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The Squareness of the Earth

The Chessboards of India and Iran

Scholars have been fighting over the origin of chess ever since Captain Hiram Cox presented his version of what has come to be known as the Cox-Forbes theory in the *Asiatic Researches* for 1799.[1] The theory is currently held in disrepute, although the opposition has presented no viable alternative. Fortunately, since we are concerned here with the Tarot deck rather than chess, we may safely avoid the entire dispute until later when we will note a development of the Cox-Forbes theory due to Stewart Culin of the University of Pennsylvania Museum. Both Cox and later Forbes[2] derive this two-handed game from a four-handed variety known variously as *chaturanga, chaturaji,* dice chess or four kings.[3] The latter refers to the fact that this form of "proto-chess" was played with four kings, four elephants (bishops), four knights and four ships (rooks).[4] Figure 1 shows the layout of the pieces on the board. What are we to make of these four kings and their armies eternally fighting their little war on the chessboards of ancient India and Iran?

The first step toward an answer lies in the work of Giorgio de Santillana and Hertha von Dechend. *Hamlet's Mill* is the kind of book you have to read three or four times before you begin to realize what the authors are talking about. This is true even if you already know the difference between a quern and a mill. In a way it is similar to the *Anacalypsis;* the slant is that the roots of mythology are astrological; not a new idea. If there is a twist it is the introduction of the precession of the equinoxes into the stew. The authors make a point of warning the reader against any attempt at a visual reconstruction of the ancient astrological system. It never occurs to them that such a representation may actually have survived, encrypted but intact.

After relating the character Hamlet to Amlethus of the *Gesta*

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K = King, **E** = Elephant, **H** = Horseman, **S** = Ship, ■ = Pawn

Figure 1: The Arrangement of the Pieces in *Chaturanga* (after Bell)

Danorum of Saxo Grammaticus, the Roman Lucius Junius Brutus, Kullervo of the Finnish *Kalevala,* Kai Khusrau of Firdausi's Persian *Shahnama* and Yudhishthira of the *Mahabharata,* the authors deal with the meaning of Hamlet's mill, or Amlodhi's quern, and its multicolored cover, which they identify with the rotating heavens. After a far from transparent discussion of "shamans and smiths" during which Samson is added to the list of Hamlet's alter egos, they return to Amlodhi, this time in connection with the precession of the equinoxes. The precession is one of the effects of a slow gyroscopic wobble of the earth's axis over a period that the ancients took to be $25,920$ ($= 12 \times 2160 = 60 \times 432$) years, though the actual astronomical value is slightly less, during which the vernal equinox and other points of the tropical year gradually migrate through the signs of the zodiac. Other effects of this lack of stability are displacements of the celestial equator and poles requiring the choosing of a new pole star at regular intervals. The authors then trip over semantics and fall headlong into the moat that surrounds Castle Gnostica.

For it is a fact that the gods are stars and notice is duly taken of Aristotle's affirmation thereof[5] by our errant authors now paddling about furiously trying to outswim the crocodiles. The trick is that the planets were thought of as wandering stars and when names like Saturn, Jupiter and Mars are encountered there is the overwhelming urge to leap at conclusions that plunge the jumper into parts of the maze better avoided. They cannot for the life of them figure out what Saturn has to do with the north pole. We can only point out that this Saturn is the one connected with the Saturnalia or winter solstice celebration and must therefore be a fixed star and not a planet at all; more on this later when we identify the four kings. For the moment it is sufficient to remember that though the gods may sometimes be stars or planets, they are never exclusively so and at any given time may be any manner of things. They are, after all, gods.

In order not to further abuse a metaphor we will throw our authors a line and haul them out of the drink just long enough to get to the point of this discussion, which is where we might begin to look for the four kings of proto-chess. The chapter is an analysis of "the twilight of the gods" or Ragnarok as described in the Voluspa, a poem from the Scandinavian *Eddas,* and Snorri's *Gylfaginning.* The gods or Aesir are sitting around playing with golden checkers, which in itself is interesting, when all hell breaks loose. The details of this battle may be studied elsewhere. What concerns us here is the answer given by the Aesir when asked a question by King Gylfi about the state of the world after the great battle.

It seems that some of the gods will survive. When they are sitting around again practicing their runes they will find the golden checkers lying in the grass.[6] De Santillana and von Dechend relate this event to the portrayal of the gods in the Indian *Rigveda* as moving like *ayas* or throws of the dice and cite the fact that the term for world-ages (*yugas*) comes from dicing. It is then claimed, on the authority of A.G. van Hamel, that in *tafl,* the game referred to above as "checkers," the particular piece moved was determined by the throw of the dice. This is the very rule that led to the description of *chaturanga* as "dice chess." We are then treated to the fascinating fact that chess was known by the Indians as "planetary battles" and was referred to in Europe during the 16th century as "Celestial War, or Astrologer's Game." This would seem to be the clue we were looking for. The four kings must be sought among the stars. We will return at intervals to the matter of Hamlet's mill in search of further clues.

