

The Fan-Ching-Shih are near Hsi-Yün Yen (West Cloud Cliff) on Kuan-Yin mountain. There are two large stones, one of them saddle-shaped. If a compass is placed on them, its needle, instead of pointing north and south, turns and points east and west. Hence the name of the rocks. Another rock is near the Mushroom-Orchid Village (Chih-lan Pao) on Shih-Ko mountain, but here the needle turns to point west and east.<sup>a</sup>

How far back this observation went we cannot ascertain, but it was closely similar to the classical experiments of the Portuguese commander João de Castro on the island of Chaul off the west coast of India in +1539.<sup>b</sup>

So far as it has been possible to ascertain, the vertical component of the earth's magnetic field (magnetic dip or inclination) was never discovered in China. According to Mitchell (3) the first observation of it was due to Hartmann in +1544,<sup>c</sup> and the first correct estimate of it to Robert Norman in +1581. We have just seen something of the help which it may give in archaeological dating.

### (8) THE MAGNET, DIVINATION, AND CHESS

The whole story of magnetism in China so far has been extraordinary enough, but there is still a little more to be said. As an addendum to it we propose to explore some dark by-paths in the fields of divination-technique from which games such as chess derive, for there are indications that they alone contain the clue to the first use of a material earthly 'south-pointer'. We must keep such an exploration as brief as possible, avoiding the temptation to stray far afield into the realms of anthropology and archaeology.

The essence of the problem is—how did the *shao* get on the *shih*? Why should anyone have thought of making a model of the Great Bear at all, and of placing it on a board? That it should be made of lodestone, shaped from a bar of magnetite into the form of a dipper, is a thing less difficult to understand. But if it can be shown that there were many ancient systems of divination which involved the use of 'pieces' similar to chess-men or other game component units, and that these 'men' often represented the celestial bodies, then the whole process of thought begins to reveal itself.

Many remarkable scholars have devoted years of work to the history of chess (such as van der Linde and H. J. R. Murray). The generally accepted view resulting from their studies is that chess, the war-game as we know it today, developed first in +7th-century India, whence it radiated to Persia, to the Muslim world, and ultimately Europe.<sup>d</sup> But its antecedents have so far been very mysterious. Strictly

<sup>a</sup> Tr. auct.

<sup>b</sup> The descriptions of these are in his own route books (1, 2, 3), translated by Harradon & Ferraz (2) and summarised by Taylor (8), pp. 183 ff. From +1538 onwards de Castro studied systematically the variations in declination between Portugal and India, using the 'shadow instrument' of Nunes (cf. Harradon & Ferraz, 1), and these are the oldest systematic observations now extant. The boulders of Chaul, which turned his needle right round by 180°, were probably of basaltic lava like the Deccan trap-rocks. De Castro satisfied himself that the rock was not lodestone, but the effect was almost certainly due to the thermo-remanence we have already discussed, with a field too weak to attract iron filings. In connection with the Formosa description it is interesting that in 1879 Knipping described a clear case of magnetic deviation (local variation) at the summit of the Futarasan mountains in Japan.

<sup>c</sup> See the translation of his letter by Harradon (1).

<sup>d</sup> As also to China and Japan.

speaking, 'chess-men' should be defined as the sets of pieces of the two, three, or four contending sides in the war-game; but for the present purpose we shall find it convenient to define them (for lack of any better term), as any collection, set, side or team, of small symbolic models, which may represent anything, not only component parts of an army, but animals, or (significantly) celestial bodies such as the sun and moon, planets, stars and zodiacal houses. Though China is the only civilisation where a close connection between the magnet and 'chess'<sup>a</sup> can be shown to exist, the connection between chess and astronomical-astrological symbolism is widespread in all civilisations.

In following the argument to be presented in the next few pages, it will be best to have before us a summary of it at the outset. What I propose is along these lines. (1) The diviner's board (*shih*<sup>1</sup>) was either used with, or related to, a technique which consisted in throwing a set of 'chess'-men on to a board and noting where they came to rest, these pieces being identified with various celestial bodies. The adjustment of the heaven-plate on the ground-plate would be made first. (2) The stages in the discovery of the lodestone's directive power would have involved (a) the throwing of the pieces, (b) the decision to make some of them of lodestone because of its obviously magic attractive power, (c) the decision to model the Great Bear in magnetite in the shape of a spoon, (d) the observation that it took up an oriented direction. Putting the matter in its shortest way, the lodestone spoon was a 'chess'-man of one of the divinatory forms of proto-chess. The Chinese language makes no distinction between these forms and the war-game of chess itself, both being expressed by the character *chhi*.<sup>2,3</sup> The game or divination-procedure is also called *hsi*.<sup>4</sup>

(i) *The fighting chess-men of Luan Ta*

The first steps in the process of discovery were being taken in the -2nd century. The text which originally attracted my attention as of great interest, and which led to the present train of thought, has come down to us in five versions, and is associated with the name of Luan Ta,<sup>5</sup> one of the magicians of the Han emperor Wu Ti. There is a good deal of information about him in the *Shih Chi*.<sup>b</sup>

That spring (-113) (Ting I<sup>6</sup>), the marquis of Lo-Chhêng, presented a memorial recommending Luan Ta to the emperor. Luan Ta had been one of the eunuchs of the Prince of Chiao-Tung, and had had the same teachers as the Perfected-Learning General (Shao Ong,<sup>c</sup> another imperial magician). It was this fact which had made him Magician and Pharmacist-Royal to the Prince of Chiao-Tung....

<sup>a</sup> Although the word 'chess' is not properly applicable to anything except the specific war-game, whether the pieces have a cosmological or purely military significance, inverted commas will usually be dropped from the word henceforward, and the reader is asked to bear in mind the wider sense in which it is being used, i.e. the many forms of divination involving the throwing or moving of symbolic pieces. We may sometimes speak of 'proto-chess'.

<sup>b</sup> Ch. 28, p. 27b, tr. auct. adjuv. Chavannes (1), vol. 3, p. 479. Identical with ch. 12, p. 9b, where the Thang commentator Chang Shou-Chieh makes Kao Yu quote the *Huai Nan Wan Pi Shu*.

<sup>c</sup> Cf. Vol. 1, p. 108 above.

<sup>1</sup> 式

<sup>2</sup> 碁

<sup>3</sup> 碁

<sup>4</sup> 戲

<sup>5</sup> 梁大

<sup>6</sup> 丁儀

The emperor was now regretting that he had put to death the Perfected-Learning General, and that the fullness of his arts had not been experienced, so he welcomed Luan Ta warmly. Luan Ta was tall and a brilliant talker, fertile in techniques, and daring in promises, never hesitating. He said to the emperor 'Your subject has often been overseas and seen An Chhi, Hsienmên (Kao) and other great magicians, but as I was an ordinary commoner they despised me and did not take me into their confidence. . . . My master maintained that yellow gold can be produced (artificially), that the breach in the Yellow River can be closed, that the herb of immortality can be found, and that the *hsien* can be made to appear. But all your subjects are afraid that they will meet with the same fate as the Perfected-Learning General, so none of them dare to open their mouths. How then should I dare to speak to you of my arts?'<sup>a</sup>. . . At the end of the interview, the emperor asked Luan Ta to demonstrate one of his lesser arts by making chess-men (*chhi*<sup>1</sup>) fight automatically, and indeed they did mutually hit against each other (*hsiang chhu chi*<sup>2</sup>).

The *Chhien Han Shu*'s version<sup>b</sup> of this feat is identically worded. So far the lodestone has not been mentioned, but it prominently appears in the other three versions, all from the *Huai Nan Wan Pi Shu*,<sup>c</sup> which, if genuinely connected with Liu An, would be contemporary (c. -120). The excerpt preserved in *Thai-Phing Yü Lan*, ch. 736 is almost identical with that which the Thang commentator Ssuma Chên<sup>3</sup> added to the *Shih Chi* text. It runs:<sup>d</sup>

The lodestone lifts (animates) (*thi*<sup>4</sup>) chess-men.

The blood of a cock is rubbed up with needle-iron (filings) and pounded to mix. (Then when) lodestone chess-men are set up on the board, they will move of themselves and bump against each other (*hsiang thou*<sup>5</sup>).<sup>e</sup>

The excerpt preserved in *Thai-Phing Yü Lan*, ch. 988 is a little different.<sup>f</sup>

Take the blood of a cock and mix it with iron (filings) from the grinding of needles, pounding it with lodestone powder. In the day-time, put the paste on to the heads of chess-men (*chhi*<sup>6</sup>) and let it dry in the sun. Then put them on the board and they will constantly bounce against and repel (*chü*<sup>7</sup>) one another.

Several things are noteworthy in the above. Exactly how it was that the magnetised chess-men were 'animated' is not clear; they may have been lodestone balls with iron underneath the board, or some of them may have been lodestone while others were iron. Powdered magnetite would have little attractive power. The connection with needles is interesting, and suggests that the demonstration of polarity using needles may really have been older than we thought (p. 278 above).<sup>g</sup> But in any case the important thing is

<sup>a</sup> Note the emphasis on alchemical arts, cf. pp. 269, 277 above. The emperor alleged that Shao Ong had died accidentally by eating horse liver, and raised Luan Ta to high honours, but he in his turn was executed in -112.

