

Analysis of the Astronomical System of Constellations in Koguryo Tomb Murals

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This article articulates the Koguryian characteristics of astronomy shown in Koguryo mural tombs, which were painted from the fourth to the seventh century. As of 2008, a total of 107 mural tombs have been discovered. Of these, I confirmed that twenty-five tombs had constellation paintings. Analyzing these constellation tombs, four guardian deities as mystical animals (Blue Dragon, White Tiger, Vermilion Phoenix, and Black Warrior) were guardians of this world. I discovered that Koguryo people developed *Sasook-do*, a unique constellation system of four directions that is in charge of guarding the cosmos. It consisted of the Big Dipper on the north ceiling, the Southern Dipper, the Eastern Double Three Stars, and the Western Double Three Stars. Each corresponds with the Great Bear, the Archer, the Scorpion, and Orion, respectively. The Three Polar stars are placed in the center and are enlarged according to *Osook-do*, a five constellation system for directions. The Southern Dipper was a very important constellation rarely seen among Chinese mural tombs during this period.

Keywords: Koguryo mural painting tombs, ancient constellations, Big Dipper, Southern Dipper, constellation system of four directions, four deities

I. Introduction

Regardless of place or age, knowledge of the movement of heavenly bodies and of the constellations has always played a very important role in the lives of men. Whether it was the knowledge of calendars, important in agricultural life, or the knowledge of the constellations that served as directional indicators necessary

for nomads and seafarers alike, there have always been demands for objective astronomical knowledge.

Astronomy is a field that studies the organization of the heavens. There has always been an organic relationship between astronomy and the study of the organization of human society under the premise of the influence heaven exercises upon human affairs. Astronomy's influence shows in many humanities fields, a phenomenon that man has approached through cosmology.

Historically speaking, astronomy has played an extremely important role in all aspects of social organization, whether in such questions as an interest in the true identity of emperors or kings or as a basis for how the social order ought to be. When faced with the problems of life and death, furthermore, astronomy fulfilled a huge role regarding the interest concerning the afterlife, as well as in the search for the background of the order of life. Being intimately connected with the questions of life and death of man, religion in particular could not but inquire into astronomy and it accordingly has established astronomical traditions in all forms and shapes.

Pre-modern astronomical thought is an extremely complicated phenomenon that combined two different qualities of objective knowledge for the observation of nature and that of cosmology, invoked in interpretations of the proper order of the human organization. In modern science only the objective aspect has survived, but ancient astronomical thought is a thought system that combined two aspects. Consequently if we are to deal with this subject, it is necessary to approach it not only from an astronomical point of view, but also from a historical and religious angle.

Because of this dual structure of astronomy, it is possible to make deductions about cosmology when researching objective data based upon the observation of nature. It is precisely this possibility that we can try out by using the astronomical materials found in Koguryo tomb murals.

The tomb murals with paintings of constellations¹ are of great importance for the understanding of Koguryo astronomical thought, the subject of this article (see plate 4). The reason that I have made Chinese astronomical materials corresponding to the Koguryo tomb murals (such as the painted stones and tiles from

1. See Kim 1996a. In this article an attempt has been made at a detailed reproduction of the constellations in tomb murals, while scrutinizing the mistakes in reproductions and the established positions of constellations in previous research. Through my continued research, I discovered a total of twenty-five tombs with constellation paintings. See also Kim 2007.

the Hàn and the murals and silk paintings from the Jìn to the Tàng) the subject of a comparative study lies in the fact that the principal aim of this article is to understand the ancient Korean Weltanschauung, for which there are very few documents and theoretical treatises dealing with astronomy.

The Koguryo tomb murals, our primary material, represent in the first place an artistic style, originating from burial tombs, but they also constitute materials that can be approached through the symbols of the afterworld painted in them by their builders. The paintings of the sun, moon, and constellations on the tomb murals are consequently very conceptual and are symbolic mural themes. Our first task is to extract the ancient Korean Weltanschauung from the murals through an analysis of astronomical symbols.

It is beyond question that the astronomical systems developed in China since the Qín entered Koguryo through the sinified cultural area. It is nevertheless not the case that the quality of the transmitter of culture and that of the receiver are completely the same. This is because the receiver firmly sticks to his own peculiar attitudes. If we compare the Koguryo tomb murals with the astronomical thought of the Hàn, the following characteristics of Koguryo astronomical thought stand out.

First, the concept of the triple indication system of astronomical direction is prominent in Koguryo astronomy. In addition to the Four Deities (*Sasin-do*)—the Blue Dragon, White Tiger, Vermillion Phoenix and Black Warrior—the Three-legged Crow, the sun symbol, and the Toad, the moon symbol, the “constellations of the four directions (*Sasook-do*),” namely the Big Dipper, the Southern Dipper (The Archer), the Eastern and Western Double Three Stars,² are also a part of the astronomical direction system. The eastern stars correspond with the Scorpion and it is named *Sim-su* and *Bang-su* in Korean, so I have also termed it *Sim-bang* six stars. The western terminology is Orion and in Korean it is *Sam-su* and *Beol-su*, so I have named it *Sam-beol* six stars. Since the “four directional astronomical symbols system” is a form that is only rarely found in Chinese astronomical charts, it is a good example of the establishment of a distinctive tradition in Koguryo, even while absorbing Chinese astronomical thought.

Second, it is different to describe the northern polar constellation between Koguryo and ancient China. In the Ssirm and Chum Mural, the Northern Three

2. On this terminology, see Kim 1996a. Also refer to Kim 2004.

Stars under the Big Dipper has been identified as the Koguryo's northern polar constellation. In China this appears as the Northern Five Stars. This difference shows that the viewpoint of astronomical observation in those days was not the same between ancient Korea and China.

