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cision and in all her actions there must be no step taken alone, but only after counsel and direction is she to move, and only after definite proof is she to speak. In the day-time let her not step out into the court for pleasure, and at night only with a light may she cross the thresh-hold. These are things right and proper for women.

"There are five things that will disqualify a woman for marriage,

First, if she is the daughter of a rebel or out law.

Second, if she belongs to a family that has broken nature's laws.

Third, if her ancestry is one branded with marks of imprisonment.

Fourth, if her family has been diseased for generations.

Fifth, if she is a fatherless child and untaught.

"There are seven reasons for which a woman may be put away by her husband:—

First, if she is rebellious toward her parents-in-law.

Second, if she has no children.

Third, if she is unfaithful to her husband.

Fourth, if she is jealous-minded.

Fifth, if she has an incurable disease.

Sixth, if she is given to hurtful talk and tale-bearing.

Seventh, if she is a thief.

"There are however three conditions that modify these, and in view of anyone of them the woman cannot be put away although she has fallen under one or more of the reasons for divorce.

The three condition are:

First, if she has no father or brothers living to whom she can be sent.

Second, if she has worn mourning for three years for her parents-in-law.

Third, if the husband has risen from poverty to riches while she was his wife.

THE CELESTIAL PLANISPHERE OF KING YI TAI-JO.

By W. CARL RUFUS.

INTRODUCTION.

The presumption of the writer in attempting this paper, when he has spent less than five years in Korea, may be partially justified by the kindness of the encouragement and assistance given by our president, Dr. Gale.

Korean astronomy and astrology have received little attention by students of this country, altho material abounds on every side. Voluminous astronomical works, prepared by royal order, have been published and cherished by the Emperors of Korea. The Mun-hun-pi-go 文獻備考, the great Korean Encyclopedia, gives first place to these subjects, in deference to King Chung-jong 正宗, the originator of the monumental work, who believed in the fatherhood of heaven and motherhood of earth. Dynastic histories chronicle solar and lunar eclipses; the Sam-kuk-sa 三國史 records these important events at the beginning of the history of each reign. The ancient kingdom of Silla 新羅 possessed an observatory, the ruins of which may be seen near its capital Kyung-ju 慶州. In the government museum, Chang-duk Palace, Seoul, are displayed specimens of old astronomical apparatus, including an armillary sphere, a clepshydra, an old iron clock frame, a marble *gnomic* plane, an oblique sun dial, a moon dial or month measure, a brass astrolabe and stellar planisphere of the northern hemisphere, a nameless pear-shaped instrument in a small case, and a marble celestial planisphere or astronomical chart, which is the subject of this paper.

A brief introduction suggesting the infiuence of astronomical and related physical ideas upon Korean thought and life offers a good avenue of approach to our subject.

Korea seems to have contributed little to cosmogony, but *accepts* a physical universe peopled with spirits and an earth possessing vegetation and animal life. The genesis of human life was due to a celestial spirit, who wished to establish an earthly kingdom, and a bear that desired to become a human being. The animal first became a woman, upon whom the spirit breathed. This union produced the Tan-gun, by tradition the first king of Korea. (Hulbert, History of Korea, P. 1.)

The stars in their stately courses have contributed to the *making of Korean history.* We read that Keui-ja 箕子, the reputed founder of Korean civilization, 1122 B.C., "guided, or at least influenced, by the reigning constellation, sailed up the Taitong river." (Korean Repositor Vol. 2, P. 83.) established his capital at Pyeng Yang and gave his nine laws to the land. Now we are also confronted with a myth which would identify Viscount Keui with the asterism Keui, 箕, seventh of the 28 zodiacal constellations of the ancients! (A Comparative Table of the Ancient Lunar Asterisms, by T. W. Kingsmill, proceedings of China Branch of Royal Asiatic Society, Vol. 26, P. 59.) Add the history and the myth, subtract the astrolatry of the oriental, multiply by the lapse of years and divide by the demands of science, and the unknown quantity proves the effect of astrology upon the Korean mind. Physical phenomena have changed the course of events. Ancient Silla was once saved by a meteor that fell in the camp of the enemy, because it foretold destruction (Korea Review, Vol. 1, P. 135). Pyeng Yang was prevented from becoming the modern capital by an unpropitious hailstorm. (Korea Review, Vol. 2, P. 179). During the seventeenth century the army was ordered out upon the appearance of two comets presaging war. (Griffiis, The Hermit Nation, P. 173). Eclipses, earthquakes, fighting clouds, showers of various articles, thunder in winter, two suns in a day, black spots in the sun, and a white bow in the sun, have also contributed to Korean, history. In warfare the celestial army has rendered service; also the miraculous Moon Fortress, the ruins

of which are near Taiku. Swords and armor were emblazoned with constellations and astronomical inscriptions.

In *religion*, the thermometer of a people's life, the physical universe has exerted a powerful influence. Temples are erected for the worship of heaven, the earth and the seven stars; spirit houses are dedicated to the color gods of the five divisions of the sky, to the constellations and the stars, e.g., the Old Man Shrine, in honor of the No-in 老人 star. (The Spirit Worship of the Koreans, Jones, Korea Branch of Royal Asiatic Society, Vol. 2, P. 37). There are also forms of moon worship; men pray to the Pleiades, bow to Venus, and the Emperor as late as 1900 sacrificed for rain. The kitchen god may be a vestige of former sun-worship; in 1235 the King, in refuge on Kangwha island, turned sun-worshiper to obtain peace for the land. The Buddhist counts his 33 heavens and the 28 constellations on the beads of his rosary. Religious feasts and festivals and national holidays commemorate astronomical events. Around these occasions cluster the most characteristic customs of the race, many of which cling to the present day, partly thru the influence of the Yuk-kwă-chăk 六掛丹, an Unmoon book, sown by the thousand thruout the land, indicating the guiding star of every year of life from 10 to 64, and the precautionary measures necessary to ward off evil and to secure success on various undertakings. The almanac for this year in daily use, by employing various astrological cycles indicates numerous combinatious propitious or unpropitious for marriages, funerals, journeys, business ventures and other affairs of life.

As the earth supposedly was patterned after the heavens, *geography* up to recent times registered the vagaries of ancient star-gazers. Earth was pictured as a four-square plane booked at the corners for support in the all-sustaining heavens. Maps of the nations were unknown; their approximate positions, determined by the orientation of the geomancer's cycle, were marked by squares on a grotesque chart. The divisions of the compass have astrological designations. *Language* and *literature* also bear the same impress. The 28 constel-

lations had a part in the origin of the Korean alphabet originally of 28 letters. Proverbs and the folk lore of the country are enriched by astronomical allusions. What is more poetic than this conception,—"The stars are made of the purity of everything?" Or this,—"A shooting star is a bridegroom hurrying to his bride?" This may be difficult of appreciation,—"A silk-worm's eye-brow moon,"—said of a moon a few days old. What do you think of this,—"Scattering flowers of heaven,"—to designate the ravages of the small-pox fiend? The coinage of this country is said to have included the star money, Sung-jun, 星錢 of Silla, which is omitted by some numismatists, so we make the following quotation. (Korea Review, Vol. 2, P. 339-340) "Another Silla coin was the Sung-jun 星錢 or "Star Money." This the writer has seen. It is a round cash with a round hole and the impress of two stars; on the reverse is the legend (應天通寶) "Heaven sanctioned eastern treasure.": "We have before us also a large coin called (七星錢) meaning 'seven star money.' It is made in imitation of a Silla coin. It bears a picture of the Great Bear constellation on the edge and a cloud in the center, the latter being the national emblem of Silla, as the plum blossom is of this dynasty. On the reverse is the inscription (如星之長而表世之助) a free translation of which would be 'as faithful as the stars.'" Lockhart, "Coins of the Far East," presents many coins used as amulets bearing the impress of stars and astronomical inscriptions. The Korean *pharmacopoeia* includes a pill formed by splitting the seed of an apricot, writing sun on one part and moon on the other, and sticking them together with honey. (Korea Review, Vol. 3, P. 65.) Divination by stars has been widely practiced, probably the knowledge of the stars was chiefly cultivated and a royal board of astronomers maintained for the purpose. Much of Korean prophecy is stigmatized as *ex post facto* so we omit examples of astromancy.

These illustrations could be multiplied many fold, suggesting the influence of the physical universe upon Korean thought. We have noted especially the deep impress of the starry heavens upon the most ordinary affairs of life. Even the prosaic pig is said to bear seven spots on its hind legs resembling the seven stars, but for reasons patent to anyone aquainted with this dejected animal, cast out from heaven by the Celestial Dragon, the writer has not ventured to verify the asseveration.

THE STONE MODELS.

In the government museum, Chang-duk Palace, Seoul, may be seen two stone models of our subject, bearing the date, Hong-mu 洪武 28th year, 12th month (December, 1395). The older stone, a huge slab of slate, shows marks of transportation and water erosion, rendering the inscription partly illegible; both sides are engraved, but symmetry and proportion are lacking. Special interest, however, centers in this monument, which presents our subject in its oldest Korean garb. The newer stone is an excellent piece of white marble, well preserved; the dimensions are $6'\ 11''\times 3'\ 3''\times 1'\ 0''$ and approximate weight 3975 pounds. A studied symmetry pervades the plan; the mensuration is quite accurate, the proportion good and the workmanship excellent.

We learn from the Mun-hun-pi-go, Book 3, P. 29-30, that the old stone made in 1395 was originally kept at the Kyung-bok Palace. In 1434 (Syun-duk Kap-in 宣德甲寅) near the Kang-yung-chun 康寧殿 was constructed the Heum-kyung-kak 欽敬閣 in which the planisphere was placed. This building was destroyed by fire, was rebuilt on the site of the ruins, and was again destroyed in 1592 at the time of the Japanese invasion. The Heum-kyung-kak was next built inside the Syu-rin-mun 瑞麟門, Chang-duk Palace, in 1614 (Man-yuk Kap-in 萬曆甲寅), but was torn down by King Hyo-jong 孝宗 in 1656 when he built the Man-su-chun 萬壽殿. The old stone, however, had been left at the Kyung-bok Palace. King Suk-jong 肅宗, (1674-1720), revived the interest in Astronomy. In the 13th year of his reign he ordered Yi Min-chul 李敏哲 to repair the turning-sphere of the preceeding dynasty. Finding that the planisphere

of Yi Tai-jo was old and indistinct, he ordered a new stone engraved, (the marble model now exhibition), and built a new house to shelter it. Still the old model was neglected. King Yung-jong 英宗 (1724-1776) heard that the old protograph was in Kyung-bok Palace and ordered the Minister of Finance to transport it to the Bureau of Astronomy in the 46th year of his reign. He put the old stone with the new model in the small house which he christened the Heum-kyung-kak, recorded the history of the planisphere on a wooden tablet, which we have not yet been able to find, and revised the Chūng-sung-ki, which revision is preserved in the chapter on meridian stars in Book 2 of the Mun-hun-pi-go. The last Heum-kyung-kak, which stood north-east of the old stone mount for celestial observations in the present museum grounds, has recently been removed, and the stones transferred to their present location.

The only foreign mention of the planisphere that we have found is in the Bibliographie Coréenne by Courant. (Vol. 3, P. 28-29.) He honors this production with a half-page descriptive article and the insertion of an excellent print 9″, by 16″. Concerning the stone models he says: "The engraving of the present chart was made by order of the King in 1395 (Hong-mu 28) according to a rubbing of a more ancient stone, that was previously kept in Pyeng Yang, but had been lost; different corrections were made from the ancient chart." "The planisphere of 1395, having become worn little by little, a new model was engraved on stone in the 18th century with no modification whatever."

In the study of the contents an old rubbing of the chart now in our possession has been used, altho frequent reference to the original has been made.

OUTLINE OF SUBJECT MATTER.

The title is, A Chart of the Regular Divisions of the Celestial Bodies (天象列次分野之圖)

Its contents are :—

1.—The central astral chart,
2.—A table of the twelve zodiacal divisions,
3.—A circular chart of the constellations culminating at dark and dawn for the 24 solar periods,
4.—A short treatise on the sun,
5.—The moon,
6.—The heavens,
7.—A table of the 28 zodiacal constellations or lunar mansions,
8.—A history of the chart.