<sup>b</sup> Ch. 25A, p. 24a.

<sup>c</sup> Already mentioned, p. 232 above.

<sup>d</sup> P. 8a, tr. auct.

<sup>e</sup> Note that the word used here is the same as that which Wang Chhung uses for 'rotating' the lodestone spoon. Ssuma Chên has *ti chi*,<sup>8</sup> 'repel and hit'. <sup>f</sup> P. 3b, tr. auct.

<sup>g</sup> In the passage from the *Shih Chi* above, we followed Chavannes in translating *hsiao fang*<sup>9</sup> as 'lesser arts', but it is possible that it might refer to the square ground-plate of the diviner's board.

<sup>1</sup> 棊

<sup>2</sup> 相觸擊

<sup>3</sup> 司馬貞

<sup>4</sup> 提

<sup>5</sup> 相投

<sup>6</sup> 棊

<sup>7</sup> 拒

<sup>8</sup> 抵擊

<sup>9</sup> 小方

the association of the magnet with the men or pieces used in divinatory proto-chess. This is what gives significance to the several mentions of chess in connection with magnetism which we have noticed above (pp. 233, 268 and 302), as well as those yet to be mentioned.

Luan Ta's magnetised chess-men were not forgotten, as the following examples show. Ko Hung referred to them<sup>a</sup> as an example of a technique proved to be effective, and elsewhere<sup>b</sup> speaks of

playing with the three (sets of) chess-men, in order to foretell the success or failure of military enterprises.<sup>c</sup>

It will be remembered that Ko Hung spent the latter part of his life in alchemical pursuits in the Lo-fou Shan mountains north of Canton; we are not, therefore, surprised to read in the *Lò-Fou Shan Chih*<sup>d</sup>:

Under the Shih-Lou Fêng peak there is a stone as smooth as a mirror, and on it there used to be 18 chess-men, some black, some white. They moved to and fro and pushed each other about, yet if you tried to pick them up you could not do so. This was called 'spirit chess' (*hsien i*)<sup>e</sup>.

Again, Jen Kuang<sup>3</sup> gives a term for chess-men in +1126, *pai yao hsüan shih*,<sup>4</sup> the 'white-jade magnetite objects' (cf. p. 232 above, and Table 53).<sup>f</sup> And there are later references to wooden horses and paper men being made to dance by the use of magnets.<sup>g</sup>

Some food for thought is provided by occidental legends which parallel this material. In the Far West, St Augustine (+354 to +430), a long time after Luan Ta, was much struck by seeing pieces of iron move about on a silver plate under the influence of a lodestone manipulated below.<sup>h</sup> An episcopal colleague, Severus, saw this done at the house of Bathanarius ('some-time a Count of Affrica') and later demonstrated it to Augustine.<sup>i</sup> But a flotation method also enters in, for when about +325 Julius Valerius made that Latin translation of Pseudo-Callisthenes<sup>j</sup> which (as the *Res Gestae Alexandri Macedonis*) became one of the great sources of the medieval

<sup>a</sup> *Pao Phu Tzu (Nei Phien)*, ch. 3, p. 5b (Feifel (1), p. 201).

<sup>b</sup> *Pao Phu Tzu (Nei Phien)*, ch. 3, p. 20a (Feifel (1), p. 195).

<sup>c</sup> The meaning of this will be understood later; see p. 321.

<sup>d</sup> By Thao Ching-I<sup>5</sup> (+1716) but based on the early history of the region by Kuo Chih-Mei<sup>6</sup> (before +1053).

<sup>e</sup> Ch. 1, p. 27b, tr. auct. I myself have often seen stone chess-boards in grottoes of Taoist temples, such as the beautiful San Chhing Ko, near Kunming. Cf. Vol. 2, Fig. 40.

<sup>f</sup> *Shu Hsü Chih Nan*<sup>7</sup> (Literary South-Pointer), ch. 9, p. 13c.

<sup>g</sup> E.g. in the Sung, the encyclopaedia *Shih Lin Kuang Chi* (Guide through the Forest of Affairs), ch. 10; in the Chhing, the *Wu Li Hsiao Shih* (Small Encyclopaedia of the Principles of Things), entry under lodestone, ch. 12, pp. 2aff.

<sup>h</sup> *De Civitate Dei*, xxi, 4; cf. Jenkins (1).

<sup>i</sup> Nothing ever seems to die in these affairs. At Christmas 1959 I was delighted at being asked to participate in a game of magnetised footballers, the figures being moved from beneath the board in the age-old way.

<sup>j</sup> This core of the Alexander Romance was, it is thought, composed at Alexandria in the -2nd century, but the later embroiderings and accretions were voluminous.

<sup>1</sup> 羅浮山志

<sup>2</sup> 仙弈

<sup>3</sup> 任廣

<sup>4</sup> 白瑤玄石

<sup>5</sup> 陶敬益

<sup>6</sup> 郭之美

<sup>7</sup> 香叙指南

'Alexander Romance',<sup>a</sup> he incorporated a very relevant passage. According to this corpus of legend Alexander's father was the last of the Egyptian kings, Nectanebus the magician. It was his custom to make divination about the outcome of naval battles by floating model ships of wax with model crews in a basin of water. They began to move, says the text, seeming to be alive, but if the omens were good they would sink when he passed his ebony wand around the basin, uttering invocations to the gods of the upper and lower regions.<sup>b</sup> Though the legend does not mention the presence of lodestone and iron, it surely must have been invented, as Taylor says,<sup>c</sup> by someone who had seen or practised such 'magic'. The story is particularly interesting because it forms a 'pre-historic' background for the development of the floating magnetic needle of which our first description is Chinese of the early +11th century. Evidence already presented (p. 277) indicates that this could have originated in China at any time after the +4th. One might almost venture to predict that somewhere in the vast mass of Chinese legendary material there will be found some parallel account of Luan Ta's chess-men turned marines and gone to sea. Nothing suggests that the European stories were not quite independent. But there is equally nothing to indicate that the knowledge behind them led to the invention of the floating-compass.

(ii) *Chess and astronomical symbolism*

Let us now approach the matter from another angle. A great wealth of information exists about chess in medieval Europe<sup>d</sup> and it is likely, on philological grounds, that the earliest knowledge of it by Europeans was early in the +10th century. But there is no specific mention of it before the +11th; the first date having now been pushed back from the famous letter of Peter Damiani (+1061) to certain wills and bequests on the Pyrenean frontier about +1010.<sup>e</sup> The entry of the game to Europe was thus almost certainly through Spain from the Muslim world, where it had long been well-known.<sup>f</sup> In the +10th century Firdausī in Persia had played it,<sup>g</sup> and al-Mas'ūdī had written, or attempted to write, its history.<sup>h</sup> It seems quite certain that the Arabs obtained it from India, where the earliest references to it (as *chaturāṅga*) occur early in the +7th century. There it had developed from an earlier game which had also used a checker-board (*ashṭāpada*) and which had probably been a race-game in which dice were used.<sup>i</sup> Most of the authorities have considered that Chinese chess (using the word in its most precise sense) was derived from India, but their grounds for this are very weak; its 'Indian ancestry', said Murray,<sup>j</sup> rests upon 'the identity of certain

<sup>a</sup> For the general background of this see Cary (1).

<sup>b</sup> In medieval pictures illustrating the Alexander Romance Nectanebus is generally represented with his wand and basin as well as a sighting-tube for observing the stars (cf. Vol. 3, p. 333).

<sup>c</sup> (8), pp. 93 ff.

<sup>d</sup> v. d. Linde (1, 2); v. d. Lasa (1); H. J. R. Murray (1).

<sup>e</sup> Murray (1), p. 402; v. d. Linde (2), p. 54; Garner (1).

<sup>f</sup> The Latin name *scacus*, or *ludus scacorum*, is a direct derivative of Persian *shah*, king; and *mate* comes from Persian *māt*.

<sup>g</sup> Murray (1), p. 155.

<sup>h</sup> Murray (1), p. 209.

<sup>i</sup> Murray (1), pp. 33, 42; v. d. Linde (1), p. 34.

<sup>j</sup> (1), p. 119.

essential features of the two games, and partly upon what is known of the indebtedness of China to India in religion, culture, and above all, in games'. Board-games as such are of course found everywhere, going back to at least the -11th century in Egypt, and there has been much speculation as to how some of them were played in Greek and Roman times.<sup>a</sup>

The oldest Chinese name for a chess-like game played on a board is *i*,<sup>1</sup> to which there are two references in Mencius (-4th century),<sup>b</sup> but there is no sure information as to what it was, or how played.<sup>c</sup> In the +1st century, Pan Ku said<sup>d</sup> that this game was what people in the south call *chhi*,<sup>2</sup> so it is quite probable that it was similar to, if not identical with, the game known as *wei chhi*<sup>3</sup> from the San Kuo period onwards. This is also a war-game, but played with some 150 pieces a side, moving along the lines of a rectangular grid of 19 units, thus giving 361 places in all.<sup>e</sup> Its object is, not to capture the opposing pieces, but to surround them and occupy as many as possible of the available cross-points. This was not the only kind of *chhi*<sup>2</sup> other than chess proper, as we shall see.