Third, among the Koguryo paintings of constellations there are two tombs that are notable because they contain all of the twenty-eight constellations. In the case of Dokhwari Tomb No. 2, all twenty-eight constellations have been painted, but the seven constellations of the east including the Horn (*Gak*), Neck (*Hang*), and Root (*Jeo*) have not been positioned in the east but in the west. This is a 180° difference compared to the arrangement of normal Chinese astronomical charts. Furthermore, in the case of Jinpari Tomb No. 4, the seven constellations of the eastern direction have been painted in the west, just as in Dokhwari Tomb No. 2, and even more peculiar is the fact that the constellations have not been arranged clockwise, as is customary, but counterclockwise. These two examples provide evidence of the fact that Koguryo paintings of constellations do not reflect the typical Chinese system of the twenty-eight constellations.

Fourth, the fact that the Big Dipper and the Southern Dipper are very much emphasized is one of the characterizing phenomena of Koguryo astronomy. In 76% of the twenty-five murals with constellations, the Big Dipper has been painted, and in at least 56% of the cases, the Southern Dipper can be found. And where the Southern Dipper has been painted, the Big Dipper appears without exception (Table 2). This might be called a phenomenon where the Southern Dipper appears in contrasting quality to the Big Dipper.

Apart from these characteristics, several constellations have an N, W, U, and inverted V shape, shapes that are hard to find in Chinese astronomical charts. Even if we suppose this to be due to Chinese influence, the Koguryo murals show a tendency to simplify the Chinese arrangements and number of stars.

As I have pointed out, Koguryo astronomical thought did adopt Chinese astronomical thought, but the tendency to transform it into distinctive Koguryo concepts was strong. How should the principal differences between Koguryo and Chinese astronomical thought be interpreted? What is the conceptual background that underlies these differences? These questions are important in order to understand the cosmological Weltanschauung of Koguryo. They will also aid us considerably in elucidating the processes of cultural exchange with other countries during Korea's antiquity.

In order to approach this problem we have to establish at least three different directions of approach. First, we have to approach the most recently reported

astrological charts on stone ceiling props from North Korea from a traditional constellation interpretation framework. Second, Koguryo astronomical thought was formed under Chinese influence, but since there were several different sources within Chinese astronomical thought, we have to establish which one of these conceptual systems carried the most weight. Here several possibilities present themselves per period and per subject such as Han astronomy, Han mythical motives, and Daoist and Buddhist astronomical thought. Third, when we consider that Koguryo had quite extensive cultural relations with west Asia, we might think of the influence of non-Chinese west Asia.

This article will approach the above-mentioned problems using these methods, but it has its limitations in that it still concentrates on comparative research of Koguryo and Chinese astronomical thought. Nevertheless, I expect the present background research to provide clues regarding the cosmological Weltanschauung of Koguryo astronomy and I hope that it will stimulate further research in this field.

II. Triple Combination Method of the Representation of the Sun and the Moon, the Four Deities, and the Four Directions

When we think about the Four Deities, we perceive their function as sacred animals guarding the four directions, while images of the Blue Dragon of the East, the White Tiger of the West, the Vermillion Phoenix of the South, and the Black Warrior of the North flash in our mind. In particular the tradition of positioning the images of the Four Deities in the four directions in burial tombs continued to the Joseon period,³ and the fact that they had been painted upon the banners of the Imperial Guard during the Great Korean Empire of Gojong shows that they

3. During the Joseon dynasty, the Four Animals were chiefly painted on the four sides of the chamber in which the coffin was enshrined in the burial mound. This custom has been recorded in *Sonjo mokreung cheonreung dogam uigwe* (1639: the ritual book that was made during the relocation of the tomb of King Sonjo from the Tonggu tomb in Yangju, Gyeonggi-do), *Inwon wanghu sanreung dogam uigwe* (1757: the ritual book that was made during the construction of the tomb of Queen Consort Inwon, the second wife of King Sukjong, in the same place as the tomb of Queen Inhyon), and *Jeungjong daewang gonreung sanreung dogam uigwe* (Gyujanggak, Seoul National University, no. 13640: the ritual book written when the mountain burial mound of King Jeongjong was constructed). See *Joseon wangjo ui uigwe* (The Ritual Books of the Joseon Court), which is housed at Gyujanggak at Seoul National University, 1993.

were also used to indicate leadership of the armed forces and command over the honor guard (*Gungjung yumul torok* 1986).

The concept of the Four Deities was in fact the systematization of the symbols that represented the four directions and the four seasons during the Chinese Warring States period and later, when this concept was combined with the system of the twenty-eight constellations, a method to draw certain constellations apart from others, came to play the role of guardian deities of the directions of heaven. The Heart (*Sim*) and Tail (*Mi*) constellations, for example, of the seven constellations of the eastern direction were named this way because they were thought to correspond to the heart and the tail of the Blue Dragon. Moreover, the fact that the Blue Dragon and the White Tiger have been painted together with the names of the twenty-eight constellations on a lacquer box found in the Cēnghóyǐ Tomb—excavated in 1978 in Suíxiàn Léigǔdūn and dated to the beginning of the Warring States period (around 433 B.C.E.)—in the earliest known materials suggests that a close connection between the Four Deities and the constellations was established before this period.⁴

The fusion between the Four Deities and the twenty-eight constellations that had been developing since the Warring States period reached its completion during the time of Sī Mǎ-qīān's *Book of History* (91 B.C.E.); Sī Mǎ-qīān's depictions of the constellations subsequently obtained canonical status and became the *locus classicus* for future debates.