TRANSLATION.

The Sun.

The sun is the essence of the great positive element and the head of all the positive creation. It travels 24 degrees on both sides of the equator (red road). When the sun is distant it is cold, when near it is hot, and when midway it is mild. The positive element operates thus; the sun proceeds north, the days are long and nights short, and because the positive prevails it becomes warm and then hot. The negative works in this way: the sun retires to the south, the days are short and nights long, and because the negative prevails it becomes cool and then cold. If the sun travels south or north the degrees change; when it proceeds and remains at a long distance it is cold all the time, when it returns and remains at a short distance it is warm all the time. So it directs the beneficent power of life and growth.

Being the symbol of sovereignty, when it traverses the countries possessing knowledge, the days are bright and glorious. Then the king flourishes in prosperity and the people dwell in peace.

The stars are the glory of the positive essence. The positive element produced the sun, the sun divided and formed the stars; so the character *sung* 星 (star) corresponds with *il* 日 (sun) with *säng* 生 (beget) underneath. In the Suk-myung

釋名 it is said that the stars scattered and spreading out dotted the heavens.

The Moon.

The moon is the essence of the great negative element and the head of the whole negative creation. So it is the sun's mate, the symbol of the queen; and comparing with virtue it has the meaning of punishment. It also typifies all the feudal kings and ministers of the court.

When it travels east of the ecliptic (yellow road) it is called the azure road; south of the ecliptic, the red road; west, the white road; north, the black road. The four roads both on the inside and outside of the ecliptic together with the ecliptic make the nine roads.

Ecliptic and Equator.—The road in which the sun dwells is called the ecliptic; and the one midway between the north and south poles, where the degrees are equal, is called the equator. The ecliptic is half outside and half inside of the equator. In the east they intersect a little preceding the fifth degree of Horn, (Kak 角) and in the west a little beyond the fourteenth degree of Astride, (Kyu 奎).

Discussion of the Heavens.

In the Ch'in Chi 晋志 the scholars of old say that the form of heaven and earth resembles an egg; the heavens on the outside enclosing the earth, like a shell with the yolk inside. The surrounding part revolves without end. Because the form was utterly chaotic it is called chaos-theory heaven, (Hon-chun 渾天).

During the Ch'in 晋 dynasty, Kal Hong 葛洪 said that the circumference of the heavens is 365 1/4 degrees; half covers the earth overhead and half surrounds the earth underneath, so half of the 28 constellations are visible and half invisible as the heavens revolve like a wheel.

Also it is said that at the time of the Song 宋 dynasty Ha Sung-Chun 何承天 examined the chaos-theory globe and investigated the theories of the heavens, thereupon he perceived

that the heaven is truly round and half of it is water, also that the middle of the earth is high, the outside is lower, and water surrounds the lower part.

Also at the time of the Yang 梁 dynasty Cho Whon 祖暅 said that the shape of the chaos-theory heaven inside is round like a ball. In general in the discussions among astronomers there were six theories.

1. The so-called chaos-theory heaven, which Chang Hyung 張衡 recorded.
2. Canopy heaven (Kai-chun 盖天) whose laws Chu Bi 周髀 expounded.
3. Night revealing (Syun Ya 宣夜) whose laws were without a teacher.
4. Stationary heaven (An-chun 安天) advocated by Oo Hi 虞喜.
5. Dawn heaven (Heun-chun 昕天) advanced by Yo Sin 姚信.
6. Lofty heaven (Kung-chun 穹天) advanced by Oo Yong 虞耸.

The canopy heaven and all the subsequent theories seem unreasonable, surpassing credulity; at least the ancient scholars did not esteem them of much value.

History of the Chart.

The lost model stone of the above astronomical chart was kept in Pyeng Yang, but on account of the disturbance of war it was sunk in the river; many years having passed since it was lost, existing rubbings of the original were also out of stock.

However, when His Majesty began to reign, a man having one of the originals tendered it to him. His Majesty prized it very highly and ordered the court astronomers to engrave it anew on a stone model. The astronomers replied that the chart was very old and the degrees of the stars were already antiquated; so it was necessary to revise it by determining the present midpoints of the four seasons and the culminations at dark and dawn and to engrave an entire new chart designed for the future.

His Majesty responded, "Let it be be so!"

They spent the time until the sixth moon of Eul Hai 乙亥 (1395) preparing the new Chŭng-sung-ki 中星記 when part I was written out. On the old chart at the beginning of Spring (Ip-chun 立春) Pleiades (Myo 昴) culminated at dark (Hon 昏) but now Stomach (Wi 胃) does. Consequently the 24 solar divisions were changed in succession to correspond with the meridian stars of the old chart. The stone was carved and just now completed.

Thereupon His Majesty commanded me, his obedient servant, Keun 近, to make a record to come after the other part. His humble servant, Keun, calling to mind that from ancient times the emperors have not neglected the worship of heaven, and the directors and have made it their first duty to arrange the calendar, the celestial signs and sacrificial seasons, as Emperor Yo 堯 commanded Hi 羲 and Ha 和 to set in order the four seasons, and Emperor Sun 舜 had the turning sphere and transverse tube and put in order the seven directors, faithfully worshiped heaven and diligently served his people, so I respectfully think that these duties are not to be neglected.

His wise, beneficent, martial, Imperial Majesty ascended the throne upon the abdication of his predecessor and throut the whole country brought peace and prosperity, comparable to the virtuous achievement of the Emperors Yo and Sun. He gave great official attention to astronomy, revising the mid-seasons and stars, even the directors of Yo and Sun. In this way, I believe, by observing the heavenly bodies and making astronomical instruments he sought to find out the mind of Yo and Sun and to emulate their most worthy example.

His Majesty exemplified this pattern to the hearts of all; upward by observing the heavens and seasons, downward by diligently serving the people. So thru his spiritual achievements and prosperous zeal, he also, together with the two emperors, stands highly exalted. Moreover he had this chart engraved on pure marble to be an eternal treasure for his descendents for ten-thousand generations.

All ye who read, believe!

The following is abridged.

Kwon Keun 權近 received royal ordinance to make the record; Ryu Pang-taik 柳方澤 to supervise the computations and Sul Kyung-su 偰慶壽 to write the characters.

The astronomers who helped were, Kwon Chung-wha 權仲和 Choi Yŭng 崔融, No Eul-chŭn 盧乙俊, Yun In-yong 尹仁龍, Chi Sin-won 池臣源, Kim Toi 金堆, Chŭn Yŭn-kwon 田潤權, Kim Cha-yŭ 金自綏 and Kim Hŭ 金侯.

Hong Mŭ 28th year, twelfth month. (Dec. 1395).

TABLE I.—MERIDIAN STARS AT DARK AND DAWN FOR THE 24 SOLAR PERIODS.

No	Solar Period.		Culminating at Dark.		Culminating at Dawn.	
1	冬至 Winter solstice	Dec. 22	室 House	6:17	軫 Crossbar	5:43
2	小寒 Slight cold	Jan. 6	壁 Wall	6:20	亢 Neck	5:40
3	大寒 Sevre cold	Jan. 21	奎 Astride	6:28	氐 Bottom	5:32
4	立春 Spring opens	Feb. 5	胃 Stomach	6:40	氐 Bottom	5:20
5	雨水 Rainy weather	Feb. 19	畢 End	6:56	心 Heart	5:04
6	驚蟄 Insects awake	Mar. 5	參 Mix	7:14	尾 Tail	4:46
7	春分 Vernal equinox	Mar. 20	井 Well	7:35	尾 Tail	4:25
8	淸明 Clear and Bright	April 5	井 Well	7:58	箕 Sieve	4:02
9	穀雨 Crop rains	April 20	星 Star	8:22	斗 Measure	3:38
10	立夏 Summer begins	May 5	張 Draw a bow	8:47	斗 Measure	3:13
11	小滿 Grain fills	May 20	翼 Wing	9:10	牛 Ox	2:50
12	芒種 Bearded grain	June 6	軫 Crossbar	9:27	女 Girl	2:33
13	夏至 Summer solslice	June 21	亢 Neck	9:34	危 Danger	2:26
14	小暑 Slight heat	July 7	氐 Bottom	9:27	室 House	2:33
15	大暑 Great heat	July 23	房 Room	9:10	壁 Wall	2:50
16	立秋 Autumn begins	Aug. 7	尾 Tail	8:47	奎 Astride	3:13
17	處暑 End of heat	Aug. 23	尾 Tail	8:22	胃 Stomach	3:38
18	白露 White dew	Sept. 8	箕 Sieve	7:58	昴 Pleiades	4:02
19	秋分 Autumn equinox	Sept. 23	斗 Measure	7:35	參 Mix	4:25
20	寒露 Cold dew	Oct. 8	斗 Measure	7:14	井 Well	4:46
21	霜降 Frost descends	Oct. 23	斗 Measure	6:56	井 Well	5:04
22	立冬 Winter begins	Nov. 7	女 Girl	6:40	星 Star	5:20
23	小雪 Slight snow	Nov. 22	虛 Emptiness	6:28	張 Draw a bow	5:32
24	大雪 Heavy snow	Dec. 7	危 Danger	6:20	翼 Wing	5:40

TABLE II.—TWELVE ZODIACAL DIVISIONS.

Number.	Table on the chart: Limits.	Extent.	Name of Division.	Corresponding State.	Province.	Branches.	Direction.	Animal.	Zodiacal Sign on Astral chart.	
1	Crassbar 12 to Bottom 4° ...	31	壽星 수성	鄭 Chung	兗州 Yun	辰진	E.S.E.	Dragon.	天秤宮	Celestial Balance (Libra)
2	Bottom 5° to Tail 9°	30	大火 대화	宋 Song	豫州 Yea	卯묘	E.	Rabbit	天蝎宮	Celestial Scorpion (Scorpio)
3	Tail 10° to Measure 11° ...	31	析木 석목	燕 Yun	幽州 Ū	寅인	E.N.E.	Tiger.	人馬宮	Man and Horse (Sagittarius)
4	Measure 12° to Girl 7°	30¼	星紀 성기	吳越 Oh Wol	楊州 Yang	丑축	N.N.E.	Ox.	磨蝎宮	Ma Kal (Capricornus)
5	Girl 8° to Danger 15°	30	玄枵 현오	齊 Che	青州 Chung	子자	N.	Rat.	寶瓶宮	Precious Water Bottle (Aquarius)
6	Danger 16 to Astride 4	31	娵訾 취자	衛 Wi	幷州 Pyung	亥히	N.N.W.	Pig.	雙魚宮	Two Fish (Pioces)
7	Astride 5 to Stomach 6.....	30	降婁 항루	魯 Ro	徐州Sŭ	戌술	W.N.W.	Dog.	白羊宮	White Sheep (Aries)
8	Stomach 7 to End 11	30	大梁 대량	趙 Cho	冀州 Ki	酉유	W.	Fowl.	金牛宮	Golden Ox (Taurus)
9	End 12 to Well 15.....	31	實沈 실침	晋 Chin	益州 Ik	申신	W.S.W.	Monkey.	陰陽宮	The two Primordial Essences (Gemini)
10	Well 16 to Willow 8.....	30	鶉首 순수	秦 Chin	雍州 Ong	未미	S.S.W.	Sheep.	巨蟹宮	Great Crab (Cancer)
11	Willow 9 to Draw a bow 16	30	鶉火 순화	周 Choo	三河 Sam Ha	午오	S.	Horse.	師子宮	Lion (Leo)
12	Draw a bow 17 to Crossbar 11	31	鶉尾 순미	楚 Cho	荊州 Hyung	巳사	S.S.E.	Snake.	雙女宮	Two Women (Virgo)

TABLE III.—THE 28 ZODIACAL CONSTELLATIONS OR LUNAR MAŃSIONS.