Wheels Within Wheels

When the commentaries have been stripped away, what remains of *The Secret Doctrine*[7] are *Two Books of the Stanzas of Dzyan.*[8] *Dzyan* is a Tibetan variant of the Sanscrit word *dhyana,* which refers to a state of detachment or liberation sometimes associated with the practice of yoga[9] and eventually reaches as far as Japan as the word "zen." Ignoring Madame Blavatsky's interpretations, which are for the most part rather obtuse, there is a remarkable resemblance between the cosmology of *The Stanzas of Dzyan* and that ascribed to the Greek philosopher Anaximander of Miletus (c.611/612–c.547/546 B.C.). Of particular interest is a short fragment extracted by Sir Thomas Heath from what remains of classical Greek literature.

"The stars are compressed portions of air, in the shape of wheels, filled with fire, and they emit flames at some point from small openings."[10]

These wheels "filled with fire" relate to *The Book of Dzyan* where the fiery whirlwind or primordial light, *Fohat* or Eros, builds a winged wheel for each of the four sons of light and their armies which stand at the four angles of the square.[11] In the commentary to the fifth verse of Stanza V in *The Secret Doctrine* the four sons of light are identified as the four maharajas, or great kings, who preside over the four points of the compass as well as the four elements of ancient cosmology: earth, water, air and fire. Reference is made to the *Antiquities* of Flavius Josephus where he claims that pillars were erected to these elements in the tabernacle and at Tyre.[12] The corners of the pedestals of these pillars bore images of "the four figures of the zodiac," which are an ox, a lion, an eagle and a man. They are also the faces of the living creatures seen by Ezekiel and appear on Trump 21, The World. The maharajas are therefore connected with the zodiacal constellations Taurus, Leo, Scorpio[13] and Aquarius. Blavatsky gives the names of the four kings as Kuvera, Yama, Indra and Varuna; north, south, east and west respectively. She regards their wives and elephants as an afterthought. We will return to the matter of these four kings when we take up the subject of the Tarot deck in earnest.

Yin and Yang

The *I Ching,* or *Book of Changes,* is a Chinese oracle whose origins can be traced to the Shang Dynasty, though its present arrangement dates from the Chou and the commentaries from the time of Confucius

or later. While *ching* is sometimes translated as "manual," the pictograph *I* is made up of the characters for "sun" and "moon," which in turn may be used to represent the concepts "day" and "month" respectively. The operation of the oracle is based on the deeply rooted Taoist concept of *yin* and *yang*. At their most primitive level *yin* may be equated with the binary number zero and *yang* with binary one, off and on, though in actual practice the values two and three or even eight and seven may be used according to numerological considerations. Since we will be dealing in the present chapter with the binary *yin-yang* system and in later chapters with both the trinary *t'ien-jen-ti* system of the astronomer Yang Hsiung and the sexagesimal system used in Greece and Mesopotamia, this is an opportune time to make a short detour into the land of nondecimal numbering systems.

The most primitive form of counting is on the fingers of the two hands and the decimal or base ten system may have developed from this ancient practice. The early Hebrew and Greek alphabets were used to express quantities in a sequence based on the number ten.[14] Table II illustrates the Greek version of this method. The first nine letters, which stand for one through nine, are followed by 10 through 90 in increments of 10, and then 100 to the final letter in increments of 100. This type of early decimal system would in principle require an ever increasing number of symbols to express larger and larger values. A major advance over this alphabetical representation is the place value system used today in which the same symbol may stand for larger and larger powers of a particular quantity. This quantity is called the "base" of the system. Hence in the decimal system the first position from the right stands for individual units, the second position for tens, the third for tens of tens, or hundreds, the fourth for tens of tens of tens, or thousands and so on. It is a property of this type of format that the base is the smallest whole number that cannot be expressed as a single digit.

The Sumerians developed a sexagesimal, or base-60, numbering system later used by the Greeks, the remains of which can still be seen in the 60-minute hour and the 360-degree circle.[15] The advantage of 60 as a base is that it is evenly divisible by a multitude of quantities.