As the Four Deities were being understood as part of the heavenly world, the influence of such a cosmological concept caused the Four Deities to assume the role of guardians of the afterlife of those interred in tombs. As a result, the numerous paintings of the Four Deities in Hàn and Koguryo tombs can be understood as a product of astronomical thought and notions regarding the continued existence after death.

I propose to regard this notion of the Four Deities as one form of an 'indication system of astronomical direction' (see table 1). This means that I will try to understand the 'indication system of astronomical direction' against the background of the notion of a correspondence between heaven and man as an important element in the cosmological Weltanschauung that is intimately related to the existence of man before birth and after death. I expect this perspective to present us with a useful tool to deal with such problems as the structure of official heav-

4. See Wáng, Liáng, and Wáng 1979. *Lǚshì chūnqū* contains the earliest recorded names of the twenty-eight constellations, from *jǎo* to *zhèn*. See Chén 1985:65-77.

Table 1 Triple Indicational System of Astronomical Directions

direction	Indicational factor	Constellations of the four directions (<i>Sasook-do</i>)	Sun & moon symbols	Four Deities (<i>Sasin-do</i>)
East		Eastern Double Three Stars (<i>Sim-bang</i> six stars or the Scorpion)	Sun disk (with the three-legged crow)	Blue Dragon
West		Western Double Three Stars (<i>Sam-beol</i> six stars or Orion)	Moon disk (with the toad or the jade-rabbit)	White Tiger
South		Southern Dipper (the Archer)		Vermillion Phoenix
North		Big Dipper (the Great Bear)		Black Warrior
Center		Polar Three Stars (the Little Bear)	This row added, it is <i>Osook-do</i> , i.e., the constellation system of five directions.	Golden Dragon

en worshipping rituals during the Hàn dynasty and the historical and structural changes in the Daoist cosmological systems, but since these questions are not the main subject of this article I will leave them for future research and try to apply a similar perspective in examining the cosmological Weltanschauung of Koguryo astronomy.

Among the symbolic figures used in the indication system of astronomical directions in Koguryo murals, there are also depictions of the sun and the moon. The sun symbol, related to the Three-legged Crow, and such moon symbols as the Toad or the Jade Rabbit are figures that respectively represent the east and the west.

Depictions of the sun and moon were one of the principal themes of painted tiles and stones from the Hàn dynasty and they started out in very mythological forms. Their typical forms of representation, if we look upon them in an astronomical context, are as follows (Jeon 1991; Jeon 1992): First, the representation of the sun and moon god as Daoist immortals, in the form of flying birds that have been humanized, that carry the sun or moon on their backs. Second, the representation of the sun and the moon in the form of asterisms in which several other stars have been painted and that look as if the Daoist immortals are living in a heavenly world. Third, the sun and moon are depicted in the myths of Xī-wángmǔ and Tōngwánggōng. Fourth, depictions of the sun and moon fused

with those of Fúxī and Nūwā. Fifth, the complex depictions of the sun and moon in which all of the above mentioned elements have been mixed together.

Among these representational forms, there are several shapes the depictions of the sun and the moon took when accompanied by paintings of the constellations. For example, there is the shape of the Sun Bird carrying a round wheel on its back; the shape of the Blue Dragon and White Tiger asterisms, drawn together with the Four deities; the shape of the moon in which the Toad or the Jade Rabbit have been depicted; and the shape of the Herdboy and the Serving Maid asterisms painted in the middle of the Lyra constellation.

These different forms of depicting the sun and moon in a very mythological manner established themselves as the images symbolizing the eastern and western directions through the Jin, Wèi, and the Northern and Southern Courts and were continued in the murals of the Táng dynasty. The sun and moon images in Koguryo thematically continue the mythological motives of the Hàn dynasty, but they seem to reflect the atmosphere of the Northern and Southern dynasties in that the symbols for the astronomical directional system are standardized and systematized.

Apart from this, the 'directional symbols for the constellations' were very much developed in Koguryo astronomy. The Big Dipper, the Southern Dipper, the Eastern Double Three Stars, and the Western Double Three Stars were imported as a system to indicate the four directions. To add the Three Polar stars (the Little Bear) on the northern wall, the system was enlarged to display the constellation in five directions. Chinese materials that used this system to indicate the constellations' positions have to date only been discovered in the astronomical charts on the ceiling of the stone shrine in the Guōshì tomb dating from the Later Han in Xiàotāngshān, Shāndōng (Luō 1961) and in the mural tomb of Mǎ Jiā-zhuāng Dàoguǐ dating from the Northern Jì in Jínám, Shāndōng (Jínámsì Bówùguǎn 1985). These cases, however, only show the Big Dipper and the Southern Dipper; the east and west indicated by the double three stars, as in Koguryo, are missing. Although it would be possible to see the astronomical directional motives of Koguryo as originating from these Chinese materials that have been developing since the Hàn dynasty in the case of Koguryo, it is more helpful in discovering its cosmological worldview to suppose that Koguryo formed a distinctive system through the adoption of a set of standardized constellations indicating east, west, north, and south.

Let us then closely examine the indication system of astronomical direction that clearly shows the characteristics of Koguryo from among the triple system

of astronomical directions, consisting of the above-mentioned Four Deities, the sun and moon, and the directional constellations.