As given on chart: Number.	Sign.	Number of Stars.	Extent in Degrees.	Polar Distance.	Right Ascention.	English Designation.	Corresponding Element.	Corresponding Animal.	Approximate Constellation or Prominent Star.	Influence.
						Eastern Dierction, Azure Dragon, 32 stars, 75 degrees.				
1	角각	2	12	91	188	Horn,	Wood,	Hornless Dragon,	Spica,	Propitious.
2	亢항	4	9	89	200	Neck,	Metal,	Dragon,	Virgo,	Drought.
3	氐뎌	4	15	97	209	Bottom,	Earth,	Badger,	Libra,	Bankruptcy, suicide, divorce disasters.
4	房방	4	5	108	224	Room,	Sun,	Hare,	Scorpio,	Lucky.
5	心심	3	5	108	229	Heart,	Moon,	Fox,	Antares,	Lawsuits, imprisonment.
6	尾미	9	18	120	234	Tail,	Fire,	Tiger,	Scorpio,	Riches, honor.
7	箕긔	4	11	118	252	Sieve,	Water,	Leopard,	Sagittarius,	Lucky, prosperous.
						Northern Direction, Sable Warrior, 35 stars, 98 degrees.				
8	斗두	6	26½	116	263	Measure,	Wood,	Gryphon,	Sagittarius,	Propitious.
9	牛우	6	8	106	289½	Ox,	Metal,	Ox,	,,	Unpropitious.
10	須女수녀	4	12	106	297½	Trysting Maiden,	Earth,	Bat,	Aquarius,	Sisters unchaste, brothers brutal diseases.
11	虛허	2	10	104	309½	Emptiness,	Sun,	Rat,	,,	Scarcity.
12	危위	3	17	99	319½	Danger,	Moon,	Swallow,	,,	Evil.
13	營室영실	2	16	85	336½	House,	Fire,	Boar,	Markab,	Fortunate.
14	東壁동벽	2	9	85	352½	Eastern Wall,	Water,	Porcupine,	Alpheratz,	Fortunate.

TABLE III.—THE 28 ZODIACAL CONSTELLATIONS OR LUNAR MANSIONS.

Number.	Sign.	As given on chart. Number of Stars.	Extent in Degrees.	Polar Distance.	Right Ascention.	English Designation.	Corresponding Element.	Corresponding Animal.	Approximate Constellation or Prominent Star.	Influence.
						Western Direction, White Tiger, 51 star,			80 degrees.	
15	奎규	16	16	77	361¼	Astride,	Wood,	Wolf,	Miraeh,	Unlucky.
16	婁루	3	12	80	12	Mound,	Metal,	Dog,	Aries,	Propitious.
17	胃위	3	14	72	24	Stomach,	Earth,	Pheasant,	,,	Propitious.
18	昴묘	7	11	74	38	Pleiades,	Sun,	Cock,	Pleiades,	Unlucky.
19	畢필	8	16	78	49	End,	Moon,	Raven,	Hyades,	Fortunate.
20	觜주	3	2	84	65	Bristle up,	Fire,	Monkey,	Orion,	Fortunate.
21	參숨	10	9	94	67	Mix,	Water,	Ape,	,,	Unpropitious.
						Southern Direction, Vermilion Sparrow, 64 stars,			112 degrees.	
22	東井동정	8	33	69	76	Eastern Well,	Wood,	Tapir,	Gemini,	Luck.
23	輿鬼여귀	5	4	68	109	Imp.	Metal,	Sheep,	Cancer,	Terror.
24	柳류	8	15	80	113	Willow,	Earth,	Muntjak,	Hydra,	Similiar to 23.
25	星성	7	7	91	128	Star,	Sun,	Horse,	Alphard,	Similiar to 23.
26	張장	6	18	97	135	Draw a bow,	Moon,	Deer,	Hydra,	Peaceful.
27	翼익	22	18	99	153	Wing,	Fire,	Serpent,	Crater,	Misfortune.
28	軫진	4	17	98	171	Cross bars,	Water,	Worm,	Corvus,	Prosperity.

NOTES ON THE CONTENTS.

HISTORY.

The *Mun-hun-pi-go, Book 2, P. 22, introduces* the chapter on meridian stars (chung sung 中星) as follows: "The fixed stars move to the east 51 seconds per year, so the meridian stars are not the same now as they were in former times. At the beginning of the reign of His Majesty, Yi Tai-jo, the founder of this dynasty, a man of Pyeng Yang presented him with an old astronomical chart. The astronomers informed His Majesty that the chart was very old, so the degrees of the stars were antiquated; and requested him to revise it and to determine anew the four midseasons and the meridian stars of dark and dawn. His Majesty assented, and in the sixth month of Eul Hai (1395) he completed the Chūng-sung-ki 中星記 containing the meridian stars of dark and dawn for the 24 solar periods, revising them from the old chart. The astrography according to the old chart and the meridian stars according to the new compilation were engraved directly on a stone. Since the founding of this dynasty, 300 years ago, the fixed stars have again changed, therefore the following new list is compiled according to the Imperial Almanac." The Chung-sung-ki of Yi Tai-jo is given in Book 3, P. 30-32, and a part of the history of the chart is quoted exalting the memory of His Majesty.

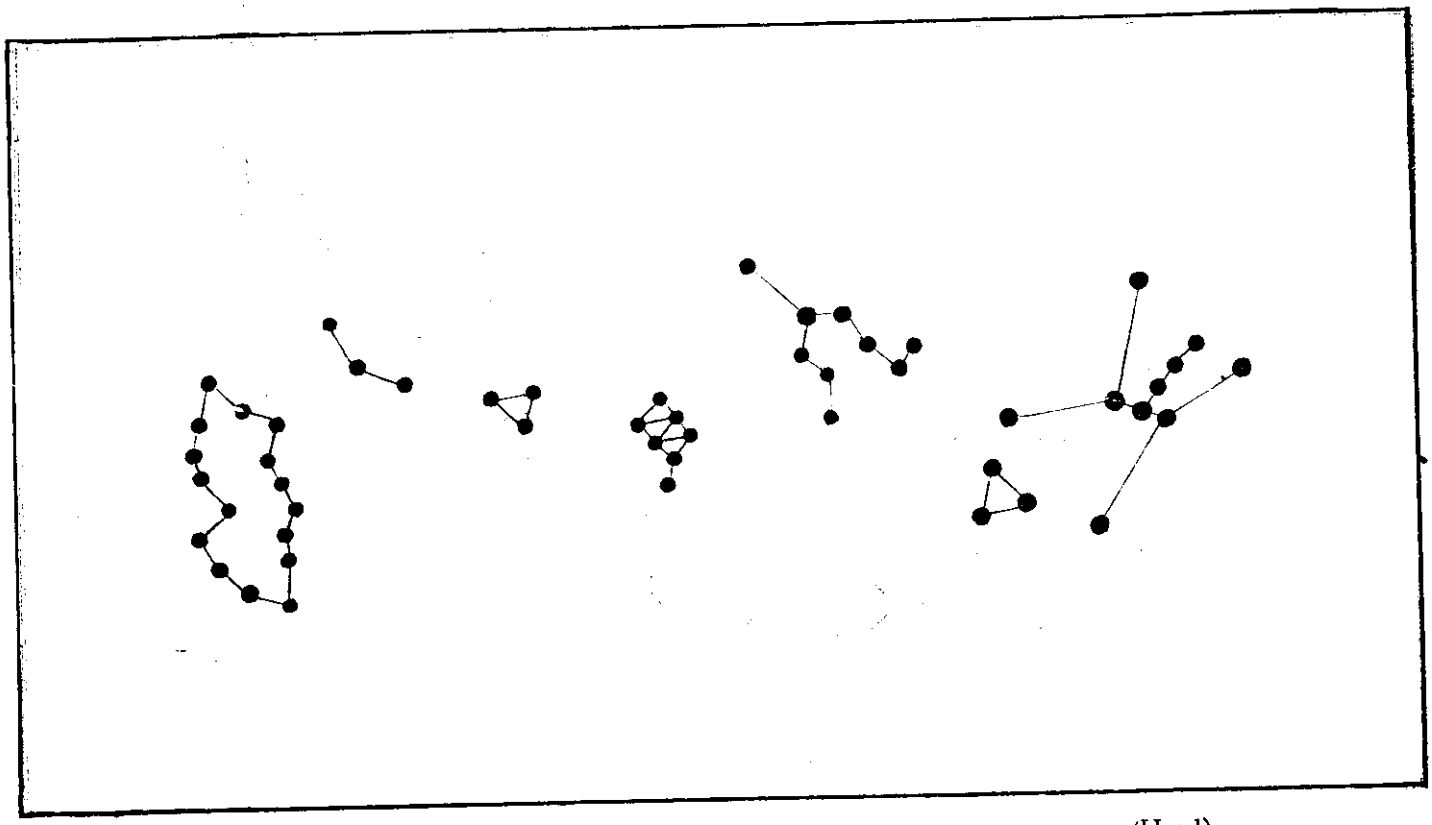
This authority confirms the main facts recorded in the history of the chart, and contributes one important item, viz., the constellations of the central astral chart were not revised. No trace of the lost stone has been found. The Tai-tong Ya-seung 大東野勝 Vol. 5, P. 219, quoting the Yang-chŏn-to-sul 楊村圖說 says that the old stone was sunk in the river and lost at the time of the war when Ko-gu-ryu 高勾麗 fell, 672 A.D. Whereas the stars had advanced one division, from Pleiades to Stomach, the old star list was approximately 1000 years old at the time of Yi Tai-jo. (The determining lines of

these constellations are 14 degrees apart, therefore we have 14/365 of 25800 years.)

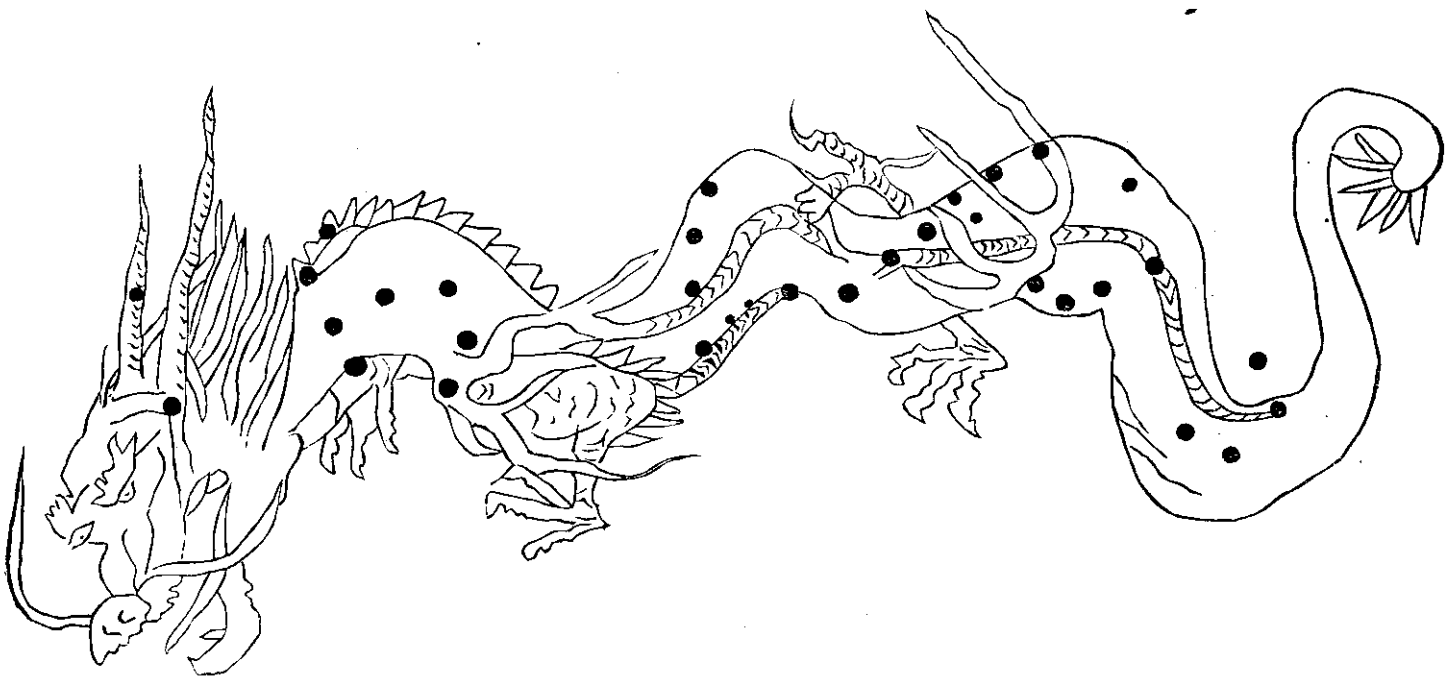
The contents of the chart transport us to the crepuscular period of Chinese history, when the legendary rulers considered their astronomical duties of supreme importance. Emperor Whang Ti 黃帝, 2697 B.C., and his assistants arranged the sexagenary cyclical period, constructed astronomical instruments said to include a celestial globe, and regulated the calendar. Emperors Yo and Sun are lauded for their astronomical labors. Yo (2356 B.C.) commanded his astronomers, "To calculate and delineate the movements and appearances of the sun, the moon, the stars, and the zodiacal spaces; and so to deliver respectfully the seasons to the people." (Legge's Chinese Classics, Vol. 3, P. 18.) Envoys were sent to the four points of the compass: east to welcome the rising sun and to determine the approach of spring; south to arrange the summer season; west to convoy the setting sun and to adjust the labors of autumn; and north to determine the winter. Yo is also credited with a knowledge of the solar year of 365 1/4 days; because he instructed his astronomers, since the year consists in round numbers of 366 days, to intercalate a month. Concerning Sun (2255 B.C.) the *Shoo King* says, "He examined the gem-adorned turning sphere, and the gem transverse tube, that he might regulate the seven Directors." (Legge's Classics, Vol. 3, P. 33.) Scholars do not agree on this passage and the chart simply passes on the difficulty. Dr. Legge concludes that it refers to a simple kind of armillary sphere with a hollow transverse tube for celestial observations. The astrological aim of Sun's work is clearly indicated. At that early date the Directors may have been the seven stars of the Big Dipper; but later they were understood to be the sun, the moon, Mercury, Mars, Jupiter, Venus and Saturn.

