over the course of the year and its correlation with the cosmological and seasonal cycles enumerated by Ssu-ma Ch'ien are to be found at two places in the Huai Nan Tzu. The entirety of Huai Nan Tzu 5 is a cosmological exposition on the twelve months. Each month is determined primarily by the position of Far-Flight (chao yao 招搖), a bright star in Bootes which was treated as an extension of the handle of the Big Dipper,¹⁹ relative to the duodenary sequence of Earthly Branches. These twelve symbols denote the twelve chronograms (ch'en 辰) or stations (tz'u 次) of the sky occupied each year by Jupiter during its twelve year sidereal orbit; and the symbols are also applied to the twelve months of a single year. A textual gloss by Kao Yu identifies Far-Flight as the Dipper determinant (tou chien 斗建), i.e., the stellar pointer on the handle of the Dipper.²⁰

Huai Nan Tzu 3 is even more explicit in its description of the calendrical function of the Big Dipper. One passage describes the monthly rotation of the Dipper through the twelve chronograms:

The Thearch spread out the Four Pinions; and revolves across them by means of the Dipper. Each month it shifts by one chronogram and then returns again to its domicile. In the first month it points towards yin (ENE by N) and in the twelfth month it points towards ch'ou (ENE by E). It makes a complete rotation in a year; upon completion it commences again.²¹

This introductory passage is then followed by an extended account of the symbolic correlations between each Branch and the climatological conditions of the month associated with it.

Huai Nan Tzu 3 also describes the rotation of the Dipper around the twenty-four compass points, represented by the same sequence of Stems and Branches as is found on the earth plate of the cosmic board, according to the annual cycle of fifteen day periods known as ch'i 氣 ("vapors") – i.e. the twenty-four climatological permutations which occur over the course of the year.²²

The implicit bond between the polestar and the Big Dipper as well as the use of the Dipper's handle to mark off the divisions of the year were noted in most ancient civilizations. The cuneiform tablets from Sumer refer to the Big Dipper as the Mar-gidra ("long chariot"), which can be associated with the kingly chariots found in the royal cemeteries at Ur and Kish, and further they confirm its use in fixing the calendar.²³ In India, the venerated Rig-veda records that the Big Dipper is the chariot of Indra, whose celestial residence is the polestar.²⁴ A remarkable set of diagrams engraved on a fourth century B.C. Egyptian sarcophagus show the different positions of the Big Dipper (known as the "foreleg") over the twelve months of the year at dusk, midnight, and dawn.²⁵

Let us continue to examine the spatial arrangement of the cosmos around the polestar and the Big Dipper. The idea that the Big Dipper constitutes a

cosmic line suggests comparisons with other kinds of lines which are drawn across the dome of heaven in order to chart out its constant motions. Just such a comparison is provided in the Huai Nan Tzu:

From tzu (N) to wu (S) and from mao (E) to yu (W) are the Two Cords (erh sheng 斗) . . . When the sun is at the winter solstice then the Dipper falls directly on the Cord towards the north; the vapor of Yin culminates and the vapor of Yang sprouts. . . When the sun is at the summer solstice then the Dipper falls directly on the Cord towards the south; the vapor of Yang culminates and the vapor of Yin sprouts.²⁶

The Two Cords described in this passage are in fact the solstitial and equinoctial colures, the two great circles which intersect each other at right angles at the two poles – one passing through the solstitial points and the other through the equinoctial points on the ecliptic. The Dipper functions like a cosmic switch to unleash the cycles of Yin and Yang as heaven passes through the temporal junctures of the year.

The structural integrity of the Big Dipper is reinforced in a passage from the Tun Chia Ching 遁甲經 ("Scripture of the Occulted Chia"), a later divination text which has been partially preserved due to quotations from it which are found in the sixth century compendium on cosmological matters, the Wu Hsin Ta I 五行大義 ("Grand Meaning of the Five Phases")²⁷

Tzu and wu are the warp-thread (ching 斗) of heaven and earth. The first and seventh stars of the Dipper, God-of-the-Bowl (k'uei 魁) and Rigid (kang 剛), are also the warp-thread of the Dipper.²⁸

The correspondence between the solstitial colure (the "warp-thread" of heaven and earth) and the Big Dipper is a theme repeated in the cosmogonies of many ancient peoples. The Big Dipper was known to the Babylonians as the "bond of heaven" and they believed that heaven was suspended from it along the north-south axis formed by the solstitial colure.²⁹ The term for the solstitial colure in India was the "line of the Seven Sages", named after the eponymous sages who were stellified in the seven stars of the Big Dipper.³⁰

In Han times the concept of suspending the sky from the Big Dipper was expressed by analogy with the Mainstay (kang 綱) and Filaments (chi 紀). These terms are derived originally from the parts of a net: the Mainstay is the large horizontal cord running across the top of the net and the Filaments are the smaller strands which hang down from the Mainstay.³¹ When the Mainstay was stretched out, then the entire net would unfold without becoming tangled. It was a political homily of the time that the ruler "raises up the Mainstay" (chü kang 舉綱), meaning that he is the one man upon whom the entire populace depends for support.³² In the area of moral doctrine, the social relationships which bind people together are termed the Three Mainstays (san kang

三綱) and the Six Filaments (liu chi 六紀).³³ The calendrical treatise of the Han Shu extends the analogy of the Mainstay and Filaments to music and to heaven:

Kung 宮 is the center. It is situated at the central point and spreads to the Four Quarters. When it sounds, it brings [the other notes] to life and is the Mainstay of the Four Notes. . . The Four Notes are the Filaments of kung.³⁴ The Jade Transverse (yü heng 玉衡) and Handle Determinant (piao chien 杓建) is the Mainstay of heaven.³⁵

Jade Transverse may denote either the fifth star of the Dipper or all three of the stars which form the handle of the Big Dipper.³⁶ Together with Handle Determinant it forms a pleonastic expression denoting the Big Dipper in its capacity as the celestial pointer.