Chess proper, i.e. the game with the sets of pieces differing among themselves in value and move, was known in China as *hsiang chhi*,<sup>4</sup> and became common during the Thang period.<sup>f</sup> The name has usually been interpreted as meaning 'elephant-chess', and there were indeed generally four elephants among the pieces,<sup>g</sup> corresponding broadly to the bishops,<sup>h</sup> but it can equally well be taken as meaning 'image' (*hsiang*<sup>5</sup>), 'model' or 'figure' chess, so-called in order to distinguish it from other earlier games in which all the pieces were identical. Among the numerous Sung mentions of true chess, that in Ouyang Hsiu's<sup>6</sup> *Kuei Thien Lu*<sup>7</sup> (On Returning Home), of +1067, may be adduced. But the earliest description of the game recognisably identical with chess proper occurs in the *Yu Kuai Lu*<sup>8</sup> written by Niu Sêng-Ju<sup>9</sup> at the end of the +8th century—he has a story<sup>1</sup> of a man who dreamed that he was present at a ceremonial

<sup>a</sup> Cf. Ridgway (1); Austin (1); H. J. R. Murray (2).

<sup>b</sup> *Mêng Tzu*, IV (2), xxx, 2 (Legge (3), p. 213); VI (1), lx, 3 (Legge (3), p. 286).

<sup>c</sup> Another ancient reference is in the *Mu Thien Tzu Chuan*, ch. 5 (tr. Chêng Tê-Khun (2), p. 137), but its words are not very explicit.

<sup>d</sup> In his essay on chess, *TPYL*, ch. 753, p. 5a; *TSCC*, *I shu tien*, ch. 799, *i tseu*, p. 1b.

<sup>e</sup> Descriptions by H. A. Giles (6); Volpicelli (1); Cheshire (1). There are many quotations about it in *TPYL*, ch. 753.

<sup>f</sup> Many have given descriptions of true chess, as it is now played in China, e.g. Holtz (1); Hollingworth (1); Schlegel (4); Himly (7); v. Möllendorff (1); Holt (1); Volpicelli (2); Wilkinson (1); Gruber (1); Slobodchikov (1); and Tu Chung-Ming (1). All the papers are of the last century except the three last-named. The account of Irwin in +1793 is interesting because he actually played it with his friend 'Tinqu' (Phan Chen-Kuan<sup>10</sup>) in China. Phan wrote for him a memorandum in which the invention of the game was attributed to Han Hsin (the -2nd-century general), but though this was said to be in a quotation from 'Chinese annals', it has never been possible to identify it (Murray (1), p. 123).

<sup>g</sup> Not always, however, for some sets of pieces have another character, *hsiang*,<sup>11</sup> meaning diviner, instead of elephant. This is often regarded as a mistake, but in fact it may have been the earlier form, and the change to 'elephant' may have been made under later Indian influence. On military diviners see Sects. 18 and 30. The word *hsiang*<sup>11</sup> may also be interpreted as counsellor.

<sup>h</sup> Thus the medieval term for chess bishop was 'Alfil'. The elephant as castle in Indian chess sets is a modern development.

<sup>1</sup> Translation given in Murray (1), p. 123.

<sup>1</sup> 弈                    <sup>2</sup> 棊                    <sup>3</sup> 圍棊                    <sup>4</sup> 象棊                    <sup>5</sup> 像                    <sup>6</sup> 歐陽修  
<sup>7</sup> 歸田錄                <sup>8</sup> 幽怪錄                <sup>9</sup> 牛僧孺                    <sup>10</sup> 潘參官                    <sup>11</sup> 相

battle, the moves being those of chess, and who afterwards found a chess set in an old tomb on the other side of the wall. This event is referred to +762. But it has a background which, though known at second or third hand to historians of chess, has hardly yet been appreciated at its full value.

The *Tan Chhien Tsung Lu* (Red Lead Record), compiled by Yang Shen shortly before +1554, summarises this as follows:<sup>a</sup>

Tradition handed down says that image-chess (*hsiang chhi*<sup>1</sup>) was invented by the Emperor Wu<sup>2</sup> of the (Northern) Chou dynasty (+561 to +578).<sup>b</sup> According to the *Hou Chou Shu*, it was in the 4th year of the Thien-Ho reign-period (+569) that the emperor finished writing his *Hsiang Ching*<sup>3</sup> (Image-Chess Manual). He assembled all his officials in a palace hall and gave lectures to them about it.<sup>c</sup>

The bibliography of the *Sui Shu* records this *Hsiang Ching* in one chapter, as written by Chou Wu Ti, with commentaries by Wang Pao,<sup>4</sup> Wang Yü,<sup>5</sup> and Ho Tho.<sup>6</sup>

There was also a *Hsiang Ching Fa Thi I*<sup>7</sup> ('The Substance and Main Idea of the Image-Chess Manual') (written by someone else).

Then the story-tellers say that in the *Hsiang Ching* (it was stated that) images of the sun, moon, stars, and constellations were used. From this it is to be supposed that the playing-board had (divinatory technical terms such as) *ping-chi*,<sup>8</sup> *ku-hsü*,<sup>9</sup> and *chung-pho*<sup>10</sup> marked on it. It was not the same as our modern chess (*hsiang hsi*<sup>11</sup>), where chariots, horses, etc. are in play. Had it been like our modern chess, even ordinary people or children could have understood it without much difficulty. Yet it was necessary to have scholarly commentaries on it, and lectures to the hundred officials.

Confirmatory evidence of these traditions comes from another Ming scholar, Wang Shih-Chên<sup>12</sup> in his *Yen-Chou Ssu Pu*<sup>13</sup> ('Talks at Yenchow on the Four Branches of Literature')<sup>d</sup> and indeed they are often referred to. Already in the Sung, Kao Chhêng had said:<sup>e</sup>

Image-chess (*hsiang hsi*<sup>11</sup>) was invented by Chou Wu Ti. It had as chess-men (*chhi*<sup>14</sup>) the sun, moon, stars and constellations, and was quite different from modern *hsiang chhi*. Probably it was the modern chess which was referred to by Niu Sêng-Ju of the Thang in his *Yu Kuai Lu*.

Now although the emperor's manual has disappeared, we are fortunate to have the preface<sup>f</sup> which Wang Pao<sup>4</sup> wrote for it.<sup>g</sup> This runs:

The first (great significance) of image-chess (*hsiang hsi*<sup>11</sup>) is astrological, for (among the pieces are represented) heaven, the sun, the moon and the stars. The second concerns the

<sup>a</sup> Ch. 8, p. 14b, tr. auct. adjuv. Himly. The passage is also to be found in *TSCC, I shu tien*, ch. 801, *tsa lu*, p. 4a.

<sup>b</sup> This was Yüwên Yung,<sup>15</sup> a rather successful ruler, but opposed to Buddhism, and (more curiously) to Taoism.

<sup>c</sup> (*Hou*) *Chou Shu*, ch. 5, p. 15a; *Pei Shih*, ch. 10, p. 7a.

<sup>d</sup> Quoted *TSCC, I shu tien*, ch. 801, *i chhi pu, tsa lu*, p. 3b.

<sup>e</sup> *Shih Wu Chi Yuan*, ch. 48, p. 30a; cit. *TSCC, I shu tien*, ch. 801, *tsa lu*, p. 4b; tr. auct.

<sup>f</sup> Preserved in *TPYL*, ch. 755, p. 7a; tr. auct.

<sup>g</sup> His biography is in (*Hou*) *Chou Shu*, ch. 41; *Pei Shih*, ch. 83.

<sup>1</sup> 象棊

<sup>2</sup> 武

<sup>3</sup> 象經

<sup>4</sup> 王褒

<sup>5</sup> 王裕

<sup>6</sup> 何妥

<sup>7</sup> 象經發題義

<sup>8</sup> 兵機

<sup>9</sup> 孤虛

<sup>10</sup> 衝破

<sup>11</sup> 象戲

<sup>12</sup> 王世貞

<sup>13</sup> 兗州四部

<sup>14</sup> 棊

<sup>15</sup> 宇文邕

earth, for (among the pieces are represented) earth, water, fire, wood and metal. The third concerns the Yin and the Yang; if we start from an even number it signifies Yang and Heaven; if we start from an odd one it signifies Yin and Earth. The fourth concerns the seasons; the colour of the east is green,<sup>a</sup> and the other three directions have each their proper colour. The fifth concerns the following of permutations and combinations, according to the changes of position of the heavenly bodies and the five elements. The sixth concerns the musical tones, following the dispersion of the *chhi*. The Tzu position (among the compass-points) takes the cyclical sign *wei*, the Wu position takes *chhou*, and so on. The seventh concerns the 8 *kua*, fixing their position; *Chen* takes *Tui*, *Li* takes *Khan*, and so on.<sup>b</sup> The eighth concerns loyalty and filial piety. . . . The ninth concerns ruler and minister. . . . The tenth concerns peace and war. . . . The eleventh concerns rites and ceremonies. . . . The twelfth concerns the recognition of virtue and the punishment of vice (i.e. promotions and demotions, etc.). . . .