The compliment extended by Kwon Keun to his sovereign is the highest praise that could be bestowed,—favorable comparison with Yo and Sun, who embody the highest ideal of sovereign wisdom, grace and virtue. Judging from his official

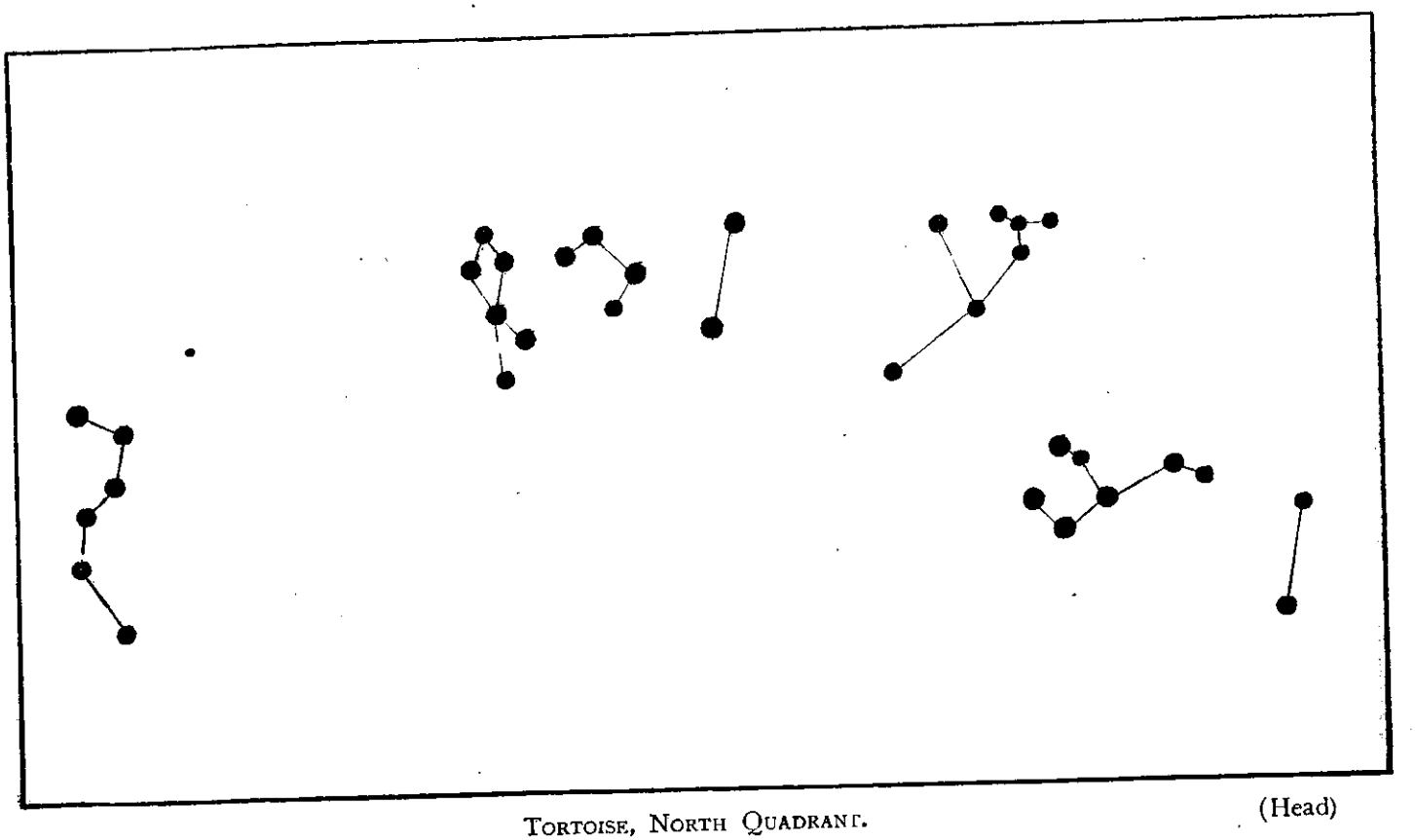
designation his reward was great: Ka-chŭng-tai-pu-yea-mŭn-ch'ŭn-ch'ū-kwan-hak-sa-to-pyŭng-wi-sa-sa-sa-po-mun-kak-hak-sa-kyŭm-yea-cho-chŭn-sŭ-sŭng-kŭn-tai-sa-sŭng-sin Kwon Keun. 嘉靖大夫藝文春秋館學士都評議使司使賓文閣學士兼禮曹典書成均大司成臣權近. He was a man of Pŏk-ju 福州 and became a disciple of Chŭng Mong-ju 鄭夢周 of Blood Bridge fame, and like his master was a loyal patriot. He was a precocious student, passing the first literary examination with high honors at 18 years of age. In the Mun-hun rok 文獻錄 Vol. 2, his name is listed among the Hak-ja 學者 or eminent scholars. His literary pseudonym is Yang Chon 揚村, and post humous title Mŭn-chung 文忠. His tablet appears in the Sŭng-Kyŭn-Kwan 成均館 inside the small East Gate. During the reign of King Tai jong he was adviser of the cabinet, at one time recommending that the officials' private guards be abolished and made soldiers of the state (Kuk-cho-po-gam 國朝寶鑑 Vol. 2, P. 2). Among his associates in compiling the chart was Ryu Pang-tak 柳方澤, whose ancestry was of Whang-hai Province and later moved to Sŭ-san 瑞山 in South Choong-chung. He became a government official in the Bureau of Astronomy. (Mun-hun-pi-go, Book 88, P. 41). Sul-Kyung-su 偰慶壽 was originally from Kyung-ju and became an official scribe and translator according to the Mun-hun-rok, Vol. 1, Penmanship section.



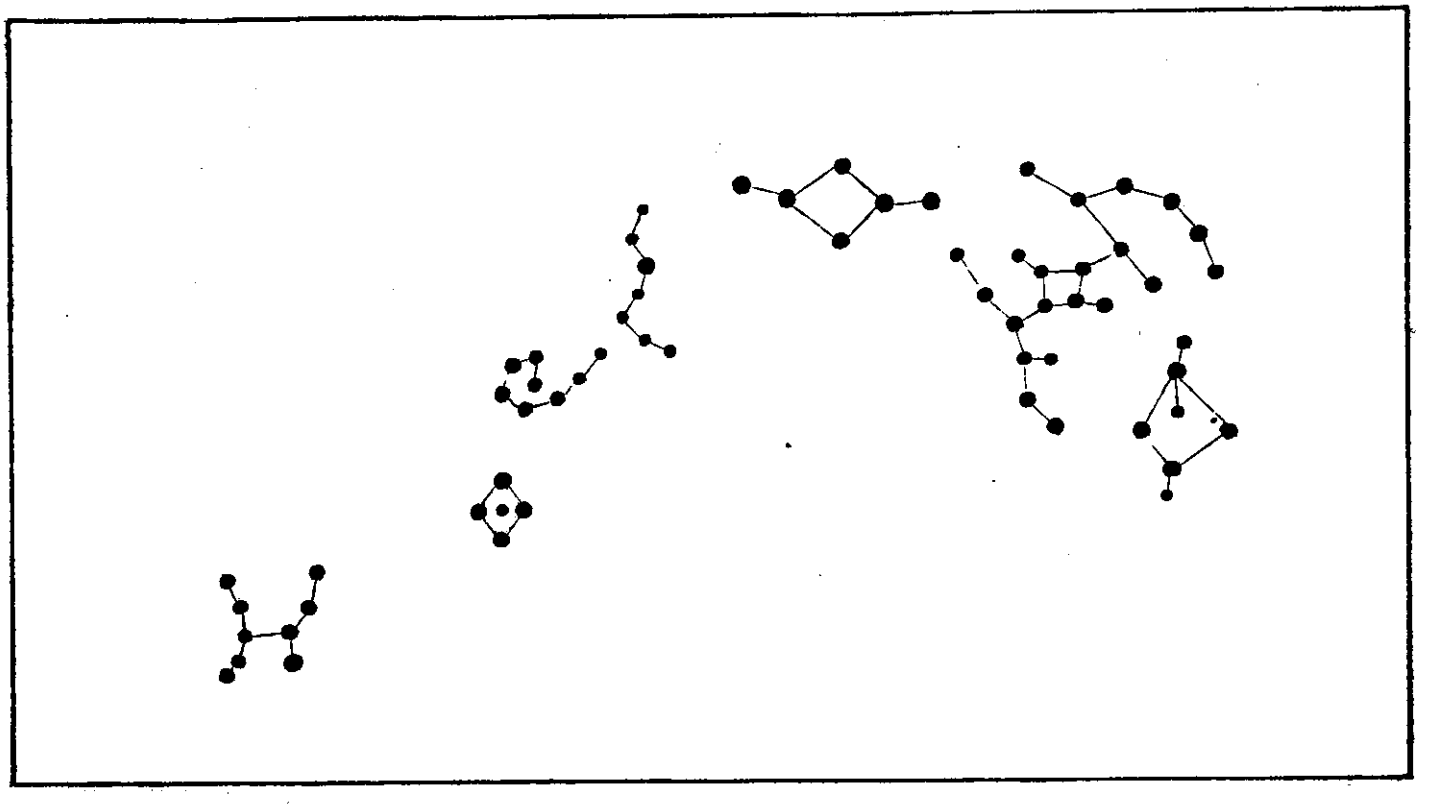
TIGER, WEST QUADRANT. (Head)



THE AZURE DRAGON, EAST QUADRANT.



TORTOISE, NORTH QUADRANT. (Head)



(Head) BIRD, SOUTH QUADRANT.

THE CENTRAL ASTRAL CHART.