III. Characteristics of the Indication System of Astronomical Direction

1. Big Dipper

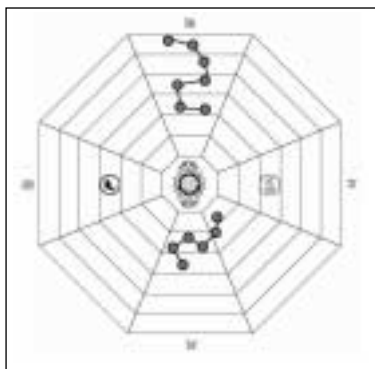
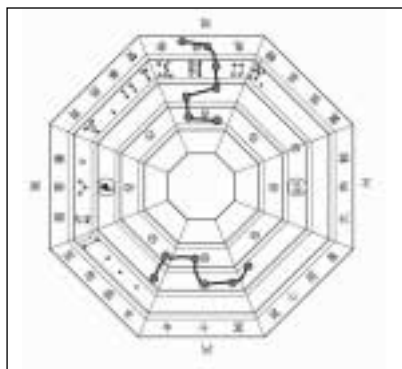
Among the directional constellations in Koguryo, the Big Dipper appears most frequently (Table 2). The fact that the Big Dipper has been painted twenty times in nineteen of the twenty-five mural tombs that have constellations in them testifies to the avid interest Koguryo people had for it.⁵

The tendency to attach importance to the Big Dipper can also be understood as an extension of traditional concepts regarding the constellations, judging from the fact that stone props and stone coffin lids were engraved with many constellations such as the Big Dipper during Korea's prehistory (Kim 1996; Kim 1997). The enduring popularity to the present of a Big Dipper Pavilion on the grounds of each temple complex and of the popular and indigenous Big Dipper beliefs can already be ascertained from the astronomical thought contained in the

Table 2 Affinity Ratio for Astronomical Factors in Koguryo Tomb Murals

	Big dipper	Sun & moon	Four guardian deities	Southern Dipper (14 tombs)
Constellations (23 tombs)	19 (83%)	22 (96%)	16 (70%)	14 (61%)
Big Dipper (19 tombs)		19 (100%)	13 (68%)	14 (74%)
Sun & moon (22 tombs)			16 (73%)	14 (64%)
Four guardian deities (16 tombs)				9 (56%)

5. The Big Dipper has been painted twice in the Jangchon tomb, which makes twenty times in nineteen murals. If we would roughly divide the Big Dipper paintings into the forms in which it is in fact observable, namely the dipper form (form no.1) and the symmetrical S form (form no. 2), twelve instances of the first form can be found against eight instances of the second form (Kim 1996b).

Plate 1 Dokhwari Tomb No. 1**Plate 2** Dokhwari Tomb No. 2

Koguryo tomb murals. The fact that the Big Dipper usually took its place in Koguryo murals as the background to the owner of the tomb suggests that the Big Dipper was assigned the cosmological function of protecting the tomb owner after death and of watching over the afterlife.

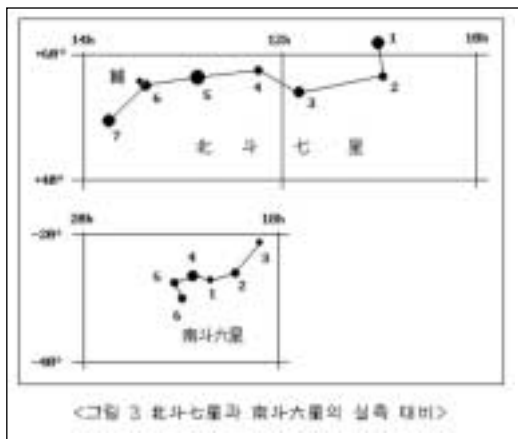
But what truly makes us aware of this intimate relationship with the afterlife is the presence of the Southern Dipper. Represented in its typical form in both Dokhungri no. 1 and no. 2 tombs, the Big Dipper and the Southern Dipper are part of a system of symbols in which the Big Dipper and the Southern Dipper correspond respectively to the north and the south. The presence of the Southern Dipper emphasizes the cosmological connotations of the Big Dipper (see plates 1 & 2).

2. Southern Dipper

Namdu yuksong, the Southern Dipper, corresponds to the Western constellation called Sagittarius ($\varphi \lambda \mu \sigma \tau \zeta$ Sgr) and since it was thought to look like a spoon stuck halfway through the Milky Way, just as if it was a smaller version of the Big Dipper in the north, it was called the Dipper or the Southern Dipper and was incorporated among the twenty-eight constellations as one of the seven constellations of the north. In the Chinese astronomical system of the twenty-eight constellations, the Southern Dipper was just one of the twenty-eight constellations and it is accordingly hard to highlight it as an independent concept that corresponds to the Big Dipper as in the Koguryo Dokhungri tombs no. 1 and no. 2.⁶

The period in which the Southern Dipper is observable in the sky is limited,

Plate 3 Contrast between Big Dipper and Southern Dipper



not only because it is the constellation that is furthest south of the twenty-eight constellations with its zenith at 116° northern latitude, but also because it is not a polestar like the Big Dipper which is visible throughout the year.⁷ Its brightness is furthermore magnitude 2-3 which makes it darker than the Big Dipper (magnitude 1-2) and its width is approximately 15° smaller than that of the Big Dipper (45° ; see plate 3).⁸ These data reveal to us the dwarfish stature of the Southern Dipper compared to the Big Dipper.

The fact that in Koguryo tomb murals the Southern Dipper is exceptionally emphasized not in its quality as one of the twenty-eight constellations but as the southern counterpart of the Big Dipper tells us that Koguryo astronomical thought was applied in a very conceptual manner. The twenty-eight Chinese constellations were adopted, but there seems to have been a certain notion at work that selectively transfigured its objective observations.

What was the ideological background supporting such transfigurations?

6. It is only the case that because the winter solstice is near the 3rd star of the Dipper (φ) that the sun passes through the vicinity of this star from the early part of the 12th month according to the lunar calendar to the early part of the 1st month.