In the modern world by far the most commonly encountered type of nondecimal numbering is the binary or base two system used by digital computers. Since each place represents a power of two (1, 2, 4, 8, 16, 32, 64, etc.), the binary system is made up exclusively of zeroes and ones. Anyone who has programmed in machine language knows the inherent power of this deceptively simple looking system. It is ironic

Greek	Letter	Value	Greek	Letter	Value
A	Alpha	1	Ξ	Xi	60
B	Beta	2	O	Omicron	70
Γ	Gamma	3	Π	Pi	80
Δ	Delta	4	$\mathcal{Q}$	Koppa	90
E	Epsilon	5	P	Rho	100
F	Digamma	6	Σ	Sigma	200
Z	Zeta	7	T	Tau	300
H	Eta	8	Υ	Upsilon	400
Θ	Theta	9	Φ	Phi	500
I	Iota	10	X	Chi	600
K	Kappa	20	Ψ	Psi	700
Λ	Lambda	30	Ω	Omega	800
M	Mu	40			
N	Nu	50			

Table II: The Greek Alphabetical Numbering System

that the earliest and simplest yes-or-no kind of oracle should find itself reflected at the very heart of Western technological civilization.

The *I Ching* is more than just a fortune telling device. It is a Taoist religious document that consists of 64 hexagrams, or groups of six solid or broken lines, a text written by King Wen and the Duke of Chou[16] near the beginning of the Chou dynasty, and a series of interpretations and commentaries some of which have been associated with the name of Confucius. The lineal figures are often treated as two trigrams or groups of three lines and are attributed to the culture-hero Fu-hsi. James Legge's translation, which is sometimes used for purposes of divination, forms Volume XVI of *The Sacred Books of the East*. Plate II at the end of Legge's introduction[17] contains an 8 × 8 arrangement of the hexagrams which he also relates to Fu-hsi (see Figure 2).

The hexagrams of the *I Ching* would appear to be a rather limited but quite clever two-part solution to a problem that was not dealt with in the West until the discovery of the so-called imaginary numbers. The
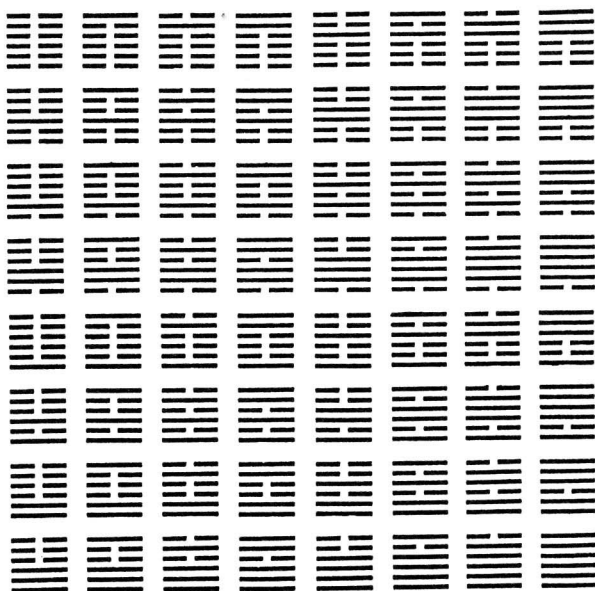
Figure 2: Arrangement of the 64 Hexagrams According to Fu-hsi

problem is how to identify a point on a plane or surface using a single number. The first part of the Chinese solution was to circumscribe a particular sequence of binary numbers by limiting them to six digits and placing zeroes in front of all those of less than six digits. This device produces the sequence of 64 six-digit numbers shown in Figure 3. The second step was to divide the plane into eight rows and eight columns like a chessboard and to assign each of the 64 numbers to one of the squares. Looking again closely at the figure it can now be seen that not only can each six-digit number, or hexagram, be divided into two three-digit numbers, or trigrams, but these trigrams define the row and column in which the hexagram falls. For example, all hexagrams in the third row begin with the sequence 010 (the number 2) and all hexagrams in the fifth column end with the sequence 100 (4). At first glance the ability of the oracle to travel, in a sense, between one and two-dimensional space by means of information stored within itself may seem like nothing more than a mathematical curiosity. Later on, however, our awareness of this type of multiple dimensionality will unlock a realm of the Tarot deck that has remained unsuspected by historians and occultists alike.

000000	000001	000010	000011	000100	000101	000110	000111
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
001000	001001	001010	001011	001100	001101	001110	001111
(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
010000	010001	010010	010011	010100	010101	010110	010111
(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
011000	011001	011010	011011	011100	011101	011110	011111
(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
100000	100001	100010	100011	100100	100101	100110	100111
(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)
101000	101001	101010	101011	101100	101101	101110	101111
(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)
110000	110001	110010	110011	110100	110101	110110	110111
(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)
111000	111001	111010	111011	111100	111101	111110	111111
(56)	(57)	(58)	(59)	(60)	(61)	(62)	(63)

Figure 3: The *I Ching* Hexagrams Expressed as Binary Numbers (Decimal Equivalents)

Figure 4: The Positions of Wilhelm's Month-Hexagrams in the Arrangement of Fu-hsi

Binary Value	King Wen	Month
32	24	Dec.–Jan.
48	19	Jan.–Feb.
56	11	Feb.–March
60	34	March–April
62	43	April–May
63	1	May–June
31	44	June–July
15	33	July–Aug.
7	12	Aug.–Sep.
3	20	Sep.–Oct.
1	23	Oct.–Nov.
0	2	Nov.–Dec.