Here again is a definite statement that not only the heavenly bodies, but also the five elements were represented among the set of pieces. It also looks as if the position of the pieces at the outset differed according to the position of the celestial bodies and the situation of the cyclical characters at the time when play was begun. The latter part of the preface seems to refer to the kind of question which this complicated divination technique was required to answer. A parallel source is the essay on *Hsiang Hsi*<sup>1</sup> (the Image-Chess Game) by Yü Hsin,<sup>2</sup> a +6th-century cavalry general.<sup>c</sup> Using obscure hidden language, he speaks of a board (*chü*<sup>3</sup>) made round (*yuan*<sup>4</sup>) according to *Chhien*<sup>5</sup> (the main Yang *kua*; Heaven), and another made square (*fang*<sup>6</sup>) according to *Khun*<sup>7</sup> (the main Yin *kua*; Earth). This is valuable information because it links up the emperor's inventions with the ancient diviner's board (*shih*<sup>8</sup>). He then speaks of the model pieces carrying ivory tablets (*chin hu*<sup>9</sup>) like officials, and placed about according to sidereal reference-points. The boards had diagrams on them (*wên chih hua*<sup>10</sup>). It will be agreed that Himly (2, 3, 4) had abundant justification for his remark that the more one investigates the origins of chess in Asia, the more intimate its connections with astrology and astronomy appear to be.

Before alluding to a few outstanding items in the mass of other evidence which associates chess with astrology and cosmic speculation, let us pause for a moment to try and reconstruct what the emperor Wu had in mind. The ultimate object of this account, be it remembered, is to explain how a lodestone model of the Northern Dipper found itself on the diviner's board. But that was in the +1st century; in the +6th the diviners were much more sophisticated. Our immediate object must be to explain how a cosmic-astrological technique used for divination could have turned into a war-game used for recreation. The answer is not far to seek; the image-chess of the emperor Wu was nothing but a mimicry of the eternal contest between the two great forces in the universe, Yang and Yin. It was desired to determine the general balance between Yin and Yang in the existing cosmic situation, and if the model

<sup>a</sup> Cf. Vol. 2, pp. 238, 262, 263.

<sup>b</sup> Cf. p. 296 above.

<sup>c</sup> Preserved in *TSCC, I shu tien*, ch. 799, *i wên* 1, p. 6a.

<sup>1</sup> 象戲

<sup>2</sup> 庾信

<sup>3</sup> 局

<sup>4</sup> 圓

<sup>5</sup> 乾

<sup>6</sup> 方

<sup>7</sup> 坤

<sup>8</sup> 式

<sup>9</sup> 摺笏

<sup>10</sup> 文之畫



pieces were well chosen, their moves properly adjusted, and the board oriented and arranged according to the concrete circumstances, the players, being themselves part of that situation,<sup>a</sup> could not fail to proceed to a valid and informative decision. The idea of the stars fighting against one another was quite old in Chinese astrology. One has only to open the first of the astronomical chapters in the *Hou Han Shu* to find it said that in the time of Wang Mang 'large stars and small stars were struggling against one another in the palaces of the heavens.'<sup>b</sup> The word *tou*<sup>1</sup> (combat) occurs frequently in this sense.

What chariots, what horses, against us shall bide  
While the stars in their courses do fight on our side?<sup>c</sup>

Superstition of course the image-chess was, yet it must have seemed at the time a brilliant device, evoking respect somewhat analogous to that accorded to the elaborate computing-machines of today.

After all, though essentially the good, for the Chinese mind, was the perfect balance between Yin and Yang, it had always been realised, for example in medical circles discussing the aetiology of disease, that Yin and Yang did not always balance. Image-chess was a way of detecting the extent of the unbalance at the time in question. As for the disposition of the sides, the details will presumably never be known, but it is easy to picture that the 28 *hsiu* (equatorial constellations) were the pawns,<sup>d</sup> while the two kings would be sun and moon, and the eight planets (including counter-Jupiter, Rahu and Ketu) would be divided between the sides.<sup>e</sup> Cannon and chariots (our knights and rooks) may well have been comets. And the remaining places may have been taken up by the five elements (perhaps represented on both sides), with sundry bright stars such as Canopus or Algol. The 'river' dividing the Chinese chess-board across the middle still retains its original name of the Milky Way (*thien ho*<sup>2</sup>).

That this interpretation is on the right track is confirmed by no less an authority than Pan Ku the historian (+ 1st century), who understood the astrological significance, not of *hsiang chhi*<sup>3</sup> (image-chess) which had not been invented in his time, but of a game or technique which was probably *wei chhi*.<sup>4</sup> In his essay on 'chess' he says:<sup>f</sup>

Northerners call *chhi* by the name of *i*.<sup>5</sup> It has a deep significance. The board (*chü*<sup>6</sup>) has to be square, for it signifies the earth, and its right angles signify uprightness. The pieces (of the two sides) are yellow and black; this difference signifies the Yin and the Yang—scattered in groups all over the board, they represent the heavenly bodies.

<sup>a</sup> No doubt there was some accompaniment of abstinence and liturgy.

<sup>b</sup> *Hou Han Shu*, ch. 20, p. 2b; *ta hsing yü hsiao hsing tou yü kung chung*.<sup>7</sup>

<sup>c</sup> From Rudyard Kipling's 'Astrologer's Song' in *Rewards and Fairies*. Cf. Judges v., 20.

<sup>d</sup> There had been, as early as the Han, an astrological 'game' in which the names of all the *hsiu* had been written on sets of bamboo slips. Some of these have survived (Schindler (4), p. 222).

<sup>e</sup> Since each of the planets and pseudo-planets was associated with one or other of the five elements, the sides were no doubt set up in accordance with the position of the elements in the Yin-Yang field (cf. Vol. 2, p. 461). Yin and Yang themselves were sufficiently represented by the moon and the sun.

<sup>f</sup> *TPYL*, ch. 753, p. 5a; *TSCC*, *I shu tien*, ch. 799, *i wên* 1, p. 1b; tr. auct.

<sup>1</sup> 鬪            <sup>2</sup> 天河            <sup>3</sup> 象筭            <sup>4</sup> 圖碁            <sup>5</sup> 弈            <sup>6</sup> 局

<sup>7</sup> 大星與小星鬪于宮中

These significances being manifest it is up to the players to make the moves, and this is connected with kingship. Following what the rules permit, both opponents are subject to them—this is the rigour of the Tao.

He could hardly be more explicit.<sup>a</sup>

Moreover, one can quote the converse. For the *Chin Shu* says:<sup>b</sup>

The heavens are round in shape like an open umbrella, while the earth is square like a chess-board (*chhi-chü*<sup>1</sup>).

To such an extent was the analogy fixed in the Chinese mind.

It would be tempting to pursue this further, but I will only add that evidence supporting the division of the *hsiu* into two teams of fourteen each according to Yin and Yang may be found in Sung Taoist books such as the *Wu Chen Phien Chih Chih Hsiang Shuo San Chhêng Pi Yao*<sup>2</sup> (Precise Explanation of the Difficult Essentials of the 'Poetical Essay on the Understanding of the Truth', according to the Three Scriptures),<sup>c</sup>



Fig. 345. Bronze chess-men (British Museum, after Murray, 1). On the right, two pawns; on the left a cannon (equivalent to the knight).

attributed to Ong Pao-Kuang,<sup>3</sup> where tables are given separating all kinds of natural objects into Yin and Yang things, and the *hsiu* appear in them. A very large number of astrological 'pieces', some of which look like coins or medallions but also resemble the discoidal true chess-men figured by Murray (Fig. 345),<sup>d</sup> were illustrated by Li Tso-Hsien,<sup>4</sup> in his classical study of Chinese coinage (*Ku Chhuan Hui*<sup>5</sup>) (cf. Figs. 346–8).<sup>e</sup> There are numerous tokens representing the Great Bear (significant because of the round heaven-plate of the *shih*),<sup>f</sup> some of which have references to the spirits of its seven stars (five men and two women);<sup>g</sup> other pieces show what may be other constellations.<sup>h</sup> Larger discs have radiating arrangements reminiscent of the geomantic compass,<sup>1</sup> and of the non-Chinese 'star-chess' which will shortly be referred

<sup>a</sup> There may have been astrological significance in the 361 places of the *wei chhi* board if they represented the days in the year (Culin (1), p. 870).

<sup>b</sup> Ch. 11, p. 2a.

<sup>c</sup> *TT* 140.

<sup>d</sup> (1), p. 126.

<sup>e</sup> Pt. IV (Chên).

<sup>f</sup> Ch. 2, p. 12b; ch. 4, pp. 3a, 3b, 4b, 12a, 13b; ch. 5, pp. 1a, 2b, 3b.

<sup>g</sup> Ch. 5, p. 13a; ch. 6, p. 10a.

<sup>h</sup> Ch. 7, p. 13a.

<sup>1</sup> Ch. 7, p. 11a, b; ch. 8, p. 7a.