7. It is usually the case in Korea that this constellation becomes visible in May in the south, is positioned in the center of the southern sky in June, and disappears in the southern direction in August. See the astronomical charts in No 1985.

8. See the astronomical charts in Ozaki 1987.

There are two possibilities. The first one is that Koguryo chose and emphasized the Southern Dipper as the constellation of southern direction against the background of Koguryo's own indication system of astronomical direction, as is argued in this article. The second one is that the Southern Dipper reflected astrological notions created during the heyday of Buddhism and Daoism during the Jin, Wei, and the Northern and Southern Courts.⁹ In the *Shāngqīng jīng*,¹⁰ ascribed to Yáng Xī (331-386) of the late Eastern Jin, it is written that "the six offices that watch over the prolongation of human life are located at the Southern Dipper."¹¹ In volume three of *Sōushénjì*,¹² supposedly compiled by Gān Bǎo during the Jin dynasty, it is written that "the Southern Dipper regulates life and the Northern Dipper regulates death," which corresponds to the assertion that the Southern Dipper watches over the life of man.

The facts that in Koguryo astronomical charts the Big Dipper and the Southern Dipper are depicted in contrast with each other and that the cases where these two constellations are exceptionally emphasized are far from few support the interpretation that this reflects the astrological notions regarding the Big Dipper and the Southern Dipper. (In the nineteen paintings in which the Big Dipper appears, the Southern Dipper appears fourteen times, which is a ratio of 74%).

The considerably conceptual nature of Koguryo astronomy can also be confirmed through the Eastern Double Three Stars.

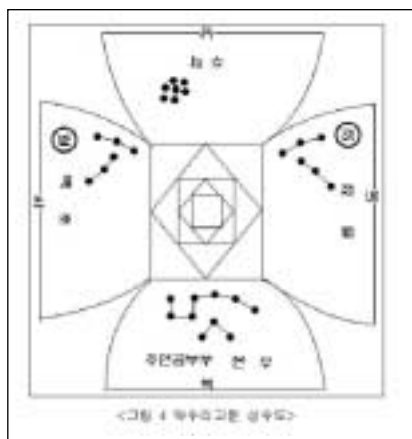
3. Eastern Double Three Stars

9. The section on astrologers and astronomers in *Book of History* does see the Northern Dipper and the Southern Dipper as contrasting motives, stating that "the middle star of the Big Dipper (héng) is positioned straight opposite to the Dipper and the first star of the Big Dipper (kuí) approaches the head of Orion (*Sam* constellation)," but in the subsequent explanation of the Dipper constellations this is not touched upon. It would therefore seem to be the case that the assigning of astrological significance regarding life and death to the Southern Dipper and the Northern Dipper did not take place until later.

10. For *Shāngqīng jīng* compiled by Yáng Xī (331-386) of the late Eastern Jin, see Liǔ Xī-tài (ed.), *Zhōngguó dǎojiāo* (Chinese Daoism), Xīshǐ chūbǎnshè, 1994.

11. For details on these six offices and the star lords who preside over them, see Zhāng 1994:306.

12. See *Shénxiān jìchuán shūgū* (Records and Documents of Daoist Sages), 20 volumes, compiled by Gān Bǎo of the Jin. His pseudonym is Lǐng-shēng and he came from Xīncài, Húnán. *Jīnshū* (Book of Jin) states that "finally somebody has compiled all the books on the strange and divine transformations of human beings into spirits of heaven and earth and his name is Gān Bǎo. His book covers 30 volumes." See *Dǎojiāo wènwù cǐdiǎn*, p. 908.

Plate 4 Yaksuri Tomb's Constellation

The Eastern Double Three Stars refers to the wedge shaped double tri-stars of the eastern directional constellations (see plate 4, east). These double tri-stars are supposed to be the same as the Heart ($\sigma \alpha \tau$ Sco) and Room ($\pi \rho \delta \beta$ Sco) constellations from the twenty-eight Chinese constellations and they respectively correspond to the head and the claws of Scorpio (Nakamura 1936:374-401; Ri 1984:2-58; Kim 1996b: 11-3). The wedge shaped double tri-star in the east has been depicted in the Muyong Tomb (Tomb of the Dancers), the Yaksuri Tomb, and the Ssangyong Tomb (Tomb of the Double Pillars) and the stars painted in the southeast part of the Dokhungri murals are also regarded as belonging to this category (Kim 1996a: 71; Kim 1996b: 11-3). Asterisms that show a similar nature are the binary stars depicted next to the sun in the Gakjo Tomb and the solitary tri-star in the Anak no. 1 tomb and the Chonwangjisin Tomb.

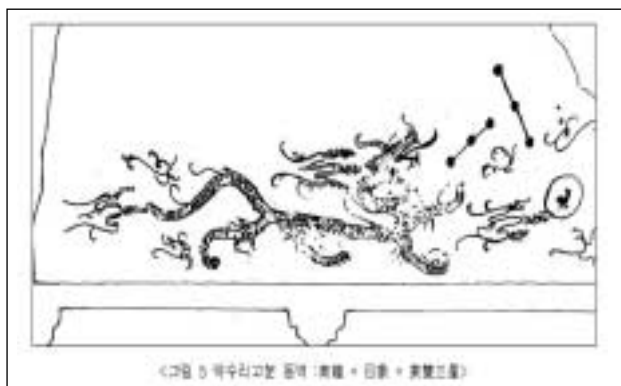
The reason to regard the two asterisms of the Eastern Double Three Stars as a directional constellation is formed by the presence of the Western Double Three Stars, which has been depicted to the west of the Eastern Double Three Stars in a symmetrical way (see plate 4). The wedge shaped tri-star of the western direction has been discovered in the Gakjo Tomb, the Muyong Tomb, the Yaksuri Tomb, and the Ssangyong Tomb and the solitary tri-star in the Chonwangjisin Tomb also seems to fall under this type. Outside of these tombs, the Western Double Three Stars has also been depicted in the Boksari Tomb, the Byol Tomb (Tomb of the Stars), and the Usanri no. 1 tomb.