The chart is projected on the plane of the celestial equator and contains all the constellations at any time visible in Korea. The left is east; top, north; right, west; and bottom, south. The north pole is the centre and three concentric circumferences mark the circle of perpetual apparition, approximately 38 degrees, the celestial equator, and the boundary of the circle of perpetual occultation about 55 degrees south declination. The ecliptic has an obliquity of approximately 21 degrees. The River of Heaven (Milky Way) is given due prominence. Radial lines corresponding to the 28 zodiacal constellations divide the map into as many parts excluding the inner circle. These divisions grouped by sevens form four unequal quadrants, the east, north, south and west, respectively protected by the Azure Dragon, Sable Warrior, Vermilion Sparrow and White Tiger. The four divisions are often called by the names of these stellar influences.

The inscription says: "In each of the four directions the seven constellations make a single shape. In the east they form a dragon, in the west a tiger, both having the head south and the tail north. In the south they form a bird, in the north a tortoise, both having the head west and the tail east."

This division into quadrants is entirely arbitrary and the assignment of the animals purely imaginary. The Azure Dragon, however, suggests a resemblance to that mythical animal rivalling the imagination of the Greeks, and Romans, which may be seen from the accompanying illustration by Mrs. Rufus. A native artist experimented on the skeleton of the White Tiger; on first attempt the head and tail had exchanged places, on second trial the animal had feet upwards, the third result was fair.

The star configurations are very old. An astral chart of the Chow dynasty, about 600 B.C., a copy of which is in the Royal Library of Paris, contains 1460 stars, (Allen, Star Names and their Meanings, P. 21). We find a total of 1463 stars under 306 designations on our chart, which shows practical correspondence with the standard astrography of the Chows. Comparing with other ancient authorities we find that the Catalogue of Hipparchus, 2nd. century B.C., contained 1080; Pliny, 1st. century A.D., whose scientific merit is questionable, reckoned 1600; Ptolemy, 2nd. century A.D., a very careful investigator records 1028. Young's "Manual of Astronomy," P. 478, says, "The total number which could be seen by the ancient astronomers well enough to be observable with their instruments is not quite eleven hundred." But here we find 1460 stars "correctly laid down," to use Allen's expression, 400 years before the time of Hipparchus. Many of the asterisms, especially the zodiacal constellations, are much older and their orgin is probably Euphratean.

The celestial mythology is fascinating. Altho differing in quality from the Occidential it is not lacking in lively imagination as some seem to think. The heavens are peopled with gods and goddesses, "a celestial galaxy for terrestrial adoration." The celestial dragon guards the mansions of the gods lest they fall. In the central division are palaces and thrones, where dwell the Great Celestial Emperor (north star 天皇大帝), royal family, ministers, servants and feudal kings, also the royal stables and palace for women. Comets sweep the celestial courts, and shooting stars are the refuse thrown out of heaven. In Ursa Major dwells the god of literature. A myth also teaches the presence of the fates in this constellation presiding over the destiny of mankind. In the south-east are the pillars of heaven (天柱) and celestial portals (天門). During the mythological period Prince Kong (共工) in a rage broke the pillars of heaven by beating his head against a mountain. A violent flood followed, but was stayed by No Kwa (女媧) one of the mythical sovereigns who repaired the heavens. (2738 B.C.). Some men still live in fear of the heavens falling. In the northeast separated by the river of heaven are found the Herdsman (牽牛 견우) and the Weaving Damsel (織女 직녀)

or Trysting maiden (須女 슈녀). The story of these star lovers is current in Korea and Japan as well as in China. Their meeting was first witnessed by Chang Kun (P. 5 Mayers) (張騫) who sailed to find the sources of the Yellow River popularly believed to be the earthly continuation of the River of Heaven. Their marriage was celebrated by the celestial choir, when all the stars sang together, and by a display of celestial fireworks, to which the meteors owe their origin. They are now permitted to meet annually on the seventh of the seventh moon, when the magpies flock to the heavens and bridge the celestial river, after which the crown of their heads is bare. Rain on the preceding day indicates the washing of the chariots for the journey, on the following day the shedding of farewell tears.

Farther north are the celestial seats of 12 ancient feudal states; to the west of which the gods of Thunder bellow and Prince Lightning flashes forth. In the west rides "Astride" (Kyu 奎) the star of literature, pictured with a pencil in his hand. Near by are the gods of the clouds and the rain, distilling the essence of heaven for the thirsty earth. The brilliant south contains the wolf star (狼星), Sirius; also the no-in star (老人), Canopus, which the Koreans believed could be seen only from Quelpart and the sight of which insured a happy old age. Spanning the heavens like a triumphal arch is the beautiful Galaxy, which the *poetic* West styles the Milky Way, and the *prosaic* East calls the Silver River of Heaven.

The directions on the chart have come down from the time of Yo; when according to Chalmers, at midnight of the winter solstice Leo was in the meridian, south, Taurus in the west, Scorpio in the east, and Aquarius, tho invisible, was in the north. (Legge, Chinese Classics, Vol. 3, part 1. Proleg. P. 94) An attempt to fix the date of the indicated position of the equinoxes presents a peculiar difficulty. As two equal circles in a plane cannot bisect, we find that the vernal equinox corresponds with the first of Aries, but the autumnal equinox follows the beginning of Libra by more than 10 degrees. The

points of intersection, however, are given on the chart in the definition of the ecliptic and the equator: "In the east a little preceding the 5th degree of Horn and in the west a little beyond the 14th of Astride." This corresponds with the position of the autumnal equinox, but not with the vernal equinox, so we take the position of the autumnal equinox as determinative of the time. Using Spica's relative position to the equinox on the chart and at the present time as a basis for computation, we obtained the first century B.C. The distance of Polaris from the north pole on the chart, about 11 $\frac{3}{5}$ degrees, practically corresponds with the preceding, as the distance at the time of Hipparchus was about 12 degrees. The correspondence between the vernal equinox and the first of Aries also suggests the time of that great astronomer, whose work was the basis of the Julian Calendar, and we have reason to believe, the foundation also of the New Calendar of the Hans, which took effect at the time of the Grand Beginning (太初) Dec. 24,105 B.C. The 365 $\frac{1}{4}$ degree circle and the introduction of the 12 solar divisions also point to that period. These reasons seem sufficient to justify the opinion that the equinoxes as here represented and the adjustment of the constellations on the planisphere were made by the Hans about the time of the reorganization of the calendar.

The circle of perpetual occultation, 55 degrees south, indicates a place farther south than Seoul, but would harmonize with the capital of the Hans and Chows, Sing-An Fu 新安府. On the other hand the circle of perpetual apparition, 38 degrees, corresponds closely with the latitude of Seoul, and the Chinese astrography includes several constellations in the Hang-sung 恒星 which are outside the central division of the chart, so we are inclined to believe that the revisers at the time of Yi Tai-jo determined the present position of the inner circle.

THE SUN, THE MOON AND THE HEAVENS.

The chart outlines briefly the orthodox teaching concerning the sun, the moon and the starry heavens. The sun is the Astronomical Great Father and the moon is the Astronomical Great Mother; or to carry out the simile of the chart, they are the King and Queen of the Universe. In Confucian cosmogony the sun is the concreted essence of the positive or masculine (yang 陽) principle in nature, and the moon of the negative or feminine (eum 陰) principle. These two Primary Essences were evolved from the Great Absolute (Tai-kuk 太極), the *primum ovum* of the physical universe and philosophical ultimate of the Confucianist. Back of the Tai-kuk is sometimes posited the Mu-kuk 無極, Absolute Nothingness. The positive category includes the sun, stars, thunder, lightning and the rainbow; the negative includes the moon, rain, dew, frost, snow, fog and mist. The wind and the clouds (some authors also include the stars and certain of the above phenomena) exist by virtue of both principles acting either in harmony or at enmity. (Compare A-hui-wul lam 兒戲原覽 and Sam-chai-to-hoi 三才圖會 on that subject.) The genesis of the sun and its imperial symbolism were embodied in a treatise, "The History of Great Light," by Liu An 劉安 2nd century B.C. commonly known as Hoi-Nam ja 淮南子. This work was preserved by Liu Hiang 劉向, 1st century B.C., to whom the essence of the First Great Cause is said to have appeared and expounded its teachings. It found a place in the Taoist canon and part is reprinted in the modern edition of the Sam-chai-to-hoi. The attributes of the positive element are heat and light, life-giving properties; of the negative are cold, darkness and dampness. Annual observation of the changes in the sun's position and accompanying changes in the seasons and vegetation led to the common belief of the ancients that the sun possesses life-giving power, agreeing with modern science, that upon it depends the possibility of life on the earth. "When it turns to the north all

things revive, when it turns to the south all things die," Quite naturally to these beneficial physical properties moral virtues were added, so the King of Day is not an arbitrary cosmocrat, but the beneficent ruler of the universe, a symbol of kind and benevolent sovereignty upon the earth. For this reason the condition of the sun determines the prosperity of the state. The astrogeny of the chart suggests the "Solar Myth" of the Egyptians, especially Set cutting Osiris to pieces to form the stars. Another striking similarity is Osiris' beneficent rule, traveling over the world spreading the blessing of civilization.

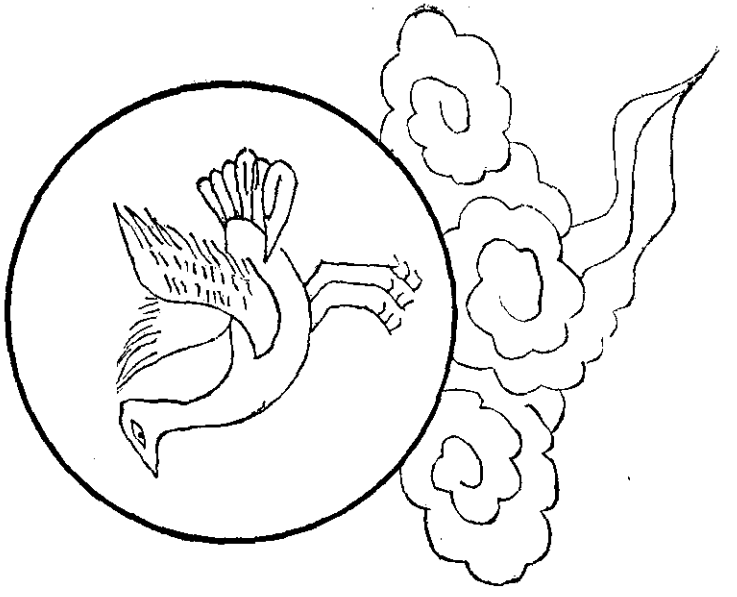
The daily motion of the sun incited much speculation. It was said to rise upon the branches of the Boo-sang 扶桑 tree and to descend on the Yak 弱 tree. (These trees are pictured on Buddhist maps of the earth. The Boo-sang is sometimes called Buddha's Leaning Mulberry. Dr. Bretschneider of St. Petersburg identifies it with the Hibiscus Rosa Sinensis of the Mallow order common in China. Dr. Hepburn says that the tree is known to the Japanese as the Chinese Hibiscus. Korean Repository, Vol. 1, P. 288, 318.) The nearness of the sun is illustrated by the ancient belief that a country existed where a sizzling noise can be heard when it drops into the water beneath the horizon. This corresponds with a Hindoo myth, and reminds us of Vulcan's boat to ferry the sun to the morning sky. Confucius was unable to settle a dispute between two parties, one holding that the sun is nearer at sunrise, because it appears larger, and the other maintaining that it is nearer at midday, because it sheds more heat. The book of Sul-moon 說文 (Yun-gam-yu-ham Vol. 2, P. 1) states that the sun's diameter is 400 *li*, circumference 1200, distance from the earth 25000, and explains that it is round because it hangs in the heavens and turns freely in space. The length of the day depended upon the distance of the sun. In the Yuen 元 dynasty, just preceding the date of our chart, it was held to be due to a difference of the sun's altitude. The symbol of the sun is a circle in which is a crow with three legs, probably derived from the writing of Hoi-nam-ja. Because the sun is the master of

the positive creation, the animals take off their horns in the spring and summer.