<sup>1</sup> 碁局

<sup>2</sup> 悟真篇直指祥說三乘秘要

<sup>3</sup> 翁葆光

<sup>4</sup> 李佐賢

<sup>5</sup> 古泉匯



Fig. 346



Fig. 347



Fig. 348

Fig. 346. Tokens resembling the pieces probably used in +6th-century 'star-chess'. This one depicts the Great Bear. Above, an inscription recalls the five male and two female spirits of its stars; the latter are represented to left and right, the former are on the reverse. Below there is a sword, and then the tortoise and serpent, symbolic of the northern palace of the heavens (cf. Vol. 3, p. 242). From *Ku Chhuan Hui* (Chên sect.), ch. 6, p. 10a, b.

Fig. 347. 'Star-chess' token representing the planet Mercury (Chhen hsing, cf. Vol. 3, p. 398). The imbricated lozenges on each side are of uncertain meaning, but the constellation with its attendant spirits on the reverse is probably the four-star Chih fa, which, like the planet itself, governs judges, punishments and executions (*Hsing Ching*, p. 3a; *Chin Shu*, ch. 11, p. 9a, ch. 12, p. 2a, b). From *Ku Chhuan Hui* (Chên sect.), ch. 8, p. 4a.

Fig. 348. 'Star-chess' token representing the *chih* cyclical character Wu, sign of the south among the compass-points and of the noon double-hour of the day. It is accompanied by its symbolic animal the horse. From *Ku Chhuan Hui* (Chên sect.), ch. 8, p. 5a.

to. Some of these give the azimuth compass-points.<sup>a</sup> Others show pictures of star-spirits,<sup>b</sup> or give the 8 *kua*.<sup>c</sup> It seems extremely likely that though these may have been used in some dynasties as distributed temple tokens, they may also have been connected with the pieces used in the emperor's image-chess.<sup>d</sup> In any case, the important thing to notice is that in China, and in China alone, on account of the dominance of the Yin-Yang theory of the macrocosm, could a divination technique or 'pre-game' have been devised which was both astrological and yet had a sufficient combat element to enable it to be vulgarised into a purely military symbolism.

There is no need to commit ourselves to any definite conclusion as to when and where the 'militarisation' of astrological image-chess took place; it may well have

<sup>a</sup> Ch. 7, numerous examples.

<sup>b</sup> Ch. 8, p. 5a.

<sup>c</sup> Ch. 9, pp. 1a, 1b, 2aff.

<sup>d</sup> Another connection lies in the fact that down to modern times the moves and pieces in *hsiang chhi* were employed in the procedures of glyphomantic soothsayers (see Sect. 14a). Before 1928 there used to be many of them outside the Fu Tzu Miao at Nanking and our collaborator Dr Lu Gwei-Djen often watched them at work.

been in India in the following century. The appearance of elephants may indeed have been a misunderstanding, since *hsiang* can mean both 'image' (of a celestial body) and 'elephant'. It may even have been a substituted homophone for another word meaning 'diviner'. But if our general conclusions so far about the origin of true chess are right, we might expect to find widespread traces of astronomical symbolism clinging to it throughout later centuries. All historians of chess have agreed that this was in fact the case, though none of them has explained why. We must give a few examples.

In his *Murūj al-Dhabab*, al-Mas'ūdī, writing about +950, attributed the invention of chess to an Indian king, Balhit, saying:<sup>a</sup>

He also made of this game a kind of allegory of the celestial bodies, such as the seven planets and the twelve zodiacal signs, and allotted each piece to a star. The chess-board became a school of government and defence; it was *consulted*<sup>b</sup> in time of war, when it was necessary to have recourse to stratagems, and study the more or less rapid movement of troops. The Indians give a mysterious meaning to the houses (mansions, squares)<sup>c</sup> of the chess-board, and establish a relation between the First Cause which soars above the spheres, and on which everything depends, and the sum of the squares of the houses. . . .

Here one can see the old Asian ideas subject to modification on coming within the sphere of Aristotelian learning. Al-Mas'ūdī is talking about something that must have been very like true chess played on a square board, the lineal descendant (I would suggest) of the square ground-plate of the *shih*. But what is extremely interesting is that there were several forms of chess played on discoidal boards with radial divisions, as if the round heaven-plate of the *shih* also tenaciously lived on. Al-Mas'ūdī and al-Amulī describe<sup>d</sup> a form of this in which the board was called *al-falakiya* (the celestial). It seems to have been particularly popular in the Eastern Roman Empire, and is often known as Byzantine star-chess.<sup>e</sup> In due course this found its way to Spain, where it was known as 'Los Escaques' and is described in the MS. *Libro del Acedrex* of Alfonso X of Castile,<sup>f</sup>—'los Escaques que se juega por astronomia'.<sup>g</sup> The board consisted of seven concentric rings, divided radially into twelve parts.<sup>h</sup> Some wind of this got through to later western Europe, where, for example, a +13th-century Latin poem gives the astrological symbolism of each chess-piece.<sup>i</sup> And as late as the +16th century the old tree was still budding, for Fulke in +1571 produced a new *Uranomachia, seu Astrologorum Ludus*.<sup>j</sup>

<sup>a</sup> Tr. de Meynard & de Courteille; v. d. Linde (1); eng. Murray (1), p. 210.

<sup>b</sup> Italics mine.

<sup>c</sup> Cf. the *hsiu* as pawns.

<sup>d</sup> Murray (1), p. 343. There were seven pieces of different colours to represent the five planets and the two luminaries.

<sup>e</sup> See v. d. Linde (2), p. 251; Weil (1). The Arabs knew it as *al-Rūmīya* (Byzantine) and *al-muddawara* (circular). Murray (1), p. 342, describes it from surviving MSS. Weil and Lemoine show the connection between this discoidal chess-board and the *zā'irjat al-'ālam* or circular table of the universe (cf. *maṅḍala*), each sector of which carried letters corresponding to stars and numbers; there was also a table of fates, and the connection between the two was made by the finger-game, in divination.

<sup>f</sup> The monarch whom we have so often met in Vol. 3 (Sect. 20), and whom we shall meet again below (Sect. 27j) in connection with the history of mechanical clocks.

<sup>g</sup> Murray (1), p. 349; v. d. Linde (2), p. 254.

<sup>h</sup> The Alfonsine MS. also describes a four-handed chess of the four seasons, which seems an extremely Chinese idea (*Acedrex de los quatro tiempos*).

<sup>i</sup> v. d. Linde (2), p. 68.

<sup>j</sup> v. d. Linde (1), vol. 2, p. 374; Murray (1), p. 351.

Related to these disc-like chess-boards were the astrological dicing boards of which the most famous example is perhaps the Bianchini Table, discovered on the Aventine in +1705.<sup>a</sup> It is supposed to date from the +2nd century. In a series of concentric circles it shows, from the centre outwards, the twelve zodiacal animals, the twelve signs twice over (according to the fixed and moving ecliptics), the thirty-six decan-gods, and lastly thirty-six faces of the seven planet-gods repeated in septizonium order.

(iii) *Divination by throwing*

This provides the transition to an operation of the diviners not yet discussed, namely the throwing of objects on to a board, or the tossing of them on it or off it. In astronomical image-chess or in true chess, as in other board-games, there are moves made by the pieces of two or more sides paralleling tactics and strategy. But in forms perhaps more primitive, the pieces were actually thrown on to the board, conclusions being drawn from where they came to rest. The pieces thus approximated to dice, and the procedure had no intrinsic combat element. Hence the interest of the fact that Chinese literature contains a number of references to 'spirit-chess'. In the *Tao Tsang* there are two books with the title *Ling Chhi Ching*<sup>1</sup> (Spirit-Chess Manual), one<sup>b</sup> attributed to Tungfang Shuo<sup>2</sup> and possibly of Later Han or San Kuo date; the other<sup>c</sup> a development of it and bearing the name of Yen Yu-Ming<sup>3</sup> of the Sung. Significantly, the term for the board used in these works is the *shih*.<sup>4</sup> Their prefaces are bibliographical and the bulk of the text consists of interpretations of combinations (e.g. 'one upper, four middle, three lower'), for there were four pieces marked *shang*,<sup>5</sup> four marked *chung*<sup>6</sup> and four *hsia*.<sup>7</sup> The board, of jujube wood, was round, like the heaven-plate. More information comes from the Sung encyclopaedist, Kao Chhêng:<sup>d</sup>

The *I Yuan* (Garden of Strange Things)<sup>e</sup> says: 'Divination using the twelve chess-men (*chhi pu*<sup>8</sup>) started with Chang Liang<sup>9</sup> (*d.* -187), who got it from Huang Shih Kung<sup>10</sup> (the Old Gentleman of the Yellow Stone—the Sage of Miao-tai-tzu in Shensi).'

Our present-day (Sung) method is to divide the twelve 'chess' or divination pieces into three classes, upper, middle, and lower; these are then thrown (on to the board) and by the result obtained the decision is given as to good or evil fortune.

The introduction of Thang Shih-Yuan<sup>11</sup> to the *Chhi Ching*<sup>12</sup> says 'We do not know when *ling chhi*<sup>1</sup> was invented—some say it was by Tungfang Shuo<sup>2</sup> in Han Wu Ti's time, who used it for divination and always proved right; others say that Chang Liang<sup>9</sup> learned it from Huang Shih Kung;<sup>10</sup> others again refer it to the Prince of Huai-Nan who was taught it by a guest but kept it secret afterwards.'