In the murals of the Yaksuri Tomb, the Western Double Three Stars has been positioned on the western wall in the left corner in front of the mouth of a very dynamically painted White Tiger and above a painting of the moon. Compositionally this painting of the Western Double Three Stars achieves a complete symmetry with the Eastern Double Three Stars that has been painted on the eastern wall between the mouth of the Blue Dragon and a painting of the sun. It is an example that clearly shows what kind of form the Koguryo triple indication system of astronomical directions took, because these two scenes simultaneously contain the sun and the moon, the Four Deities, and the directional constellations (plates 5 & 6).¹³

Previous studies¹⁴ have identified this western asterism with the Chinese Triad (*Sam*) and Hair-horn (*Ja*) constellations (at present both part of Orion), but although the identification of the Eastern Double Three Stars with the Chinese Heart (*Sim*) and Room (*Bang*) constellations can be easily made, in this case there are many difficulties.

The Hair-horn (*Ja*) constellation has an intensity of such high magnitude that it bears no comparison to the much brighter Triad (*Sam*) constellation¹⁵ and, moreover, its three stars do not form a straight line, but have a triangular form. Even if we would regard the three big stars among the seven stars of the Triad constellation as representative stars of this constellation and so reduce the seven

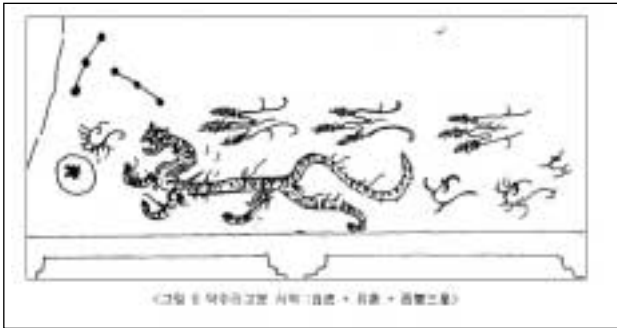
Plate 5 Yaksuri Tomb's East Wall Painting



13. For these plates, see Josen yujok dogam pyonchan wiwonhoe 1990:11-75.

14. Refer to Nakamura 1936:374-401; Ri 1984:2-58; Kim 1996b: 11-3.

15. The three stars of the Turtle constellation correspond to the three dark stars of Orion λ , φ 1 and

Plate 6 Yaksuri Tomb's West Wall Painting

to three, stretch the triangular Beak constellation into a straight line of three stars and furthermore oppose these two pairs of three star asterisms as wedge shaped ones, this would only make it more obvious that this does not correspond with data obtained from objective observations.

Precisely because of the non-observable nature of these facts, I intend to understand this from a point of view which is similar to the mindset that caused Koguryo to emphasize the Big Dipper and the Southern Dipper as an opposing pair. That is to say, we should interpret this against the background of the directional symbols for the constellations as the construction of a conceptual Western Double Three Stars in order to achieve symmetry with the Eastern Double Three Stars.¹⁶

Seen from this point where this Western Double Three Stars should have appeared in Anak no. 1 tomb and the Dokhungri Tomb, it is substituted by a constellation in an N-shape and by constellations in W and U shapes, respectively, thus destroying the symmetry. The appearance of different forms of the con-

φ 2 with respective magnitudes of 3.66, 4.41, and 4.09. On the other hand, the stars of the Sam constellation that correspond to the ζ ϵ δ α γ κ β stars of Orion are very bright stars with respective magnitudes of 2.05, 1.70, 2.23, 0.50, 1.64, 2.06, and 0.12.

16. Among the stones with paintings from the Nányáng region, there are depictions very similar to the Eastern Double Three Stars, that is to say depictions of the Blue Dragon constellation in which six asterisms (nineteen stars in total) have been arranged within the Blue Dragon and the moon, and of the White Tiger in which a double tri-star has been positioned in a T-shape in front of the mouth of the tiger and three stars between the legs of the tiger. However, even if Koguryo would have adopted this kind of motive, the standardization of the wedge-shaped double tri-star or the contrasting use as directional indications of east and west are Koguryo's own touch. See *Húnánshěng bówùguān* 1995.

stellation symbolizing the west would seem to reflect the difficult and hard work that went into this kind of conceptual undertakings.

IV. Changes and Transfigurations in the Indication System of Astronomical Directions

The above-mentioned different forms of constellations symbolizing the western direction reveal to us that the indication system of astronomical directions in Koguryo was not an immobile and fixed system. There exist in fact several transfigurations in the Koguryo indication system of astronomical directions and the representative example is the painting of the Pleiades, symbolizing the southern direction, in the Yaksuri Tomb (plate 4). The Pleiades belongs to the seven constellations of the western direction¹⁷ and it is accordingly peculiar that it has been painted in the south.

The above-mentioned N-shaped asterism in the Anak no. 1 tomb, the W and U shaped ones in the Dokhungri Tomb and the solitary tri-star in the

Table 3 Transition for Directional Factors

	1 st period		2 nd period			3 rd period
	4C	early 5C	middle 5C	late 5C	early 6C	middle 6C-7C
Sun & moon symbol						
Four deities						
Big Dipper						
Southern Dipper						
East & west double three stars						
Fúxī and Nūwā of sun & moon						

17. The Pleiades has astrological divinatory significance as the ‘eyes and ears of heaven’ and as ‘master of unruly soldiers,’ ‘master of Jizhōu,’ and ‘master of Wèi.’ Additionally the Pleiades carries the significance of being the stars that, while brightly shining during the autumn months, ‘harvest the seasons,’ and is also called the ‘autumn gate’ through which all things enter (Chèn 1985:118). In light of the shaking of this constellation it is also compared to the rising of unruly soldiers (Hú 1995:793).