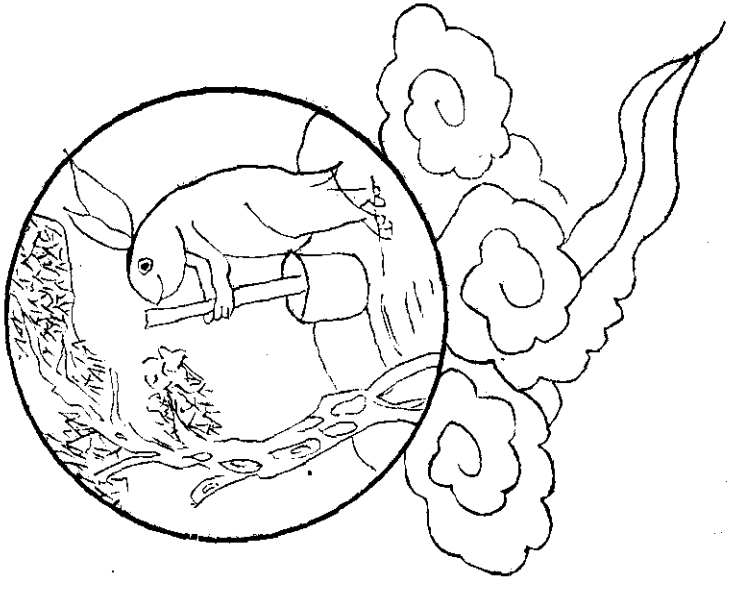
As the negative element is the complement of the positive, so its concreted essence, the moon, is the Queen of the *Eum* Creation, and the symbol of the King's consorts and court assemblage. The original idea of complementary relationship for perfect unity in the *Tai-kuk*, contained the idea of contrast or oppositeness, not necessarily antagonism, e.g., light and darkness, heat and cold, heaven and earth, water and land, husband and wife. Unfortunately for the moon and for womankind the contrast was carried into the moral realm, so the moon stands for destructive or punitive qualities, and the idea of woman is associated with all kinds of evil, accounting in a large measure for her low social position.

The symbol of the moon is a circle in which is a hare pounding rice in a mortar, probably due to a legend traceable to an Indian source (Mayers). Other creatures of the moon are the frog or toad, a cassia tree whose leaves give immortality, and a genius recognized as the matrimonial match maker. Hoi-nam-ja styles the moon the messenger of the gods, probably on account of its swift motion. Its bounds from night to night may also have suggested the leaping animals. Another author in the Wang-chung-ron-hyung 王充論衡 says it "glides like a duck thru the sky." Its diameter is 1000 *li*, circumference 3000 and distance below the heavens 7000. (Accredited to the Syu-chung-chang-yuk 徐整長曆 by the Yun-gam-yu-ham, Vol. 3, P. 1.)

Concerning the "Nine Paths of the Moon's Orbit" Mayers quotes Medhurst's Shoo King as follows: "The nine-fold course of the moon appears to refer to the inclination of the lunar orbit and to the ascending and descending nodes, where they cut the ecliptic." He then adds: "The ecliptic is described as the middle path of the sun, and each of the first four paths of the moon is considered as a double line with reference to its two successive passages of the ecliptic." We shall try to explain the explanation.



THE SUN.



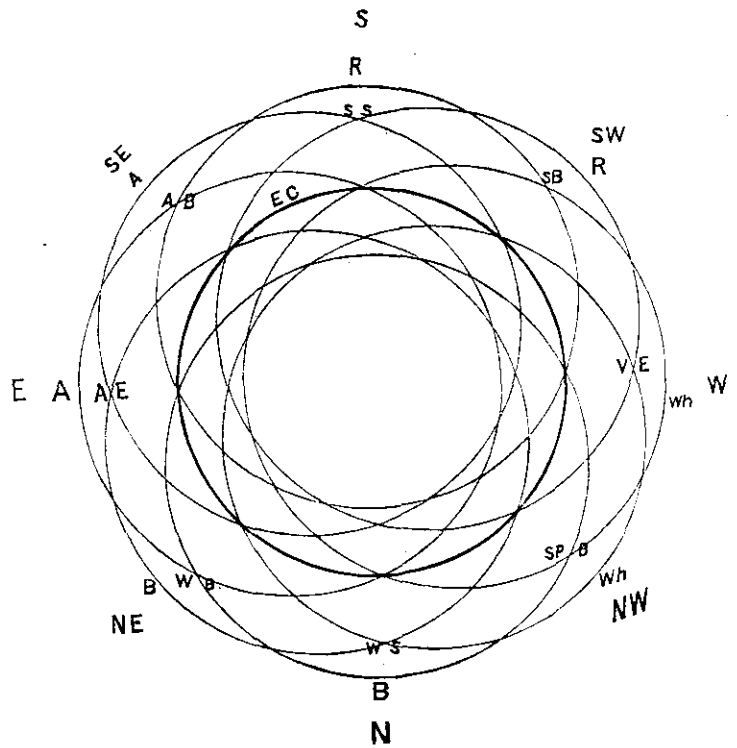
THE MOON.

The geometrical figure of the Shoo King (Table 5) illustrating the nine roads may be constructed by describing eight equal circles using the vertices of a regular octogon as centers, and drawing the ninth circle thru the central series of the points of intersection. The table indicates the ordinary correspondence between color, direction, and solar period. Inside the ecliptic, the central circle, the negative influence prevails; outside, the positive. The Shoo King or Syu-chun Vol. 1, P. 8, says: "In the winter when it enters the negative influence and in the summer when it enters the positive influence, the moon passes thru the azure road. After the winter and summer solstices half of the azure road is bisected at the point of the vernal equinox, where it is located east of the ecliptic; also after the winter and summer begins, half of the azure road is bisected at the point of spring begins, where it is located southeast of the ecliptic. The opposite sides also are just the same." Then follows a similar explanation of the white, red and black roads, and the summary: "The four series separating make eight divisions with regard to the positive and negative; all of these intersect the ecliptic and each other, so altogether the moon's orbit has nine roads. It is said because the sun and moon travel these roads we have winter and summer."

These eights paths in succession can not represent the course of the moon during one year, because the year contains over 13 nodical months; so the solar terms in the explanation must refer to points in the ecliptic rather than to seasons of the year. Then the direction of the moon from the ecliptic at the time of its greatest positive distance determines the color of the road; e.g., East or East-South is the Azure road, in that path the moon will also be in the constellations of the Azure Dragon during the period of greatest positive influence. Each road becomes two according as it is positive or negative, making eight lunar paths; these with the ecliptic are the Nine Roads. The regression of the nodes, completing a revolution in about 19 years, varies the correspondence between the roads and the seasons during successive years.

TABLE V.

The Nine Roads of the Moon.



Ec.	Ecliptic.				
A. A.	The two Azure roads of the				east.
R. R.	,,	Red	,,	,,	south.
Wh. Wh.	,,	White	,,	,,	west.
B. B.	,,	Black	,,	,,	north.
S. S.	Summer solstice.				
A. B.	Autumn begins.				
A. E.	Autumnal equinox.				
W. B.	Winter begins.				
W. S.	Winter solstice.				
Sp. B.	Spring begins.				
V. E.	Vernal equinox.				
S. B.	Summer begins.				

The discussion of the heavens shows the faithfulness of the Koreans to the authority of antiquity. The oldest cosmogony is accepted as the truth, or else the cosmogony which they held to be true was accredited to the earliest days.

The distance from the earth to the heavens was reckoned with a show of great exactness, being 216,781 1/2 *li*. The size of the heavens from north to south is 233,057 *li* 25 paces; from east to west it is 21 paces smaller. (Yun-kam-yu-ham 淵鑑類函 Vol. 1. P. 1. quoting Kwang-ah 廣雅). The calculations, however, greatly differ. Another astronomer makes the distance of the heavens 81,394 *li* 30 paces 5 feet 3 inches and 6 tenths. (Legge's classics Vol. 3. Part 1. P. 91.) Another in the Chi-ye-chi 地輿志 says the circumference of the heavens has 365 1/4 degrees and each degree contains 2,932 *li* 71 paces 2 feet 7 inches and four tenths. The circumference is 1,070,913 *li* (The paces were left out in the computation) and the diameter is 356,971 *li* (Just one-third the circumference). With this the Yu Kyung (類經) agrees, adding the explanation, "The heavens move 80 *li* during a breath. Man breathes 13,500 times during the day and night, therefore we know it is 1,080,000 *li* around the heavens." This kind of reasoning prevailed until the revival of astronomy under the influence of the Jesuits. The Mun-hun-pi-go recognizes that the size of the heavens is not obtainable.

The chart accepts the Hon-chun 渾天 explanation of the universe. The origin of this theory is lost in antiquity, but its teachings were elaborated and recorded by Chang Hyung 張衡 78-139 A.D., Grand Historiographer of the Hans, An Ti 安帝 and Shun Ti 順帝, who constructed a Hon chun-eui 渾天儀, a sort of uranosphere (Mayers) or celestial globe (Giles), and produced several works on astronomy. This school of astronomers taught that the universe is like an egg, the surrounding heaven is large and the earth within is small. Water exists on the surface of the sky, in which the constellations float, while the heavens revolve like a wheel. They also held that the form was confused or chaotic. This suggests at once the Biblical passage.

"The earth was without form and void." Williams, The Middle Kingdom, Vol. 2. P. 138, quotes as follows from a Chinese source: "Heaven was formless, an utter chaos; the whole mass was nothing but confusion." Chang Hyung explains the formlessness by saying: "There is no end to heaven because it is round, so we can not see its shape." The term *Hon-chun* is difficult to translate. Giles defines *Hon* as: "Confused; chaotic; disordered; turbid; muddy. Whole; complete; the entire mass." Hon-chun-eui is given as celestial globe. The *Hon-chun* then stands for the confused or formless heaven as represented and explained by an armillary sphere, such as is pictured in the Shoo King 書經 Vol. 1, P. 8. The term also contains the precosmic ideas involved in Confucian cosmogony and suggests a theory of creation quite as well as a conception of the present order. Attempting to convey both ideas, the passage of the chart, "Ki hyung hon hon yun go wal hon chun ya," 其形渾渾然故曰渾天也 is translated, "Because the form was utterly chaotic, it is called chaos theory heaven." Concerning the Hon-eui 渾儀 mentioned in the chart and examined by Ha Sung Chun, from the conclusions he reached (q.v.) we hesitate to apply the term "celestial globe" with its present significance. The turning-sphere of Sun and the much-improved "uranosphere" of Chang Hyung must have been rather "rude" if they faithfully represented the ideas of their authors. The present meaning of Hon-chun-eui is clearly celestial globe; but we have tried to avoid the modern significance by the translation of the text, *chaos-theory globe*. It was only a step, however, from the idea of the chaos-theory heaven to the modern idea of the celestial sphere of infinite dimensions, as far as the form is concerned. This step, nevertheless, necessitated the surrender of the idea of a limited heaven and consequently of a diurnal revolving heaven.

Kal Hong 葛洪, or Chi Chun 稚川 as he is sometimes called, 4th century A.D., who also taught this theory, was a famous Taoist doctor. The chart says that he taught that the circumference of the heavenly body contains 365 1/4 degrees,

but earlier use was made of that division by writers of the Han dynasty, at the time of the new calendar, adopted 59 years before the Julian calendar was issued. A Chinese biographical dictionary 東洋歷史大辭典 pictures Kal Hong as stupid, stammering and dirty, very poor but very studious. He discovered the medicine of immortality, and at the age of 81 went to sleep in a sequestered spot. When his friends sought him they found only his empty clothes; the great teacher was gone. He was among the first to teach the difference between the sidereal year and tropical year, first distinguished in China by Oo Hi, whose work seems to be rejected by the author of this section of our chart. Ha Sung Chun developed the same theory of the heavens and estimated the length of the sidereal year at 365.255 days and the tropical year at 365.245 days.

The Canopy Heaven system of astromony is accredited to Chu Bi. The Chu-Bi San-kyung 周髀筭經 also contains some trigonometry and is thought to be a relic of the Chow dynasty. The Yun-gam-yu-ham expresses some doubt as to the origin of the theory, but classifies it among the three "Heavens" of the ancients, the Chaos-theory, Night-revealing, and Canopy Heaven. According to this system the starry firmament was represented as a concave sphere (Wylie, Notes on Chinese Literature, P. 106), or like a huge umbrella according to Korean scholars. The celestial chart given to the Silla emperor, Hyo Syo 孝昭 by the Buddhist monk, To Ching 道証, is said to have represented this system, (Mun-hun-pi-go, Book 3, P. 2.) The Pleasant Parasol constellation, (Wha-gai 華盖) as pictured on the astral chart, is a good illustration.