In other words the method was so old that no one knew whence it originated.

<sup>a</sup> Described by Boll, Bezold & Gundel (1*b*), p. 60, pl. xviii; Gundel (2), pl. 16; Boll (1), p. 303; and Eisler (1), pp. 82, 112, 267, pl. vii*b*.

<sup>b</sup> *TT*285.

<sup>c</sup> *TT*1029.

<sup>d</sup> *Shih Wu Chi Yuan*, ch. 39, p. 39*b*; tr. auct.

<sup>e</sup> By Liu Ching-Shu, probably of the +5th century.

<sup>1</sup> 靈茶經

<sup>2</sup> 東方朔

<sup>3</sup> 顏幼明

<sup>4</sup> 式

<sup>5</sup> 上

<sup>6</sup> 中

<sup>7</sup> 下

<sup>8</sup> 蔡卜

<sup>9</sup> 張良

<sup>10</sup> 黃石公

<sup>11</sup> 唐事遠

<sup>12</sup> 茶經

Another game or divination-technique which seems to have been given off by the *shih*<sup>1</sup> was 'crossbow-bullet chess' (*tan chhi*<sup>2</sup>).<sup>a</sup> This also had its *Tan Chhi Ching*<sup>3</sup> or manual. Whatever it was, it seems to have originated in the Han, for essays on it still survive by Later Han and San Kuo people, such as Tshai Yung,<sup>4</sup> Tshao Phei<sup>5</sup> (Emperor Wên of (San Kuo) Wei), Ting I,<sup>6</sup> and Hsiahou Tun,<sup>7</sup> a general, who said that the stone pieces grouped themselves in various ways like the stars in heaven. In the +3rd century, Hantan Chhun,<sup>8</sup> in his book (*I Ching*<sup>9</sup>) on arts,<sup>b</sup> gave a short description of *tan chhi*, and from this as well as from other later descriptions one gets the impression that the procedure involved both throwing the pieces on to the board, and combat moves following this chance placing. The twelve pieces, red and black, seem to have symbolised the twelve animals of the 'zodiacal' animal-cycle,<sup>c</sup> and each player started with six. Significantly, Wang Pao<sup>10</sup> of Northern Chou, the expert on image-chess, wrote an essay on this form also. By the Thang the number of pieces had increased to twenty-four (according to the *Yu-Yang Tsa Tsu*), and from an essay of Lu Yü<sup>11</sup> we find that 'the shape of the board is square below like the earth and round above like the heavens'.<sup>d</sup> The pieces 'fly up when the board is quickly knocked, and scatter to different positions'. Sometimes the two sides represented two orders of society, commoners and officials (*chien*<sup>12</sup> and *kuei*<sup>13</sup>), or prognosticated about this or that alternative social fate, as in the Thang essays of Liu Tsung-Yuan<sup>14</sup> and Wei Ying-Wu.<sup>15</sup> Several sources associate the game with the Taoists, and some repeat a story that it was invented by Tungfang Shuo to induce Han Wu Ti to stop playing the active ball-games of which he was fond.

Yet another game or divination-procedure not to be forgotten which has a close connection with astronomy was that of *liu-po*<sup>16</sup> ('the Six Learned Scholars') which, as we saw above,<sup>e</sup> was played with twelve *chhi*<sup>17</sup> pieces on a board almost identical with the plate of the Han sundials. Fig. 349 shows a group of tomb-figures engaged in it. As Yang Lien-Shêng (1, 2) has shown, this can be traced back without difficulty to the -3rd century.<sup>f</sup> The moves of the pieces were determined by the throwing of six sticks (*chu*<sup>18</sup>), and they were divided into two 'sides', each piece being marked with one of the four animals symbolising the four directions of space.<sup>g</sup> There seems to have been a central belt of water, like the Milky Way in later systems, and when a piece arrived there it was promoted to be a 'leading piece' with greater powers. The relation of all these systems to one another remains obscure, however.

<sup>a</sup> There is a good deal about it in *TSCC*, *I shu tien*, ch. 801 (*tan chhi pu*), *hui kao* 2, *i wên* 1, pp. 1 aff.

<sup>b</sup> Preserved in *YHSF*, ch. 78, p. 69a.

<sup>c</sup> Cf. Vol. 3, p. 405.

<sup>d</sup> The remark of the ancient cosmologist that the heavens were 'as round as a crossbow bullet' (cf. Vol. 3, p. 217 above) may be worth remembering in this connection.

<sup>e</sup> Cf. Vol. 3, p. 305.

<sup>f</sup> Particularly interesting are certain stories (*Shih Chi*, ch. 3, p. 9b; *Han Fei Tzu*, ch. 11, p. 6b) that earthly kings played *liu-po* against deities and sometimes won.

<sup>g</sup> Cf. Vol. 3, p. 242.

1 式	2 彈棊	3 彈棊經	4 蔡邕	5 曹丕	6 丁廡
7 夏侯惇	8 邯鄲淳	9 藝經	10 王褒	11 盧諲	12 賈
13 費	14 柳宗元	15 韋應物	16 六博	17 棊	18 簪

(iv) *Comparative physiology of games*

It would be impossible here to embark on a history of all the games and divination-techniques on which the Chinese encyclopaedias have such a mass of information. It is obvious that the throwing of things lent itself to divination as well as to games from the earliest periods. One of the oldest of such procedures was the 'pitch-pot' game, the throwing of arrows into a pot (*thou-hu*<sup>1</sup>); a game the history of which has been analysed by Montell (1) and by Rudolph (3).<sup>a</sup> The *locus classicus* for this is a long passage in the *Li Chi*, where indeed a whole chapter is devoted to it.<sup>b</sup> This is evidence for early Han and possibly late Chou times. Better evidence for Chou is the mention in the *Tso Chuan*,<sup>c</sup> under date - 529, where the game was recreational. The *Shih Chi* has it<sup>d</sup> in connection with Shunyu Khun,<sup>2</sup> the -4th-century philosopher,<sup>e</sup> and the *Hou Han Shu*<sup>f</sup> in connection with a +1st-century general, Tshai Tsun.<sup>3</sup> In the Chin dynasty there was a special work on it, the *Thou Hu Pien*<sup>4</sup> (Changes and Chances of the Pitchpot)<sup>g</sup> by Yü Than,<sup>5</sup> and later many, such as the *Thou Hu Hsin Ko*<sup>6</sup> of Ssuma Kuang<sup>7</sup> of the +11th century. That it was used for divination appears from numerous quotations in the *Thu Shu Chi Chhêng* encyclopaedia.<sup>h</sup> Rudolph (3) illustrates several pictures of the game from Han tomb carvings (Fig. 350).

Some social anthropologist will produce some day a fully integrated and connected evolutionary story, quite biological in character, showing how all these games and divination-techniques were genetically connected. It would only need markings or numbers on the arrows to have an object which by compression would become a cubical dice, and this again by extension or unfolding would give rise to dominoes on the one hand and playing-cards on the other. Cubical dice (*chhu-phu* or *yü-phu*<sup>8</sup>) are ancient, examples having been found in Egypt and India, and from Graeco-Roman times; it is generally supposed that they reached China from India, and this we may provisionally accept.<sup>i</sup> But it is also now rather well established that dominoes and playing-cards were originally Chinese developments from dice.<sup>j</sup> There are indications, says Carter, that the transition from dice to cards (leaf-dice, sheet-dice; *yeh tzu*,<sup>9</sup>

<sup>a</sup> Be it remembered that the very name of this game includes the same character, *thou*, which appears in the *locus classicus* in the *Lun Hêng* for the 'throwing' of the lodestone spoon on the *shih*'s ground-plate (above, p. 262).

<sup>b</sup> Ch. 40 (tr. Legge (7), vol. 2, pp. 397ff.).

<sup>c</sup> Duke Chao, 12th year (Couvreur (1), vol. 3, p. 195).

<sup>d</sup> Ch. 126, p. 3a.

<sup>f</sup> Ch. 50, p. 10b.

<sup>h</sup> *I shu tien*, ch. 747.

<sup>i</sup> The transmission must have occurred quite early. Waley (8), p. 140, has suggested that the prominence of the number six in the *Book of Changes* was derived from the six sides of a cubical dice. There are Chinese mentions in +406 (Goodrich (1), p. 92) and +501 (Carter (1), 1st ed. p. 139, 2nd ed. p. 183). But Dubs (2), vol. 1, p. 292, refers dice to the Early Han time (-2nd century).

<sup>j</sup> Hummel (15); Wilkinson (2); Carter (1), 1st ed. p. 140, 2nd ed. p. 184. Culin (2) has described modern Chinese games with dice and dominoes. Other influences in the development not of course to be excluded are those of the drawing of lots by long and short sticks (cf. Vol. 2, pp. 305, 347), and of paper money.