Chonwangjisin Tomb can also be seen as transfigurations of constellations symbolizing the western direction. Furthermore, the two stars next to the sun in the Gakjo Tomb and the solitary tri-stars in the Anak no. 1 tomb and the Chonwangjisin Tomb have been identified as constellations symbolizing the eastern direction.

We can now determine a number of characteristics when examining the changes and transfigurations in the indications of the astronomical directions (see table 3).

First, we have seen that the above-mentioned Eastern and Western Double Three Stars in their role as indicator appeared during the first period¹⁸ but completely disappeared during the third period. This would seem to be an indication of the less than firm conceptual background regarding the constellations symbolizing the eastern and western directions.

Second, concurrently with this phenomenon, the indication system of the third period concentrates on its four components of the Big Dipper, the Southern Dipper, the sun, and the moon. This tendency is especially pronounced in the tombs of the Jian region. With the exception of the Gakjo Tomb and the Muyong Tomb of the first period, all tombs show the symbols for the Big Dipper and the Southern Dipper. At the same time the simultaneous depictions in Jian region tombs of two different styles of sun and moon symbols, namely the double-layered sun and moon symbols—in other words the presence of Fúxî and Nūwā—and of sun and moon symbols without Fúxî and Nūwā, should be noticed.

Third, taking a broad look, we can conclude that the symbols for the sun, the moon, and the Big Dipper were imported in Koguryo astronomical charts before the Four Deities and that afterwards the sun, moon, Big Dipper, and the Four

18. The time span between the earliest and the latest Koguryo tombs that are datable with absolute certainty is almost 300 years, from the Anak no. 3 tomb (also known as the Tongsu Tomb), built in 357, to the Ohoe no. 5 tomb, built at the end of the sixth century. This period is usually divided into three. The first period is characterized by genre paintings. The second period is distinguished by the increasing importance of ornamental patterns in genre paintings in the Jian region and by the depiction of the Four Deities in genre paintings in the Taedong Valley. The third period shows the Four Deities as the principal subject of tomb murals. Roughly speaking the first period extends from the early fourth century until the early fifth century, the second period from the middle of the fifth century until the early sixth century, and the third period from the middle of the sixth century until the middle of the seventh century. However, there are significant differences in opinion on the dates of each period and on which tombs belong to which period.

Deities were maintained as the symbols representing the astronomical directions until the third period.

Fourth, we established that the period which showed the highest concentration of depictions of the triple indication system of astronomical directions was the fifth century and that approaching the end of the third period the Big Dipper, the Southern Dipper, the sun, the moon, and the Four Deities were the elements of directional symbols that lasted until the end.

V. Koguryo-style Transfigurations of the Twenty-eight Constellations

The depiction of all twenty-eight Chinese constellations in Koguryo astronomical charts can be found in the Dokhwari no. 2 tomb and the Jinpari no. 4 tomb, both of which belong to the third period of the tomb mural periodization scheme. In the Dokhwari no. 2 tomb the names of the Chinese Room, Wall, Stomach, Well, and Willow constellations have been written down in red ink¹⁹ and as such offer very important data for the proper understanding of constellations in Koguryo tombs. This inscription in red ink shows the adoption of the Chinese system of twenty-eight constellations beyond a doubt. The paintings in Jinpari Tomb No. 4 do not show the names of the constellations, nor do the connecting lines between the stars show, but previous research has identified these constellations as part of the twenty-eight constellations.²⁰ This again is of great value to the research of Koguryo astronomical charts.

However, the Chinese system of twenty-eight constellations had not been adopted in its conventional form on two points. First, the direction of the arrangement of the twenty-eight constellations in Dokhwari Tomb No. 2 is clockwise, but it is counterclockwise in the Jinpari no. 4 tomb. Second, in both cases the seven constellations of the eastern directional constellations have been

19. The Chinese installations that can be read intact at present are the Room (*Bang*), Wall (*Byok*), Stomach (*Wi*), Hair-horn (*Ja*), Well (*Jeong*), and the Ghost (*Gwi*) constellations. Those constellations of which the outline is clearly recognizable, be it partially, are the Legs (*Gyu*), Bond (*Nu*), Pleiades (*Myo*), Net (*Pil*), *Sam*, and the Willow (*Yu*) constellations; of the Emptiness (*Heo*) and Rooftop (*Wi*) constellations only the position they occupy in the sky shows. Traces of the other constellations are hard to find.

20. See Ri 1983:46-8. Also see Kim (1996a) in which the positions of the depicted constellations have been corrected.

placed in the west and not in the east, and the seven constellations of the western directional constellations have likewise been placed in the east. In the case of Dokhwari Tomb No.2 this might be seen as a 180° rotation of the Chinese example, but in the case of Jinpari Tomb No. 4 this is not possible. This is because while the seven constellations of the east and the west have been switched, those of the north and the south have not.²¹

I have already presented the hypothesis that the background of the depictions in Dokhwari Tomb No. 2, which differs from conventional Chinese practice, originated for the purpose of having the twenty-eight constellations appear from the south, similar to the six stars of the Southern Dipper (Kim 1996a). This is because in Dokhwari Tomb No. 2, as in Dokhwari Tomb No. 1, the Southern Dipper and the Big Dipper have been emphasized by painting them so large that they bear no comparison to the twenty-eight constellations around them. This hypothesis supposes that the results of the observation of nature were sacrificed for the sake of the indication system of astronomical directions.