Placed in the context of cosmological theory, kung, the key-note in the five-fold division of sound, becomes the axial center which creates the four sounds surrounding it. Likewise, the Big Dipper is the cosmic nexus; it is the center of control and Mainstay for the stellar network of heaven, i.e. the Filaments. The spatial symbolism of the number Five which is stated explicitly in the Han Shu passage relating to the Five Notes above may also be applied to the Big Dipper and the ring of lunar mansions which surround it. Marcel Granet has already observed that dividing the twenty-eight lunar mansions into four groups of seven constellations each was modeled on the seven stars of the Big Dipper and the Chinese conception of a universe ordered on Five (north, south, east, west, and center).³⁷ Perceived in this way, each group of seven lunar mansions becomes a symbolic counterpart to the original Dipper located in the center.³⁸

Now let us move from the abstractness of this conceptual framework to its concrete manifestation on the newly discovered artifacts. As already mentioned above, the unidentified astrological device from the tomb in Anhui, for which I have adopted the name Dipper dial, served as the prototype for the heaven plate of the cosmic board (see Fig. 2). The Dipper dial consists of two discs, connected at the center by a pin, and can be rotated like the cosmic board. Inside a circle at the center of the top disc are arranged the seven stars of the Big Dipper. Counting back from the Dipper's bowl, the natural positions of the first, fourth, fifth, sixth, and seventh stars appear to have been adjusted to form a nearly straight line. It is hard to imagine a more clearcut demonstration of the Dipper's cosmic function as the Mainstay of heaven. Two lines are etched into the top disc which intersect at right angles through the fifth star, and the shorter line lies right alongside the line of Dipper stars. These lines are closely related to the idea of the Two Cords described in the Huai Nan Tzu. They confirm the textual evidence that the Big Dipper formed an axis which could serve to divide heaven into quadrants as it rotated. The names of the lunar mansions are arranged in counterclockwise order around the perimeter of the bottom disc. The lunar mansions are spaced variously along the perimeter and beneath each name is a number to indicate the

degrees occupied by that constellation along the equatorial ring.³⁹

Although the configuration of the Big Dipper has not been artificially straightened on the newly discovered cosmic boards, its position relative to the ring of lunar mansions surrounding it corresponds exactly to the Dipper dial. I might also point out that its placement also matches the description in the astronomical treatise of the Shih Chi.⁴⁰ However, the most remarkable aspect of the arrangement of the Big Dipper on these devices is the fact that all of them represent the Big Dipper as if it is being observed from the outer surface of the imaginary dome of the sky; that is, it appears as it would on the surface of a celestial globe.

This fact has not been understood in the past because of a serious error in the reconstruction of the cosmic board from the tomb of Wang Hsü at Lo Lang, Korea, made by the Japanese archeologists Harada and Tazawa in the 1930's. In the site report on the tomb complex, Harada and Tazawa provide photographs of the two fragments of a cosmic board which were discovered there and opposite these they have drawn a hypothetical reconstruction of the cosmic board.⁴¹ From looking at these photographs it is obvious that the fragment of the heaven plate was in very poor condition and that it would be difficult to determine the exact positions of the Dipper stars on it. In their reconstruction, connecting lines were drawn between the stars in such a way that the bowl of the Big Dipper was turned upside down: from the fifth star, a line was drawn to the third star, and the succeeding lines connect the third star to the fourth, the fourth star to the first, and the first star to the second (see Figs. 3 and 4).

It is surprising that this error in the astronomical accuracy of the reconstruction has not been pointed out earlier.⁴² Reference to a celestial globe or to the night sky shows quite clearly that the handle of the Big Dipper would have to curve in the opposite direction from that shown on the reconstructed cosmic board if the Dipper on the heaven plate was really meant to represent a ground view of the constellation. However, the seventh star is already alligned with the lunar mansion Horn on the reconstructed cosmic board and to reverse the curvature of the handle (thus matching the handle with the bowl of the Dipper as it appears on the reconstruction) would render the reconstructed cosmic board that much more inaccurate astronomically.

The adoption of a model of the sky as it appears from above the celestial dome is a significant astronomical innovation. By this arrangement both the Dipper dial and the cosmic board operate according to the same principles which apply to a modern celestial globe.⁴³ In addition to charting the positions of the constellations, a celestial globe also incorporates a temporal scale which allows the observer to note the exact position of the constellations at a specified hour on a specified day of the year. In a circle around the north pole on the surface of the globe the twelve months are arranged in a counterclockwise direction. An immobile "clock-face" is mounted above the north pole. The observer need only match the desired day with the hour of observation by turning the globe in a clockwise

direction in order to determine the configuration of the sky overhead.