<sup>1</sup> 投壺

<sup>2</sup> 淳于髡

<sup>3</sup> 蔡邕

<sup>4</sup> 投壺變

<sup>5</sup> 虞潭

<sup>6</sup> 投壺新格

<sup>7</sup> 司馬光

<sup>8</sup> 摴蒲

<sup>9</sup> 葉子

*phai*<sup>1</sup>)<sup>a</sup> took place at about the same time as the transition from manuscript rolls to paged books. These cards, at their first appearance towards the close of the Thang, must have been among the earliest examples of block printing (cf. Sect. 32 below). After the beginning of the Sung, their evolution forked into two directions, one leading to playing-cards as we know them, the other to dominoes (*ya phai*<sup>2</sup> or *ku phai*<sup>3</sup>), from which again in its turn the famous game of *ma chhiao*<sup>4</sup> ('Mah Jongg') derived.<sup>b</sup> But while the story of playing-cards in China includes firm dates as early as +969, when one of the Liao emperors had card games at court,<sup>c</sup> the earliest reference in Europe is +1377 in Germany.<sup>d</sup> It is strange that there are no references to them in Arabic literature, for the most obvious route of transmission would have been through the Islamic world, and many early European sources say that they came 'from the Saracens'. Still, the dates would readily permit a direct transmission through merchant contacts of the Mongol period more or less contemporary with Marco Polo. The whole question is important with regard to the origins of block printing, for the Chinese cards had long been printed when Europeans came first in contact with them, and it seems that from +1400 some of the European cards were also printed. The earliest European dated religious prints, the Virgin and Child of +1418 and the St Christopher of +1423, coincide closely with St Bernardino's famous sermon against card-playing. Carter concludes that playing-cards have a very important place in the transmission of the art of printing to Europe.<sup>e</sup>

The case of dominoes is quite similar. Western encyclopaedists say that this game was not known in Europe till the +18th century, and that it was invented in Italy. But all Chinese manuals on dominoes, of which there are many, point back to the year +1120, just before the move of the Sung capital to Hangchow, when a set of thirty-two pieces, totalling 227 pips, was presented to the emperor. The *Shuo Fu* collection contains several books on dominoes, one with a preface dated +1368. The chief work on them is the *Phai Thung Fu Yü*<sup>5</sup> of +1639, described by Hummel (15).

There remains one important piece of evidence to fit in to the picture. Culin (1) has given us a remarkable monograph on chess and playing-cards and their related games and divination-techniques in all civilisations. Much of this work is concerned with the divination-techniques and gambling games widespread among the North American Indian tribes, where the pieces are tossed on to, or in, certain special baskets.<sup>f</sup> When I first read this, my attention was caught by the striking fact that in many cases the pieces used were not simple, like draughts-men, or counters, nor numbered, like dice, but complex, like chess-men. The Chippewa Indians, for example,

<sup>a</sup> Carter (1), 1st ed. p. 243.

<sup>b</sup> See Culin (3).

<sup>c</sup> *Liao Shih*, ch. 7, p. 5a; *TSCC, I shu tien*, ch. 807, p. 8a. Schlegel (4), p. 20, maintained that the first of all card-games was fully developed in the course of the +9th century.

<sup>d</sup> Full details in Carter (1), 1st ed. p. 141, 2nd ed. p. 185.

<sup>e</sup> How characteristic it was of a scholarly civilisation that both metal money and bone or ivory dice should all in the end turn into paper.

<sup>f</sup> Analogous to the *shih*. Cf. Weltfish (1).

<sup>1</sup> 牌

<sup>2</sup> 牙牌

<sup>3</sup> 骨牌

<sup>4</sup> 麻雀

<sup>5</sup> 牌統字玉



had a set consisting of two human figures (rulers), two amphibious monsters, one or two war-clubs, one or two fish, four plain counters ('pawns'), and three ducks.<sup>a</sup> The Central Eskimo have a set of various kinds of animals,<sup>b</sup> and that of the Assiniboin of the Upper Missouri includes large and small crows' claws, and various fruit-stones.<sup>c</sup> Pieces themselves might be marked with the four cosmic directions.<sup>d</sup> This throws a good deal of light on the Chinese situation, encouraging the view we have already formed that sets of pieces existed symbolising the celestial bodies, and that divination took place by noting their fall on a prepared board. In this way the model Northern Dipper placed on the *shih* becomes quite comprehensible, and finds an appropriate context in divination-techniques in other parts of the world.

In order to summarise some of the points which have been made about the genetic origin of games and divination-techniques, a provisional chart is offered (Table 53). Pending the appearance of a comprehensive work on the subject, the details are put forward with all reserve, but the chart may well raise other useful suggestions for the early history of science.

#### (9) GENERAL SUMMARY

Looking back over the course of our argument, we see in broad survey a long and slow developmental period in China, followed by sudden appearance and later more rapid advance in the West. Some transmission from east to west our careful chronological titration compels us to recognise. But since the crucial couple of centuries before Alexander Neckam have so far afforded no trace or clue from intermediary regions such as the Arabic, Persian or Indian culture-areas, the possibility arises that this Chinese transmission occurred not in the maritime context at all, but by some overland route through the hands of astronomers and surveyors who were primarily interested in establishing the meridian of their place.<sup>e</sup> Certainly Petrus Peregrinus devotes loving description to two azimuth dial instruments with alidades and inserted compasses (floating in one, dry-suspended on a pivoted spindle in the other). The determination of the meridian on land was of course important not only for cartography but also for such operations as the proper adjustment of sundials, and Europeans at this time still had no horologes more accurate than these. It is certainly a striking fact that as late as the +17th century the needles used in the compasses of surveyors and astronomers were all made so as to indicate the south (in contradistinction to the north-pointing sailor's needles), exactly as all the Chinese needles had done for perhaps as much as a millennium previously.<sup>f</sup> If this conception found favour we might have to envisage an overland westward transmission of the 'astronomer's compass', followed by a western application of it by mariners independently paralleling the earlier application by the sea-captains of China. What we know of the level of culture of the Russians and their Central Asian or Siberian neighbours during the two or three centuries preceding the Mongol invasions, however, might at first sight hardly

<sup>a</sup> Culin (1), p. 694.

<sup>d</sup> Culin (1), p. 701.

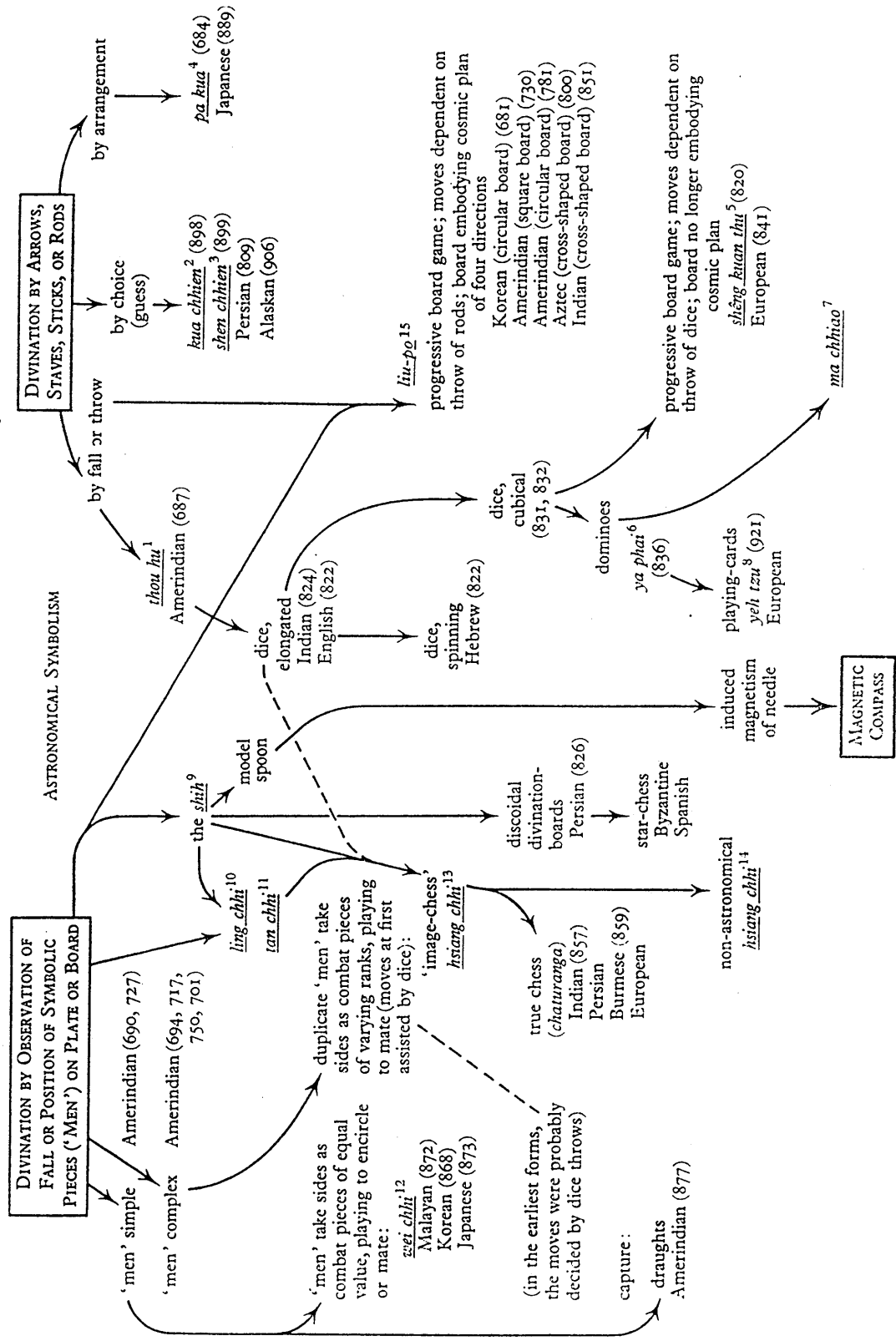
<sup>e</sup> So Lynn White (5), p. 524.