Concerning the "Night Revealing," *Syun-ya*, system Wylie says: "It has not been handed down, but native scholars suppose that there is a close resemblance between it and the system introduced by the Europeans." This agrees with the chart that the system has been without a teacher to expound its laws. The Yun-gam-yu-ham, however, calls it the law of Ha Eun 夏殷. If this refers to those two dynasties it fixes the time too early for European influence. The Koreans say this

system resembles the Canopy Heaven and is like the turning of a drooping curtain on all sides.

Preceding the three remaining theories, the Yun-gam-yu-ham mentions the Square Heaven (Pang-chun 方天) proposed by Wang Choong 王充 of the first century A.D., and designates these four theories as modern rather than ancient. The Stationary or Peaceful Heaven, *An-chun*, advocated by Oo Hi 虞喜, first half of the fourth century, taught that the heavens are at rest. An illustrative apparatus is said to have represented the heavens as motionless, but had some kind of instrument that could be moved. The Dawn Heaven, *Heun-chun*, represented the heavens as a cylinder revolving about an axis. The Lofty Heaven, *Kung-chun*, recognized the absolute loftiness of the celestial vault. These modern systems are branded as nonsense by the Yun-gam-yu-ham, which adds, "There is no doubt concerning the Chaos-theory Heaven."

THE TABLES.

We have seen that the list of meridian stars (Table 1) is credited to the labors of Yi Tai-jo, constituting a part of the Shin-pup Chung-sung-ki 新法中星記. The compilation suggests a certain degree of ability on the part of the Korean Board of Astronomers. A glance at the table will show that the variation in the time of dark and dawn during the 24 solar periods was taken into consideration in its compilation, suggesting, however, the method of observational astronomy rather than the more accurate and more expeditious method of theoretical astronomy. The interval of time between the receipt of the old chart, shorly after the beginning of the reign, 7th month of 1392, and the completion of the new list in the summer of 1395 gives opportunity for sufficient observations.

The 24 solar "breaths" here used, together with the sexagenary cycle, the 28 lunar mansions, and the 12 divisions of the zodiac, employed by the Chinese probably came from the Chaldeans. (Williams, The Middle Kingdom, Vol. 2.

P. 70). The Chinese however, credit the Kap-cha 甲子 to Ta Nao 大撓 at the time of Hwang Ti 黃帝 B.C. 2697.

The culminations deal with entire zodiacal constellations rather than with individual stars, also with solar periods and the variable expressions dark and dawn 昏曉 instead of a definite time, so computations based upon the data must be given a fair margin of probable error. Ease in computation has suggested a theoretical six o'clock average time for the observations to have taken place, and some use has been made of that hypothesis in discussing Chinese chronology. (Article, "Astronomy of the Ancient Chinese," Chalmers; Legge's Chinese Classics, Vol. 3. Proleg. P. 92). However one-half hour difference in the time of observation makes over 500 years difference in dates determined by this method of attempting to fix or to verify a chronology. (1/2 hr=7 1/2 degrees, so we have $\frac{7.5}{360}$ of 25,800 years =537 1/2, where 258000 years is the period of the precession of the equinoxes). The time of day of observations given in the table is taken from the list of Meridian Stars in the Mun-hun-pi-go, Book 2; altho this compilation was made 300 years later it illustrates the custom in vogue at the time of Yi-Tai-jo.

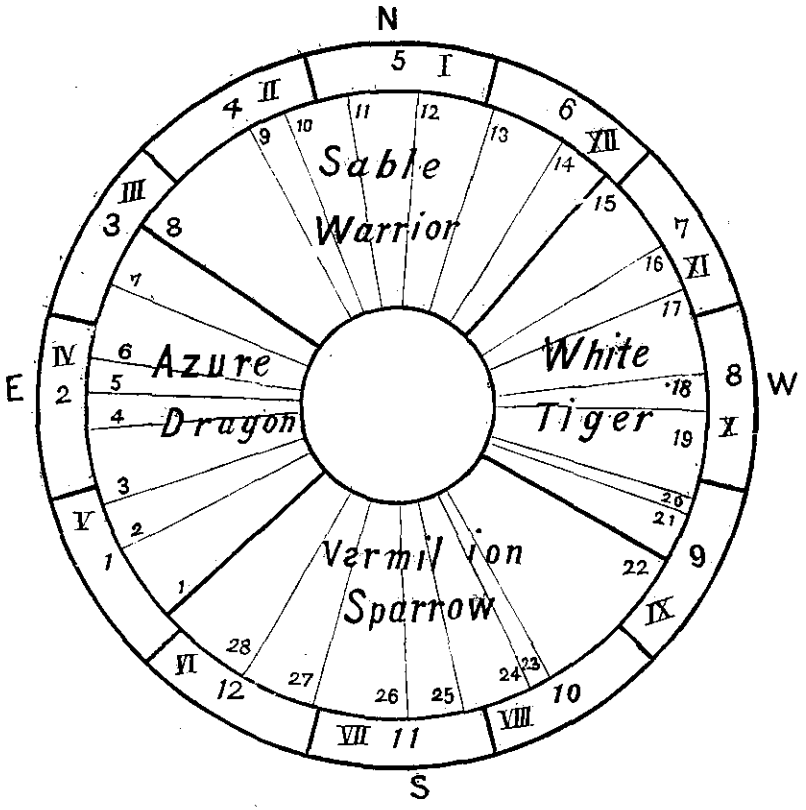
The Twelve Zodiacal Divisions (Table 2) are given due prominence on the chart; the table begins in the upper right hand corner, and the modern signs occupy the outer ring of the circular astral chart. Each division is given five designations, Name, State, Province, Branch, Sign. In addition to this the unequal solar divisions are defined by using the still more unequal lunar divisions, which are more fundamental in Chinese and Korean thought and have so remained to the present century.

The origin of the twelve "names" is obscure. Longevity Star (壽星) is one of the Three Auspicious Stars of the Numerical Catagories, also first of the Five Blessings 五福. Great Fire (Tai-wha 大火) has heen identified with Antares and suggests an origin of the term as remote as the time when that ruddy star and Aldebaran marked the equinoctial points, 3000 B.C. (Kingsmill, "Ancient Lunar Asterisms," Royal Asiatic Society,

Vol. 26, P. 79.) The order of the feudal states does not seem indicative of direction and no sufficient reason for their assignment to the various divisions has been offered. Dr. Edkins suggested that Jupiter's position in the constellations may have determined Chung's assignment. The names of the provinces take us back to the time of the Nine Provinces of Yü 禹, 2278 B.C. with which eight provinces of the chart agree, Ryang 楊 only having dropped out. Yu 幽, Pyeng 幷, and Ik 益 of the chart are among the 13 provinces of the Han dynasty, and probably were added at that time, when the Hans made greater use of the solar divisions in the reorganization of the calendar. Allowing for subsequent orientation, an attempted correspondence between the location of the provinces and the directions on the chart can be recognized. Much difficulty seems to have arisen in the introduction of the solar zodiac. Taking the 12 divisions in their usual order and making them correspond with the 12 branches and their associatied direction reverses them, so they go backward thru the year. According to Appendix 5, D. in Giles Dictionary that order is accepted; but our chart has changed the cyclical correspondence between the branches and the signs so the year progresses harmoniously. (See Table 4).

The modern signs in the outer circle of the stellar chart were unquestionably inserted by the revisers. These terms were introduced into China from India in the Buddhist Classics about the 10th century; but met with little use before the beginning of the Ming dynasty, 1368 A.D., when they were adopted by the Board of Astronomers for about 30 years. (Doolittle, "Vocabulary and Hand book on the Chinese Language," Vol. 2, P. 364.). The date of our chart comes within that period and shows the chose relationship between Chinese and Korean science. Later works including the Mun-hun-pi-go use the old terms, Su-sung, Tai-wha, etc. Allen in "Star Names and their Meanings" credits the Jesuits with the introduction of the modern signs in the 16th century; it is probable that they simply revived their use. The characters for Capricorn, Ma-kal, 磨蝎宮 do not correspond with the modern Ma-kal 摩羯宮.

TABLE IV.



Outer circle Arabic numbers refer to solar zodiacal divisions, Table 2. Inner circle, Table 3. The Roman numerals refer to the Branches and corresponding directions, Table 2.

The sounds are the same but the meaning of the terms on the chart is not clear. Another point is worthy of note. Gemini is designated by the expression Eum-Yang which is sanctioned by modern Chinese usage. Japanese dictionaries have adopted Sang-nyu 雙女, which corresponds with Virgo on the chart. The modern designation for Virgo is Sil-nyu 實女. The terms given on the chart seem quite appropriate and give rise to no confusion between Gemini and Virgo.

The origin of the 28 Zodiacal Constellations (Table 3) is involved in Chinese, Chaldean and Indian mythology. Their use seems to have been quite general thruout the Orient in ancient times; the term mazzaroth of Job 33 : 23 is now interpreted to mean zodiacal asterisms. Their introduction or use in China preceded the time of Yo and Sun according to Chinese annals, (Legge's Classics, The Canon of Yaou,) and they are still represented as they appeared at that time. The number corresponds roughly with the number of days of the sidereal month (between 27 and 28), so the constellations represent the daily or nightly "resting places" of the moon, 27 was sometimes used as the preferable number.

A discrepancy exists between the number of stars in the four quadrants given by the engraved headings and the total obtained from the table on the chart. Comparison with the star groups of the central astral chart shows that the headings agree with the old astrography, when the numbers were as follows: Horn 4, Danger 7, House 8, End 9, Well 9, and Crossbar 7, the others remaining the same. The polar distances as given in the table also differ from the astral chart. These two differences lead to the inference that the table represents a revised uranography and was introduced by the revisers of the chart. The longitude was not included. In Table 3 the right ascension has been determined from the astral chart, beginning with the Vernal Equinox which corresponds with the First of Aries and 4th degree of Astride, also using the radial lines as determinative of the position. In dealing with early approximations derived from observations made with ancient instruments, the terms

longitude and right ascension may be used interchangeably with little loss of accuracy. The "Influence" of the various constellations is condensed from Du Bose, "The Dragon, Image and Demon.

CHRONOLOGICAL SUMMARY.

The chart is not the work of a single period, but embodies the labors of 4000 years. We shall attempt to give a chronological view of the contents.

Legendary period.

Origin uncertain, probably preceding Yo and Sun.

The 28 lunar resting places,

The 24 solar "breaths,"

The 12 branches,

The 12 names, Su-sung, Tai-wha, etc.,

Yo and Soon, 2356 to 2205 B.C.

Four unequal quadrants,

Fixing the four cardinal points and directions on the ecliptic,

The turning-sphere, bearing on the chaos-theory heaven;

Yu, the Great, 2205 B.C.

The nine provinces;

Hia and Yin, to 1154 B.C.

The Syun-ya or night-revealing heaven;

Chow, to 225 B.C.

Kai-chun or canopy heaven,

The feudal states,

Development and charting of star-groups as they appear on chart.

Former Han, to 25 A.D.

Application of 12 provinces to zodiacal divisions,

Delimiting zodiacal divisions,

Adjustment of equinoxes and rectification of constellations on the planisphere.

Later Han, to 220 A.D.

Development and recording of the Hon-chun or chaos-theory heaven. Up to the sixth century,—

Introduction of the so-called "modern" theories of the heavens, including distinction between the sidereal and tropical year.

After this time there seems to have been little development of Astronomy in the East until after the time of the chart, under Jesuit influence.

The revision of the chart at the time of Yi Tai-jo,—The circular chart of the constellations culminating at dark and dawn, was entirely revised, (Table 1.)

On the outer ring of the central astral chart the modern signs of the zodiac were introduced, probably changing the order of the cycle; also the circle of perpetual apparition was fixed at approximately 38 degrees.