The cosmic board incorporates precisely the same indicators for specifying the position of the handle of the Big Dipper at any given time. The twelve months are arranged counterclockwise to the inside of the ring of lunar mansions on the heaven plate. The twelve Branches, which may represent both directions in space and hours of the day in the Chinese system, are placed around the four sides of the earth plate. By rotating the heaven plate it is possible to align the months, hours, and directions; thus making it possible to determine the position of the handle of the Big Dipper at any time of the day and during any season of the year.⁴⁴

How might a practitioner of occult arts exploit this knowledge to his advantage? In chapter 128 of the Shih Chi, a group biography of certain diviners and famous examples of divination, it is recounted that Wei P'ing 衛平, an Erudit at the court of King Yüan of Sung 宋元玉 (r. 531-517 B.C.), used a cosmic board in order to interpret the significance of a dream in which the king was visited by a divine tortoise in disguise. Having adjusted his cosmic board to reflect the true configuration of the cosmos at the time of the king's dream, Wei P'ing then proceeded to identify the deity who had appeared before the king and to reveal the nature of his spiritual business.⁴⁵

A darker side to the exploitation of the Big Dipper begins to surface when we read in the Huai Nan Tzu that, "what is attacked by the Northern Dipper cannot withstand it."⁴⁶ The Dipper, not merely a passive marker of celestial time, has here been transformed into an awesome weapon, striking deathblows to whatever lies in its path. In the bibliographic catalogue of the Han Shu we find confirmation that the Dipper's ominous power was tapped by the so-called Yin-Yang Militarists. According to Pan Ku, these men:

Act in compliance with the seasons, calculate Punishment and Virtue,⁴⁷ follow the strike of the Dipper, rely upon the Five Conquerors,⁴⁸ and derive assistance from the ghosts and spirits.⁴⁹

We may be certain that the cosmic board figured prominently among the paraphernalia of such military strategists.

However, nowhere is the talismanic value of the Big Dipper and the magical application of the cosmic board more apparent than in the brief but eventful interregnum of Wang Mang. In 17 A.D. Wang Mang ordered a set of five Majestic Dippers (wei tou 威斗) cast. According to the Han Shu:

Resembling the Northern Dipper, they were two feet five inches long. Wang Mang wished to use them to repress and quell all manner of armed attack.⁵⁰

The monarchs of the Former Han had used a gold-plated staff, called the chin wu 金梧, to ward off any evils that lay in their path. For Wang Mang, nothing less than the full cosmic potency of the

Dipper would suffice.

During the final desperate hours of his life Wang Mang once again attempted to overcome his enemies with the power of the Big Dipper. After the Han led rebel troops into Ch'ang An and trapped Wang Mang inside his palace compound in the autumn of 23 A.D., Wang retreated into the Hall of Promulgation:

At that time Mang was dressed entirely in dark purple robes. The imperial seal and thong hung from his waist and he held the spoon-hilted dagger of the Yü God. The Specialist in the Patterns of Heaven laid down a cosmic board before him. For the day and hour he made the appropriate adjustments. Mang rotated his mat and sat in alignment with the handle of the Dipper, saying, "Heaven created Virtue in me; the Han troops - what can they do to me?"⁵¹

By facing in the direction which the cosmic board had determined to be the position of the handle of the Big Dipper, Wang Mang hoped to draw down the divine assistance of the Dipper to drive back his enemies.⁵²

In the present study I have attempted to sketch out a bare outline of the cosmological role of the Big Dipper and of its exploitation in the esoteric arts associated with the cosmic board. I have skipped over many essential details regarding the arrangement of the cosmic board, its relation to other divination instruments of similar construction,⁵³ and the complex numerological operations used in conjunction with it.⁵⁴ These are all topics which I intend to treat more fully in the near future. However, as I have already suggested above, the model provided by the cosmic board can be seen to have inspired the development of certain beliefs and practices in Chinese religion. In concluding, I would like to discuss briefly one religious motif which becomes especially prominent in Taoism of the Six Dynasties period, and which I think evolved from the Han beliefs and practices relating to the cosmic board. It is the apotropaic power of the Big Dipper.

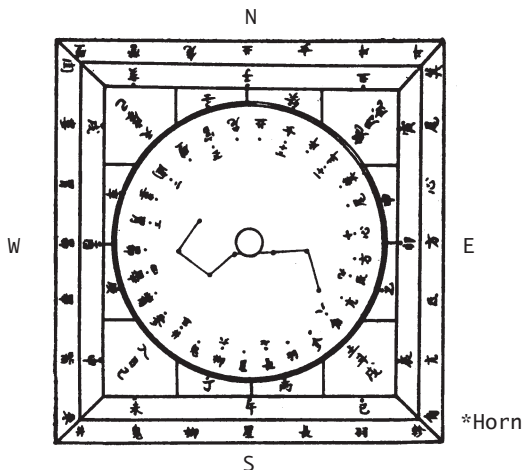


Fig. 1: Cosmic Board, ca. 165 B.C. (line drawing from K'ao Ku 1978:5)