<sup>b</sup> Culin (1), p. 717.

<sup>c</sup> Culin (1), p. 750.

<sup>f</sup> This was shown by Taylor (6).

Table 53. Chart to show the genetic relationships of games and divination-techniques in relation to the development of the magnetic compass. Numbers indicate page-references to the catalogue of Culin (1). Chinese examples underlined.



- <sup>1</sup> 投籃
- <sup>2</sup> 卦筮
- <sup>3</sup> 神籤
- <sup>4</sup> 八卦
- <sup>5</sup> 昇官圖
- <sup>6</sup> 牙牌
- <sup>7</sup> 麻雀
- <sup>8</sup> 葉子
- <sup>9</sup> 式
- <sup>10</sup> 靈筮
- <sup>11</sup> 彈筮
- <sup>12</sup> 圍棋
- <sup>13</sup> 象棋
- <sup>14</sup> 象筮
- <sup>15</sup> 六博

encourage us to believe in such a route for a scientific discovery. It is true, of course, that the feats of the needle and the stone may well have been thought of in a magical-technological rather than a scientific way by those who would have carried them across the length of the heartland. Evidently there is room for much further study of the possibilities of transmission from China to Europe through the Steppe peoples and the Russians, avoiding the Islamic, Byzantine and Indian culture-areas;<sup>a</sup> in the meantime many may well prefer to believe that in fact the mariner's compass was what was handed on, and that texts as yet unknown in Arabic or more easterly sources will yet inform us about how the sailors of the Indian Ocean did it.

The subsection just preceding may have seemed somewhat anomalous in a Section devoted to the history of physics in China. The modern physicist who may have read it will have found himself straying in fields which at first sight could have no conceivable connection with that science as it is today. Yet the problem was a fundamental one, namely to elucidate the first origins of the ancestor of all dial- and pointer-readings, the magnetic compass. Let us sum up the results in the following provisional way.

(1) The game of chess (as we know it) has been associated throughout its development with astronomical symbolism, and this was even more overt in related games now long obsolete.

(2) The battle element of chess seems to have developed from a technique of divination in which it was desired to ascertain the balance of ever-contending Yin and Yang forces in the universe (+6th-century China, whence it passed to +7th-century India, generating there the recreational game).

(3) This 'image-chess' derived in its turn from a number of divination-techniques which involved the throwing of small models, symbolic of the celestial bodies, on to prepared boards. There were intermediate forms between pure throwing and placement followed by combat moves. All these go back to Han or pre-Han China (-3rd century). Similar techniques have persisted in other cultures.

(4) Numbered dice, anciently widespread, were on a related line of development which gave rise to dominoes and playing-cards (+9th-century China).

<sup>a</sup> Here the Qarā-Khiṭāi or Western Liao kingdom presents interesting possibilities. It will be remembered (cf. Vol. 3, pp. 118, 457) that persistent tradition in China has ascribed to this country the transmission of scientific and technical knowledge to the West. The 'Black Chhi-tan' was a succession-state of the Liao dynasty established in +1124 by exiles who followed Yehlü Ta-Shih as Gurkhan to Western Sinkiang after the liquidation of that empire by the Jurchen (Chin) Tartars. It lasted under a succession of rulers until the gathering might of the Mongols swept it away in +1211. Centred on Kashgar, it included Samarqand in the west and Turfan in the east; Chinese was its official language, and Chinese literature had prestige value as the 'Latin' of the East in its culture. In religious matters the Qarā-Khiṭāi were very tolerant, and Christianity flourished side by side with Shamanism, Buddhism and Islam (cf. Wittfogel, Fêng Chia-Shêng *et al.* (1) pp. 670ff.); indeed we have already noted (Vol. 1, p. 133) that the Western legend of Prester John originated precisely from the existence of this State. Assuredly it had mercantile and cultural contacts with the Russian principdoms of Novgorod, Vladimir and Kiev. In fact, its dates, spanning as they do the +12th century, are exactly right for the spread of knowledge of the magnetic compass to the West. Yet we shall find, disturbingly, in Sect. 29, that another maritime invention, that of the stern-post rudder, also reached Europe from China towards the close of the +12th century—and the transmission of something like this by a non-maritime route would be still harder to believe.

(5) The most significant of the ancient boards was the *shih* (used from the late Warring States period onwards), a double-decked cosmical diagram having a square earth-plate surmounted by a rotatable discoidal heaven-plate, both being marked with cyclical and astronomical signs (compass-points, *hsiu*, etc.) as well as *kua* and technical terms used only in divination. 'Pieces' or symbolic models were employed with this in a variety of different ways. In the round heaven-plate of the *shih* we may recognise the lineal ancestor of all compass-dials.

(6) Among the symbolic models used was one representing the Great Bear (the Northern Dipper)—so important in Chinese polar-equatorial astronomy—carved into the shape of a spoon. This replaced the picture of the Great Bear carved on the heaven-plate of the diviner's board.

(7) The model spoon was probably first of wood, stone or pottery, but in the +1st century (and possibly already in the -2nd century), the unique properties of magnetite suggested in China the use of this substance. Since polarity would establish itself along the main axis of a bar of the mineral, whether or not it was removed from the rock in a north-south direction (i.e. in the earth's magnetic field), the 'south-pointing spoon' was discovered. Some examples, of course, must have pointed north, as indeed the texts indicate.

(8) During later centuries the frictional drag of the lodestone spoon on its base-plate was avoided by inserting the piece of lodestone in a piece of wood with pointed ends, which could be floated, or balanced upon an upward-projecting pin. Such methods were used as late as the +13th century.

(9) Some time between the +1st and the +6th century it was found in China that the directive property of the lodestone could be transferred to (induced in) the small pieces of iron which the lodestone attracted. These also could be made to float upon water by suitable devices. The earliest description still extant of such water-compasses, from which all subsequent forms must derive, is of the early +11th century.

(10) Some time before the +11th century it was discovered in China that magnetisation could be carried out not only by rubbing the pieces of iron on the lodestone, but by cooling them (quenching) from red heat, through the Curie point, while held in a north-south direction (the earth's magnetic field).

(11) Probably by the +7th or +8th century the needle was replacing the lodestone, and pieces of iron of other shapes, on account of the much greater precision with which its readings could be taken.

(12) Although the first clear and accurately datable descriptions of the magnetic compass, with needle, antedate European knowledge of it only by one or two centuries (Shen Kua, Wang Chi, Hsieh Ho-Chhing), it is probable that the Chinese use of the compass-needle is some three or four centuries older.

(13) By the late Tang period (+8th or +9th century) the declination, as well as the polarity, of the magnet, had been discovered, antedating European knowledge of the declination by some six centuries. The Chinese were theorising about the declination before Europe knew even of the polarity (end of the +12th century).

(14) The successive declinations, first eastern and then western, were embodied in

the design of the Chinese geomantic compass as concentric circles which have persisted until our own time.

(15) The compass was undoubtedly employed in China for geomancy a long time before it was used to assist navigation.

(16) The first clear and accurately datable description of the use of the compass for navigation on Chinese ships antedates the first knowledge of this technique in Europe by just under a century, but there are indications that it was used for this purpose in China somewhat earlier.

(17) Chinese sailors remained faithful to the floating-compass for many centuries. Although the dry pivoted compass had been described early in the +12th century, it did not become common on Chinese vessels until it was reintroduced from the West in the +16th century by the Dutch and Portuguese by way of Japan. Associated then with it was the compass-card (the wind-rose attached to the magnet) which had probably been an Italian invention at the beginning of the +14th century.

(18) The ancestor of all dial- and pointer-readings, the greatest single factor in the voyages of discovery, and the oldest instrument of magnetic-electrical science, may thus perhaps be said to have begun as a proto-'chess'-man used in a divination-technique.

(19) Magnetical science, unlike Euclidean geometry and Ptolemaic planetary astronomy, was an essential component of nascent modern science the antecedents of which were not primarily Greek (cf. pp. 60, 236 above). All the preparation for Pierre de Maricourt, and hence for the ideas of Gilbert and Kepler on the cosmic role of magnetism, had been Chinese; and they in their turn, with their belief that gravity must be something like magnetic influence, were an important part of the preparation for Newton. The field physics of still later times, firmly established in Clerk Maxwell's classical equations and more congruent with organic thought than Greek atomic materialism, can again be traced back to the same root. Much is owing to the faithful and magnificent experimenters of medieval China.