Concerning Table 3 a uranography later than the astral chart was followed; so the work was probably done by the revisers. The use of the term Trysting Maiden, Su-nyu 須女 in the table instead of Weaving Damsel, Ching-nyu 織女 which is on the astral chart, or the more common form, Girl, *Nyu* 女, when enumerating the 28 constellations, may also represent a change.

Of course the history engraved at the bottom is entirely Korean; and the time of day of dark and dawn taken from the Mun-hun-pi-go and copied in Table I.

Table II on the chart shows little evidence of revision.

The treatises on the sun, the moon and the heavens indicate nothing later than the sixth century; so they may have been copied from the lost chart, if it was as late as the beginning of the Tang dynasty, 618 A.D. The Tangs sent a chart to King Hyo Syo of Silla by the monk, To Ching, so it seems quite probable that the lost Pyeng Yang chart was sent by them to one of the kings of Ko-gu-ryu, when the capital was at Pyeng Yang.

Direct historical evidence concerning the lost chart is one of the points left for further search. Another lost relic is the historical tablet of King Yung-jong, which might be discovered by a better student of history.

天象列次分野之圖

日宿

布散於天

星者陽精之榮也陽精爲日日分爲星故其字從日下生也釋名云星散也

人君吉昌百姓安寧

人君之象故行有道之國則光明

若日行南北失道則進而長爲常寒退而短爲常燠主生養恩德

事則進北晝長夜短陽勝故爲温暑陰用事則退南晝短夜長陰勝故爲凉寒

日爲大陽之精衆陽之長去赤道表裏各二十四度遠塞近暑而中和陽用

在赤道外半在赤道內東交於角五小弱西交於奎十四小强

黃赤道　日之所留謂之黃道南北極之中度最均處謂之赤道黃道者半

謂之白道行黃道之北謂之黑道黃道內外各四幷黃道爲九道也

廷諸侯大臣之類行黃道之東謂之青道行黃道之南謂之赤道行黃道之西

月宿

月爲大陰之精衆陰之長以之比德刑罰之義列之朝

論天

羲和而秩四時舜在機衡而齊七政誠以敬天勤民爲不可緩也恭惟

命臣近誌其後臣近竊惟自古帝王奉天之政莫不以曆象授時爲先務堯命

爲胃二十四氣以次而差於是因舊圖改中星鏤石甫訖廼

上以爲然越乙亥夏六月新脩中星記一編以進舊圖立春昂中於昏而今則

以定今四仲昏曉之中勒成新圖以示于後

殿下寶重之　命書雲觀重刻于石本觀上言此圖歲久星度已差宜更推步

殿下受命之初有以一本投進者

者亦絕無矣惟我

右天文圖石本舊在平壤城因兵亂沉于江而失之歲月旣久其印本之存

作自盖天已下並好奇徇異之說非至說也先儒亦不重其術也

以爲法三曰宣夜無師法四曰安天虞喜作五曰昕天姚信作六曰穹天虞聳

渾天之形內圓如彈丸凡論天者有六家一曰渾天張衡所述二曰盖天周髀

義研求天意乃悟天形正圓而水居其半地中高外畀水周其下又梁祖暐云

半繞地下故二十八宿半見半隱天轉如車轂之轉也又宋何承天云廼觀渾

形渾渾然故曰渾天也又晉葛洪云周天三百六十五四分度之一半覆地上

晉志前儒舊說天地之體狀如鳥卵天包地外猶殼之裏黃也周旋無端其

則

殿下本以欽存諸心上以奉天時下以
殿下以正中星即堯舜之政也然求堯舜所以觀象制器之心其本只在乎欽而
聖武仁明以禪讓而有國中外晏然踽于太平即堯舜之德也首察天文

書雲觀

巡衛司後領散員臣金侯洪武二十八年十二月　日
掌漏進勇副尉虎勇臣金自綏權知視日脩義副尉虎勇
仁龍判事通訓大夫臣池臣源承通德郎臣金堆掌漏啓功郎臣田潤權知
嘉靖大夫檢校中樞院副使臣盧乙俊兼正嘉善大夫檢校戶曹典書臣尹
　臣權仲和兼判事嘉靖大夫商議中樞院事都評議使司使臣崔融兼判事
領觀事特進輔國崇祿大夫判門下府事都評議使司事集賢殿大學士

觀事臣柳方澤奉敎推筭中直大夫校書監臣偰慶壽奉敎書
曹典書成均大司成臣權近奉敎記嘉靖大夫檢校中樞院副使兼判書雲
賓也信矣哉嘉靖大夫藝文春秋館學士都評議使司使賓文閣學士兼禮
勤民事神功茂烈亦當與二帝並隆矣況此圖勒貞珉永爲子孫萬歲之

TABLE VI.

STAR LIST.

CENTRAL DIVISION.

No.	Names.	No.	No.	Names.	No.
1	紫微七	7	20	天厨六	6
2	北極五	5	21	八穀八	8
3	四輔四	4	22	天棓五	5
4	天一太一	2	23	天床六	6
5	陰德二	2	24	內厨二	2
6	尙書五	5	25	文昌七	7
7	柱下史一	1	26	三公三	3
8	女史一	1	27	天理四	4
9	女御宮四	4	28	北斗七	7
10	天柱五	5	29	輔星一	1
11	大理二	2	30	策一	1
12	勾陳六	6	31	扶筐七	7
13	天皇太帝一	1	32	紫微八	8
14	六甲六	6	33	天船九	9
15	五帝坐五	5	34	積水一	1
16	華盖七	7	35	積水一	1
17	杠九	9	36	天倉三	3
18	傅舍九	9		Total	166
19	內階六	6			

EASTERN DIVISION.

No.	Names.	No.	No.	Names.	No.
1	左角二	2	3	天田二	2
2	平道二	2	4	進賢一	1

No.	Names.	No.	No.	Names.	No.
5	周鼎三	3	35	陣車三	3
6	天門二	2	36	玄戈一	1
7	平二	2	37	西咸四	4
8	庫樓十	10	38	日一	1
9	柱三	3	39	房四	4
10	柱三	3	40	天市十一	1
11	柱三	3	41	列肆二	2
12	柱三	3	42	從官二	2
13	柱三	3	43	積卒十二	12
14	衡四	4	44	心三	3
15	陽門二	2	45	罰三	3
16	南門二	2	46	鍵閉一	1
17	郎將一	1	47	東咸四	4
18	亢四	4	48	賈索九	9
19	大角一	1	49	尾九	9
20	折威七	7	50	神宮一	1
21	攝提三	3	51	龜五	5
22	頓頑二	2	52	天江四	4
23	亢池六	6	53	傅說一	1
24	三公三	3	54	魚一	1
25	更河三	3	55	市樓六	6
26	帝席三	3	56	宗正二	2
27	氐四	4	57	候一	1
28	天乳一	1	58	帝座一	1
29	招搖一	1	59	七公七	7
30	騎官二十七	27	60	宦者四	4
31	車騎三	3	61	斗五	5
32	天幅二	2	62	斛四	4
33	騎陣將軍一	1	63	車肆二	2
34	攝提三	3	64	箕四	4

No.	Names.	No.	No.	Names.	No.
65	外杵三	3	71	帛度二	2
66	糠一	1	72	天紀九	9
67	天鑰八	8	73	女狀三	3
68	農丈人一	1			
69	宗人四	4		Total	272
70	宗星二	2			

NORTHERN DIVISION.

No.	Names.	No.	No.	Names.	No.
1	斗六	6	21	羅堰三	3
2	龍十四	14	22	女四	4
3	建六	6	23	齊一	1
4	天弃九	9	24	趙二	2
5	天鷄二	2	25	鄭一	1
6	狗國四	4	26	越一	1
7	天淵十	10	27	周二	2
8	天市東垣十一	11	28	秦二	2
9	屠肆二	2	29	代二	2
10	宗大夫四	4	30	晉一	1
11	狗二	2	31	韓一	1
12	牛六	6	32	魏一	1
13	天田九	9	33	楚一	1
14	九坎九	9	34	燕一	1
15	河鼓三	3	35	雉珠五	5
16	右旗九	9	36	荄五	5
17	左旗九	9	37	敗荄五	5
18	織女三	3	38	天津九	9
19	漸臺四	4	39	奚仲四	4
20	輦道六	6	40	雉瑜三	3

No.	Names.	No.
41	天桴四	4
42	虛二	2
43	司命二	2
44	司祿二	2
45	司危二	2
46	司非二	2
47	哭二	2
48	泣二	2
49	天壘城十三	13
50	敗臼四	4
51	蓋屍二	2
52	危三	3
53	人五	5
54	內杵三	3
55	臼四	4
56	車府七	7
57	釣九	9
58	墳墓四	4
59	虛梁四	4
60	天錢十	10
61	鉄錢三	3
62	北落師門一	1
63	天綱一	1
64	土公二	2
65	室二	2
66	雉宮六	6
67	雷電六	6
68	羽林四十五	45
69	八魁九	9
70	騰蛇二十二	22
71	壘壁陳十二	12
72	造父五	5
73	霹靂五	5
74	雲雨四	4
75	東壁二	2
76	天廐十	10
77	鉄鑽五	5
78	土公二	2
79	王良五	5
	Total	415

WESTERN DIVISION.

No.	Names.	No.
1	奎十六	16
2	外屏七	7
3	天溷七	7
4	司空一	1
5	軍南門一	1
6	閣道六	6
7	附路一	1
8	右樞五	5
9	天倉六	6
10	天庾三	3
11	婁三	3
12	左樞五	5

No.	Names.	No.
13	天將軍十一	11
14	天困十三	13
15	芻藁六	6
16	積尸一	1
17	胃三	3
18	天廩四	4
19	大陵八	8
20	天讒一	1
21	卷舌六	6
22	天苑十六	16
23	昴七	7
24	天阿一	1
25	礪石四	4
26	天園十四	14
27	天陰五	5
28	天街二	2
29	月一	1
30	畢八	8
31	天節八	8
32	天高四	4
33	五車五	5
34	柱三	3
35	柱三	3
36	柱三	3
37	天潢五	5
38	咸池三	3
39	天關一	1
40	參旗九	9
41	九斿九	9
42	玉井四	4
43	九州殊九	9
44	諸王六	6
45	觜三	3
46	坐旗九	9
47	司怪四	4
48	屏二	2
49	參十	10
50	軍井四	4
51	廁四	4
52	水府四	4
	Total	284

SOUTHERN DIVISION.

No.	Names.	No.
1	井八	8
2	北河三	3
3	南河三	3
4	天樽三	3
5	五諸侯五	5
6	積薪一	1
7	水位四	4
8	四瀆四	4
9	軍市十三	13
10	野鷄一	1
11	丈人二	2
12	子二	2

No.	Names.	No.
13	孫 二	2
14	闕丘二	2
15	狼 一	1
16	弧矢九	9
17	老人一	1
18	天狗七	7
19	天矢一	1
20	鬼 五	5
21	爟 四	4
22	外厨六	6
23	天社六	6
24	柳 八	8
25	酒旗三	3
26	星 七	7
27	軒轅十七	17
28	内平四	4
29	天相三	3
30	稷 五	5
31	張 六	6
32	天廟十四	14
33	長垣四	4
34	天牢六	6
35	三台六	6
36	虎賁一	1
37	少微四	4
38	靈臺三	3
39	太尊一	1
40	翼二十二	22
41	東區五	5
42	器府二十九	29
43	明堂三	3
44	大微五	5
45	屏 四	4
46	五帝五	5
47	太子一	1
48	幸臣一	1
49	從官一	1
50	太陽守一	1
51	常陳七	1
52	相 一	1
53	勢 四	4
54	軫 四	4
55	長沙一	1
56	左轄一	1
57	右轄一	1
58	大微五	5
59	謁者一	1
60	三公内坐三	3
61	九卿三	3
62	五諸侯五	5
63	郎位十五	15
64	青丘七	7
65	軍門二	2
66	土司空四	4
	Total	326

A total of 1463 stars under 306 designations part of which are repeated