In the Pao P'u Tzu and in the gleanings of the original Shang Ch'ing 上清 (Supreme Clarity) revelations preserved by T'ao Hung-ching 陶弘景 in the Chen Kao 真誥 ("Declarations of the Perfected") we find descriptions of a meditation during which the practitioner is to visualize the stars of the Big Dipper with the handle pointing towards the source of the evil power to be destroyed.⁵⁵ Intimately related to this meditation in the Shang Ch'ing literature is a shamanistic dance known as "Pacing the Mainstay"

(pu kang 步綱), i.e. performing a tantric onestep along the Big Dipper.⁵⁶ Pacing the Mainstay is performed both to drive off demonic forces and to summon the spirits of heaven at the time of meditation. In the Shang Ch'ing literature this Dipper walk has already been assimilated with the older Pace of Yü, the original shaman's dance which has its origins in Chou myths. However I have been able to trace a separate exorcistic dance related to the Big Dipper back into the Han period. In the Han Shu biography of Hsi-fu Kung 息夫躬 there is a description of a method for an incantation against thievery (chu tao fang 祝盜方).⁵⁷ Hsi-fu laid out a pattern of the Big Dipper using mulberry branches and then intoned incantations while making wild motions with his hands and feet. Somewhat later in the fourth century work Sou Shen Chi there are two references to "Pacing the Kang [star]" (pu kang 步罡) in conjunction with the performance of exorcisms.⁵⁸ Kang is one of the many esoteric names for the seventh star of the Big Dipper.

I believe that we may trace the origin of these Dipper related practices to the cosmic board and the esoteric arts associated with it during the Han. Certainly the interpretation of the Big Dipper as a cosmic weapon which could be aimed by means of the cosmic board prefigures the exorcistic meditations found in the Pao P'u Tzu and Chen Kao. And the spatial symbolism of the cosmic board provides a natural mandala upon which to lay out a cosmic walk along the Mainstay of heaven.⁵⁹

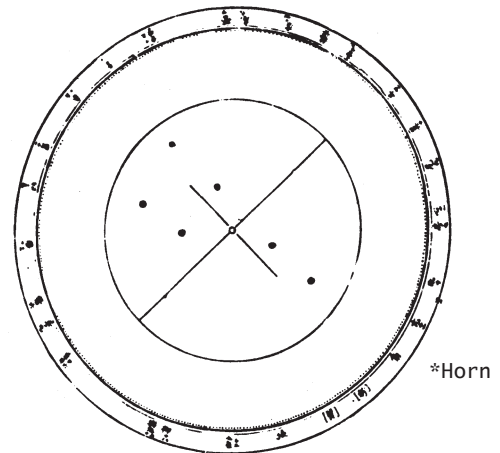


Fig. 2: Dipper Dial, ca. 165 B.C. (line drawing from K'ao Ku 1978:5)

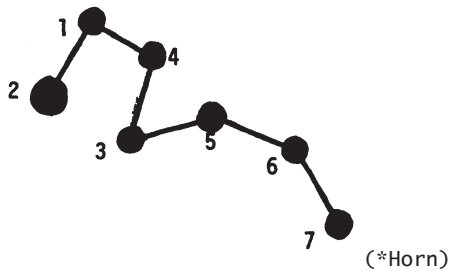


Fig. 3: The Big Dipper on the heaven plate reconstructed by Harada and Tazawa

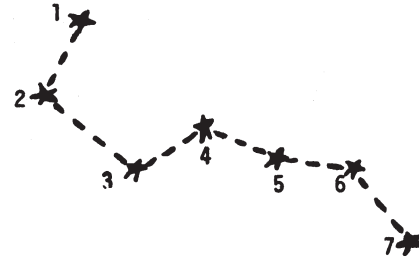


Fig. 4: The Big Dipper as seen on a modern celestial globe

FOOTNOTES

1. J. Needham, *Science and Civilization in China*, v. III, p. 276, states that this method of representing constellations may be as early as the third century B.C. The oldest example of the "dot and line" method is found on the newly discovered *shih* from the Han tomb in Anhui, dated ca. 165 B.C. See below, footnote 11 and Fig. 1.

2. The terms *t'ien p'an* and *ti p'an* do not occur in extant Han texts. *Ssu-ma Cheng* (second half of the seventh century) describes the *shih* as consisting of an upper disc symbolizing heaven and a lower square symbolizing earth in his commentary to the *Shih Chi*. See *Shih Chi* (Palace edition) 127.4a. The terms *t'ien p'an* and *ti p'an* are found in various divination texts from T'ang times on.

3. Cf. the discussion of the Chinese lunar mansions in Needham, v. III, and especially the table of the lunar mansions beginning on p. 234.