Table III: The Hexagrams of the 12 Months According to Richard Wilhelm

Volume XIX of the *Bollingen Series* is the Wilhelm/Baynes translation of the *I Ching*. Despite more popularized versions, this hardbound edition from the Princeton University Press is the one used by most serious American consultants of the oracle. In the footnotes and in his own commentaries on the text, Richard Wilhelm assigns 12 of the hexagrams to the months of the year.[18] Nowhere does he indicate the origin of these associations and we can only assume that they derive from one of three sources mentioned by his son Hellmut in the "Preface to the Third Edition": the scholar Lao Nai-hsuan and other friends, the postclassical commentaries, and the "modern scholarly literature."[19]

Figure 4 shows the positions of the 12 month-hexagrams in the 8 × 8 arrangement attributed to Fu-hsi, along with the decimal equivalents of the binary figures. Not only do all the months fall along the outer perimeter but, as is readily apparent from Table III, they progress in calendrical order, counterclockwise around the grid. Furthermore, the central positions are specifically linked to the four seasons[20] and may thus be related to the four kings. Of course it may be argued that this is all coincidental, that the 12 months have been assigned on the basis of the fact that they are the 12, and only 12, hexagrams where the yin and yang lines are strictly separated; and that the arrangement around the outside of the square, I almost said "board," is a result of the mathematical properties of the binary system. All this may be true, but why pick an 8 × 8, six-digit binary representation in the first place? The choice appears even more peculiar when we realize that Chinese chess is played on the intersections of an 8 × 9 board. Could it be that this arrangement was specifically chosen because of its close

approximation to an already existing map of reality? In any event, we shall see that the association of the borders of a square with the dimension of time appears in another form of Chinese divination.

Wind and Water

Feng-shui, sometimes translated as "geomancy," is a method used in China, including Taiwan and Hong Kong, for the siting of buildings and tombs so as to harmonize with the elements of wind and water. The main tool of the more northerly *fang wei* school of *feng-shui* is the *lo p'an,* or geomancer's compass, which consists, in part, of a saucer-shaped wooden disk at the center of which is a small magnetic compass. Around this smaller compass is a series of circular rings, or "layers," which are divided into increasing numbers of sections, all of astrological or numerological significance. This circular disk is set into a square board, which symbolizes the earth and is used for alignment. According to Joseph Needham, author of the monumental *Science and Civilization in China,* the *lo p'an* may have developed from the *shih* or diviner's board, which was made up of a round "heaven plate," which bore a picture of the Great Bear along with cyclical and divinatory signs, and a square "earth plate," which also contained cyclical characters. Around the edge of the earth plate were inscribed "the names of the twenty-eight *hsiu*" or lunar mansions.[21]

According to the authors of *Hamlet's Mill,* the term "earth" refers not to the land under our feet but to the celestial equator, the region above this being "heaven" and the region below being the netherworld.[22] The same authors reproduce a picture of Fu-hsi, inventor of the *I Ching,* and Nu Kua holding in their hands a square with plumb bob and compass respectively, by which they purportedly measured the "squareness of the earth" and the "roundness of heaven."[23] The same implements, along with a water-level, appear in *tsan* 49 and 50 of *Shou* 6 of the *T'ai Hsuan Ching,*[24] which we will deal with later. The *hsiu* are the equatorial equivalents of the 28 Indian *nakshatras,* which consist of small groups of stars and are distributed along the ecliptic or apparent path of the sun during the year. They cannot be called constellations in the usual sense of the word since they are not in themselves regions of the sky but simply mark the boundaries of such regions.[25] Needham reproduces a picture of a reconstructed *shih* that shows the characters for the 28 *hsiu.*[26] By reference to his table of *hsiu*[27] it is possible to determine the identities of the four asterisms that mark the centers of the four

sides of the diviner's board. These will eventually link together the various fortune telling systems mentioned in the present work.

Direction	Number	Hsiu	Determinative Star
West	18	Mao	Eta Tauri
South	25	Hsing	Alpha Hydrae
East	4	Fang	Pi Scorpii
North	11	Hsu	Beta Aquarii

The preceding paragraphs may be played as variations on a single theme. The plane of either the ecliptic or equator is represented as an 8 × 8, or 64-square, grid with the 28 signs or mansions of the lunar zodiac arrayed along its 28-square outer rim. The position of the sun among these stars is sometimes used to mark the 12 divisions of the solar year. The asterisms that at one time marked the seasons appear in the guise of four great kings, their armies and elephants trailing behind them. The importance of these armies will become apparent as we enter the realm of another group of games based on a cycle of 56. These in turn will lead us to that ultimate example of the celestial game board upon Salisbury Plain.