4. Needham, v. IV.1, pp. 261-273 and 314-334. The *Lun Heng* refers only to a "south-pointing ladle" which can be made to point towards the south. See *Lun Heng*, (Chu Tzu Chi Ch'eng edition), p. 173. Although its existence appears to be confirmed by drawings on Han vessels, no actual specimen of such a magnetic compass has been discovered to date. In the absence of more concrete evidence for a magnetized ladle compass-board as reconstructed by Wang and Needham, the evolution from cosmic board to ladle compass and from ladle compass to more sophisticated forms of the magnetic compass posited by these scholars must remain speculative. From my own research I believe that Needham neglects the continued importance of the cosmic board well beyond the end of the Han and into the Six Dynasties period. It is probable that the earliest forms of geomancy were practiced with a cosmic board, or some other similarly constructed device, and not with the hypothetical ladle compass. See below, footnote 53. Perhaps the "south-pointing ladle" in the *Lun Heng* represents an early attempt to produce a compass device which proved to be impracticable for use in divination or geomancy.

5. Needham, v. IV.1, p. 265. This use of the handle of the Big Dipper in ancient Chinese astronomy differs from the more recent practice of sighting along the first two stars in the bowl of the Big Dipper to find the polestar.

6. Needham, v. IV.1, p. 266.

7. See the discussion in Needham, v. IV.1, pp. 263-264. Fragments of both a heaven plate and an earth plate were found in the tomb of Wang Hsü at Lo Lang, Korea. A reconstruction of the cosmic board based on these fragments was made by Harada Yoshito 原田淑人 and Tazawa Kingo 田澤金吾 in their report on the excavation of the tomb. See Harada and Tazawa, *Rakurō Gokan-en Ō Ku no Fumbo*, 樂浪五官掾王眴の墳墓 (Tokyo, 1930), Pl. cxii. It is reproduced as Fig. 326 in Needham, v. IV.1. Fragments of a heaven plate were discovered in the so-called "Painted Basket" tomb, also at Lo Lang, Korea. Needham, v. IV.1, Figs. 327 and 328 show these fragments.

8. This cosmic board, made of bronze, has been thoroughly described by Yen Tun-chieh 嚴敦傑, "Pa liu jen shih p'an" 跋六壬式盤, *Wen Wu Ts'an K'ao Tzu Liao* 1958:7, 20-23.

9. See the site report published by the Kansu Provincial Museum in *Wen Wu* 1972:12, 9-21.

10. This cosmic board has not yet been described in any Chinese publications. Its existence was reported to me by Jeffrey Riegel, a member of the Han Studies Delegation which toured China during October and November of 1978.

11. The initial site report for this excavation appears in *Wen Wu* 1978:8, 12-31. Archeologists have determined that the occupant of the tomb in which the cosmic board and several other divination devices were found was the second Marksman

of Ju Yin 汝陰侯, known to have died in the fifteenth year of Thearch Wen (165 B.C.). Two subsequent articles on the divination instruments from this tomb have appeared in *K'ao Ku*. See Yen Tun-chieh, "Kuan yü Hsi Han ch'u ch'i

te shih p'an ho chan p'an" 關於西漢初期的式盤和占盤, *K'ao Ku* 1978:5, 334-337 and Yin T'iao-fei 殷滌非, "Hsi Han Ju Yin Hou mu ch'u t'u te chan p'an ho t'ien wen i ch'i" 西漢汝陰侯墓出土的占盤和天文儀器, *K'ao Ku* 1978:5, 338-343.

12. This device will be described in more detail below. It is worth noting that the line drawings of it which appear in Wen Wu 1978:8 and K'ao Ku 1978:5 are not the same. Hopefully a future article will clear up the discrepancies between the two drawings.
13. See Huai Nan Tzu (Chu Tzu Chi Ch'eng edition) 11, p. 173. The Erh Ya (Shih San Ching Chu Shu edition) 7.8b, places the Dipper and Culmen directly over the cosmic mountain. In his "Ch'ang Yang Fu" 長楊賦, Wen Hsüan (Ssu Pu Ts'ung K'an edition) 9.4a, Yang Hsiung praises the founding monarch of the Han by stating that he "upheld the Mandate and accorded with the Dipper and Culmen." This same theme of identification between the ruler and the cosmic axis is repeated frequently in the Prophecies and Weft Texts (ch'an wei 讖緯) of the Han period.
14. See Needham, v. III, p. 261 and E.H. Schafer, Pacing the Void (Berkeley, 1977), p. 44. For the most part I have used the translations of Chinese star names adopted by Schafer.
15. See the superb discussion of the polar deities in Schafer, pp. 44-48.
16. Huai Nan Tzu 3, p. 39.
17. Shih Chi 27.3b.
18. The idea that the Big Dipper is the agent for an immobile polar deity is developed extensively in the Weft Texts. Schafer, p. 45, cites a passage from the Ch'un Ch'iu Wei Yüan Ming Pao 春秋緯元命苞 which states that the Grand Monad stores up primal vapor (yüan ch'i 元氣), the most basic of life forms, which it disperses by means of the Big Dipper. Another fragment from this now lost text states: "The Great Thearch in the Purple Palace neither speaks nor stirs. He causes the Dipper to revolve around the degrees [of the celestial equator] and disseminate the germinal essences. . ."
- See Ma Kuo-han 馬國翰, Yu Han Shan Fang Chi I Shu 玉函山房輯佚書 (Wen Hai Ch'u Pan She photocopy), p. 2132.
19. Cf. Needham, v. III, p. 250 and Schafer, p. 52.
20. Huai Nan Tzu 5, p. 69. The Big Dipper in its capacity as a celestial pointer is also termed yüeh chien 月建 a ("month determinant") in the Huai Nan Tzu because it pointed to the twelve Jupiter stations in succession during the twelve months of the year. See Huai Nan Tzu 3, p. 42.
21. Huai Nan Tzu 3, p. 45.
22. Huai Nan Tzu 3, p. 41.
23. See R. Brown, Researches into the Origin of the Primitive Constellations of the Greeks, Phoenicians and Babylonians (London, 1899), v. I, pp. 266-267 and E. Burrows, "The Constellation of the Wagon and Recent Archaeology," Miscellanea Orientalia Dedicata Antonio Deimel (Rome, 1935). 34-40.
24. See K. Mukherji, Popular Hindu Astronomy, p. 164.
25. These diagrams are described in O. Neugebauer and R.A. Parker, Egyptian Astronomical Texts, v. II (London, 1964), pp. 49-51.
26. Huai Nan Tzu 3, pp. 39-40.
27. The Wu Hsing Ta I, compiled by Hsiao Chi 蕭吉 of the Sui, was lost in China but had been preserved in Japan. Hayashi Jussai 林述齋 included the text in his collection of books still preserved in Japan which had already been lost in China, the I Ts'un Ts'ung Shu 佚存叢書 (first published in 1799). The Wu Hsing Ta I is a major source for the study of ancient cosmological theory and quotes from many early writings on astrology and divination which are no longer extant.
28. Wu Hsing Ta I (I Ts'un Ts'ung Shu edition) 4.15a.
29. See G. de Santillana and H. von Dechend, Hamlet's Mill (Boston, 1977), p. 301.
30. De Santillana and von Dechend, p. 301.
31. The locus classicus for the term kang chi is in the Shih Ching (Shih San Ching Chu Shu edition). "Yü P'u" 棧樸, 16C.5a (Mao 238).
32. The line in the Shih Ching already uses kang chi as an analogy for governing the people: "Zealously our king [sets] the Mainstay and Filaments across the Four Quarters." The same analogy can be found in the Hsün Tzu and other writings of the pre-Han period. Among Han writers, Yang Hsiung made use of the analogy in Fa Yen (Chu Tzu Chi Ch'eng edition) 9, p. 26, where he states that good government depends upon the ruler's control of the Mainstay and Filaments. And, he states that in high antiquity Yao was successful because he "raised up the Mainstay."
33. "San Kang Liu Chi" is the title of ch. 29 of the Po Hu T'ung. See T.T. Som, Po Hu T'ung (Leiden, 1952), v. II, pp. 559-564. Som chooses to translate kang as "major relationship" and chi as "minor relationship", thus obscuring the significance of the analogy.
34. Han Shu (Wang Hsien-ch'ien Pu Chu edition) 21A.3b.
35. Han Shu 21A.13b.
36. For a table of two series of names for the individual stars of the Big Dipper see Schafer, p. 51.
37. M. Granet, La Pensée Chinoise (Paris, 1934), p. 282.
38. The Han Shu passage clearly suggests that heaven is covered by net-like strands which arch down from the Big Dipper, the Mainstay, towards the lunar mansions along the celestial equator. Other cosmological theories describe the structure of the kang and the chi in the sky differently. See Schafer, pp. 241-242, for a description of the kang and chi as developed in certain of the Taoist scriptures.
39. The antiquity of the Dipper dial is borne out by the fact that the degree measurements are not those adopted in Huai Nan Tzu 3 or in the calendrical

treatise of the Han Shu (cf. Needham, v. III, Table 24) but rather correspond almost perfectly with those found in the Hsing Ching 星經, the fragmentary astronomical writings of Kan Te 甘德 and Shih Shen 石甲 (fourth century B.C.). The relevant passages of the Hsing Ching have been preserved in quotations in the K'ai Yüan Chan Ching 開元占經, compiled by Gautama Siddhartha during the K'ai Yüan reign period (713-741). See K'ai Yüan Chan Ching ch. 60-63.

40. On the Dipper dial and the cosmic board the seventh star is pointing directly towards Horn (chiao 角); one of the lines passing through the fifth star on the Dipper dial points towards Dipper (tou 斗, i.e. the Southern Dipper); and the bottom of the bowl of the Dipper on both instruments is positioned above Triaster (shen 參). Shih Chi 27, 3a states: "The Handle jostles the Dragon Horn, the Transverse [Jade Transverse, the fifth star] is aligned with the Southern Dipper, and the Bowl is cushioned against the head of Triaster."

41. See Harada and Tazawa, Pl. cxii.

42. Needham, v. IV.1, p. 264, already observed that the Big Dipper on the fragment of a heaven plate from the "Painted Basket" tomb is reversed: "Curiously, the drawing of the Great Bear is inverted, as if a mirror image, or as if seen from 'outside the world' . . . It would be interesting to know whether the inversion was a general practice among the Han makers of shih, and if so, why they adopted it." In fact, it is the reconstruction based on the fragments from the tomb of Wang Hsü which is in error. As the archeological evidence now demonstrates, it was the standard practice to construct the cosmic board on the model of the sky as viewed from the outside.

43. In fact, both instruments represent perhaps the earliest stages in the development of the celestial globe in China. Needham, v. III, pp. 382-389, traces the development of the true solid celestial globe via a kind of "demonstrational armillary sphere" (hun hsiang 渾象) which was first devised by Chang Heng ca. 125 A.D. for computational purposes at the same time as he developed his sophisticated "observational armillary sphere" (hun i 渾儀). Sometime early in the third century a model of the earth supported on a pin was placed at the center of the nest of rings and the testimony of Wang Fan ca. 250 indicates that by then the armillary sphere was set into a box-like casing which symbolized the earth. This form of demonstrational armillary sphere persisted down through the T'ang and into the Sung period. Li Ch'un-feng's treatise on astronomy in the Sui Shu also describes a kind of celestial globe from the mid-sixth century which consisted of a round ball marked with star positions and which, significantly, was surrounded by an external horizontal ring representing the earth (cf. Needham, v. III, p. 384). Surely the cosmic board provided the technological precedent for positioning a model of the sky inside an outer incasement which itself provided the ground orientations necessary for charting the rotation of the heavens.

44. It is possible even without a working model of the cosmic board to show how the cosmic board could have been used as a demonstrational model of the heavens in Han calendrical computations. As has already been discussed, the handle of the Dipper points towards a different section of the sky during each month of the year. In order to determine the degree of the displacement of the Dipper's handle, the constellation must be observed at the same time every day. According to Shih Chi 27.3b, the position of the handle is always to be observed at dusk, i.e. during the hour designated yu (5-7 P.M.). As an example, let us calculate the position of the Dipper's handle at the summer solstice. Following the data given in Huai Nan Tzu 3, the handle should point towards wu (S) at the time of the summer solstice in the fifth lunar month. If we look at Fig. 1, it can be seen that the fifth month is placed above the lunar mansion Well (ching 井) on the heaven plate. By counting along the lunar mansions in a clockwise direction, the fifth from Well is Mane (mao 昴) which is aligned with yu (i.e. the time of dusk) on the earth plate. Therefore, in order to determine the position of the handle of the Dipper at the hour yu during the fifth month, we must count forward for a distance of five lunar mansions. In Fig. 1 the handle of the Dipper is pointing towards Horn. The fifth lunar mansion from Horn is Star (hsing 星), which is aligned with wu (S) on the earth plate. Thus, the cosmic board is a working model of the calendrical theory described in the Huai Nan Tzu. Of course while variables such as the precession of the equinoxes would render the fixed system of the Huai Nan Tzu inaccurate over time, the fact remains that the cosmic board is still an accurately constructed model of the rotation of the Dipper.

45. Shih Chi 128.6a-88.

46. Huai Nan Tzu 3, p. 51.

47. The idea that the year was divided into times of Punishment (hsing 刑) and times of Virtue (te 德) evolved out of the cosmological theories of the late Warring States period. Associated with the Yin and Yang cycles, it was sometimes stated that the motions of the moon and the sun determined the cycles of Punishment and Virtue respectively; and it was also believed that the Big Dipper was an indicator of cosmic Punishment and Virtue. Both ideas are explained in detail in Huai Nan Tzu 3.

48. i.e. the Five Phases.

49. Han Shu 30.62b-63a.

50. Han Shu 99C.2b.

51. Han Shu 99C.27a.

52. Needham, v. IV.1, pp. 271-272, has created a minor controversy by attempting to show that Wang Heng resorted to the cosmic board in order to determine the proper southward orientation, i.e. that he used it as one might have used the hypothetical ladle compass. The simple fact that the architecture of royal audience halls would already have predetermined the requisite cosmic orientations, for the Chinese ruler always occupied a northern position

facing towards the south, argues against the need for a cosmic board to point out the south. Ultimately, however, the final refutation of Needham's interpretation lies in a better understanding of the cosmic board itself. The cosmic board is not a compass. To suggest, as Needham does, that the handle of the Dipper mentioned in the Han Shu passage, "was not the constellation but either its image engraved on the shih's 'heaven plate' or indeed its lodestone model" (p. 272), is to ignore the fundamental distinction between a demonstrational model of the heavens and a primitive compass. Further, there is not a single bit of evidence, from either written records or recent archeological discoveries, to suggest that the object named shih could ever substitute a lodestone ladle for the Big Dipper engraved on its heaven plate; and none of the later texts on divination with the cosmic board ever describe its use as a kind of simple compass. The function of the cosmic board was to reduce the cosmos into a mechanistic model which could duplicate exactly its macrocosmic counterpart. With such a device it would no longer be necessary to look at the sky in order to determine where the Dipper lay; and its position could be calculated even in daylight or at other times when actual observation of the constellation was not possible.

53. In addition to the Dipper dial and cosmic board discovered in the Anhui tomb, there was a third object which also consists of a rotating disc mounted on a square board. For references, see above, note 11. Chinese researchers have found that the symbolic arrangement of the instrument corresponds to a divination system called "Nine Palaces of the Grand Monad" (t'ai i chiu kung 太一九宮) described in the Huang Ti Nei Ching and in sections of the Wu Hsing Ta I. All of these new discoveries add to our know edge of the way in which cosmological models were incorporated into physical objects intended for divination, computation, or perhaps gaming. Both the liu po 六博 game board and mirrors with the TLV design show a similar, although less elaborate, symbolic reduction of heaven and earth. There is a book in the Han Shu bibliographic catalogue titled "Golden Casket of the Canopy [of heaven] and Chassis [of earth]" (K'an Yü Chin Kuei 堪輿金匱) of which only a few fragmentary quotations survive (see Han Shu 30.70a and the Pu Chu commentary). The book is known to have expounded on the art of geomancy and the term "Specialist of the Canopy and Chassis", first seen in Shih Chi 127.7a, was the traditional name for a geomancer. A passage in Huai Nan Tzu 3, p. 51, states: "On the Canopy and Chassis the masculine is slowly moved, thereby perceiving the feminine" (graph yin 音) has been deleted on the basis of a version of this passage quoted in the commentary at Wen Hsüan 7.2b). My own interpretation of this passage is that the Canopy and Chassis refer not only to heaven and earth but also to the disc and square board of an instrument similar in construction to the cosmic board. To "move the masculine" would then refer to rotating the disc until the proper alignment was made with the square board (the feminine). Thus I would argue that the geomancers of the Han period made their esoteric computations with a device of the same general type as the cosmic board, if not with the cosmic board

itself. Few, if any, of the extant texts on geomancy can be dated with certainty to before the Sung period and the descriptions of performing geomantic operations with a magnetic compass found in many of them is a rather late development in the art.

54. There are two books on the use of the cosmic board listed in the Han Shu bibliographic catalogue, Han Shu 30.72a. No trace of them survives and the earliest method of performing divination with the cosmic board for which we have clear descriptions is known as the Six Jen 六壬 method. Wu Hsing Ta I 5.2a-4a contains a long quotation from the "Six Jen Cosmic Board Scripture" (Liu Jen Shih Ching 六壬拭經). According to the Sui Shu bibliographic catalogue, Sui Shu (Palace edition) 34.23b, a book by this name in six chüan existed in the imperial library of the Liang but had already been lost. The Radiant Blessing Six Jen Spirit Fixing Scripture (Ching Yu Liu Jen Shen Ting Ching 景祐六壬神定經), compiled by Yang Wei-te 楊維德 during the Ching Yu Reign period (1034-1037), provides a complete description of divination using the cosmic board based in large part on quotations from older writings. Yen Tun-chieh, "Pa liu jen shih p'an," provides a simplified mathematical analysis of the numerological procedures involved in Six Jen divination.

55. Pao P'u Tzu (Chu Tzu Chi Ch'eng edition) 18, p. 93, instructs the Taoist adept to meditate on the star "Sustainer" (fu 輔) in the Big Dipper when he senses that some demonic force has attacked. Sustainer is one of the two secret stars belonging to the Big Dipper and is usually identified with the tiny star attached to the sixth star of the Big Dipper. See Schafer, p. 51 and 67. The Chen Kao contains many of the spiritual instructions revealed to Yang Hsi 楊羲 by a host of celestial divinities during the years 364-370. These together with the divinely revealed scriptures transcribed by Yang Hsi formed the scriptural fount of the Shang Ching sect of Taoism. At Chen Kao (Harvard-Yenching Tao Tsang Concordance no. 1010) 5.13b a method for overcoming a demon attack is described as follows: "If you know that it is a demon test then meditate on the Seven Stars before your face or above your head and thereby expel it." The same method is repeated in T'ao Hung-ching's more esoteric collection of the instructions of the Shang Ch'ing deities, the Secret Instructions for Ascending to Perfection (Teng Chen Yin Chüeh 登真隱訣. At Teng Chen Yin Chüeh (Harvard-Yenching Concordance no. 421) 2.14b, the same line quoted above is followed by T'ao's own commentary: "Still meditating on the Guardian of the Inch [one of the chambers occupied by spirits in the head of a Taoist adept], the Seven Stars will come forth and cover the head with the handle pointing out in front to strike at it."

56. Shang Ch'ing meditation, including various forms of meditation centered on the Big Dipper, has been studied exhaustively in two recent publications by Isabelle Robinet. See I. Robinet, "Randonnées extatiques des taoïstes dans les astres," Monumenta Serica XXXII (1976), 159-273 and also her Meditation

Taoïste (Paris. 1979). Pacing the Mainstay is also described in Schafer, pp. 238-242.

57. Han Shu 45.18a.

58. Sou Shen Chi (Han Wei Ts'ung Shu, edition of Ho Yün-chung 何允中) 6.2a and 7.1a.

59. Meditation on the divine numina of the Dipper stars was not the only way to dispel noxious apparitions or to draw down the celestial deities. The use of various talismans, among them magic mirrors,

was also very important. In this volume of Early China E.H. Schafer describes a recently excavated T'ang Taoist mirror, drawings of which are also found in the Tao Tsang. In addition to representing various Taoist deities, the mirror shows the Big Dipper and the lunar mansions exactly as they are found on the heaven plate of the cosmic board. The similarity between heaven plate and Taoist mirror is not coincidental and we may quite confidently conclude that the heaven plate served as the prototype for the mirror; and further that the magical potency of the mirror derives in large part from its association with the Big Dipper.