In fact, as in Dokhwari Tomb No. 2, the very nature of lining up the Big Dipper and the Triad (*Sam*), Well (*Jeong*), and Ghost (*Gwi*) constellations shows that this goes against astronomical observations. This is because in the firmament among the twenty-eight constellations the Extended Net (*Jang*) and Wings (*Ik*) and the Chariot Platform (*Jin*) and Horn (*Gak*) constellations are parallel to the direction of the Big Dipper (10h-14h). This aspect of going against astronomical observations is something that belongs to a rather later period and can as such be found in the Zhāng Shì-qīng tomb in Xuānhuā, Héběi from the Liáo period (1116 CE) in which the Big Dipper has been lined up with the Tail (*Mi*), Winnowing Basket (*Gi*), the Southern Dipper, Ox (*U*), Girl (*Yo*), and Emptiness (*Heo*) constellations. This is related to the ancient Chinese tradition of regarding the Southern Dipper, the Ox, Girl, and Emptiness constellations as constellations

21. The contradiction found in Jinpari Tomb No. 4 might be because the painter of the murals made a mistake, or because the reproductions of the astronomical directions were erroneous. If it is the latter, there is no change in the fact that Jinpari Tomb No. 4 is counterclockwise, even if we would take into account Ri Jun-geol's research (1983:46-8). But as I have already pointed out, there are numerous mistakes in Ri's reproductions of the astrological charts in tombs (Kim 1996a). If we accept the hypothesis that the astrological charts were copied while looking from the inside of the burial chamber toward the ceiling, then as for the directions in the Jinpari no. 4 tomb, the seven constellations of the east have been placed in the west and the seven constellations of the west have been placed in the east. A conclusive solution to this problem will have to wait for a direct investigation of the astronomical charts concerned.

of the northern direction. But there is a difference with the Koguryo Dokhwari no. 2 tomb; the Well and Ghost constellations, which do not belong to the seven constellations of the north, have been lined up with the seven constellations of the south.

As mentioned before, apart from the symbolic value of the Big Dipper, conceptual aspects as shown by the quality of the Southern Dipper as an astronomical directional constellation, not as the Southern Dipper constellation as one of the twenty-eight constellations, and by the Western Double Three Stars would seem to be operating within the system of the twenty-eight constellations.

These aspects make it finally possible to conclude that the astronomical charts of Koguryo go considerably against astronomical observations. In other words, it shows that Koguryo astronomical thought, while very theoretical and conceptual, had a very strong tendency toward systematization.

VI. Conclusion

The indication system of astronomical directions and the astronomical thought as shown in the Koguryo tomb murals have characteristics that are in many respects different from its Chinese counterpart. In this distinct system Koguryo astronomical thought did not simply copy the astronomical knowledge obtained by observation; it has a conceptual dimension that adapted this knowledge into a distinctive cosmological interpretative structure. The kernel of this conceptual dimension is found in the reflection of very systematic concepts, such as is shown by the indication system of astronomical directions.

Because Koguryo adopted Chinese astronomical data without fail, but applied it with a sense of discrimination, a triple indication system of astronomical directions that was more refined than its Chinese counterpart was created. If among the three constituent parts of the sun and moon symbols, the Four Deities and the constellations of the four directions, the constellations as directional indicators had not developed, it would have been difficult to detect any significant differences with the Chinese system. It should be clear that in this respect the Koguryo indication system of the directions of constellations offers a valuable point of view in understanding Koguryo astronomical thought.

The sun and moon and the constellations that had been depicted in a very mythological manner all through the Hàn dynasty were organized and systematized in Koguryo, because they were understood through the concepts of the

Big Dipper, the Southern Dipper, the Eastern Double Three Stars, and the Western Double Three Stars. Although this kind of concept is also found during the period of the Northern and Southern courts in China, it was not as concentrated as in Koguryo and the degree of systemization was low. If this was the case, what was the conceptual background that made possible these characteristics of Koguryo astronomical thought?

We can first of all think of the background related to the political consciousness of Koguryo that had grown into a powerful country in northeast Asia after the fourth and fifth centuries. This is the point that the worldview of Koguryo was the center of the world—as shown by the inscriptions of the monument of King Gwangaeto, that of Moduru and the Koguryo inscription in Chungwon—formed the foundation for the indication system of astronomical directions (Noh 1988).

The appellations for the Koguryo founder Chumong in the inscriptions on Gwangaeto's tomb of "son of the emperor," "son of the Heavenly Emperor," and "daughter of the god of water" (when indirectly referring to his mother who was considered to be the daughter of the god of water) or the inscriptions on the Moduru Tomb of "grandson of the god of water" and "son of the sun and moon" are expressions that came out of the body of astronomical beliefs that traced the origins of Koguryo to the sun and the moon. This can of course also be understood from the context of the Dongmyong myth, a myth of Buyeo people's descent from the union of the god of the moon (Ilgwang) and the god of water (Habaek). I have attempted to read this process of the reinterpretation of the transmission of traditional myths as a cosmological *Weltanschauung* from the astronomical thought so widely reflected in Koguryo murals. The development of the concept of the Five Deities during the sixth century, as Yellow Dragon or Golden Dragon is placed on the central ceiling stone next to the Four Deities that appeared in the murals, is also approached from the same context of astronomical beliefs.²²

22. From the inscriptions of Gwangaeto's epitaph and of Moduru Tomb it appears that the Heavenly Emperor/Supreme Being sent Yellow Dragon to meet King Gwangaeto when he died. The background of the Five Deities system that developed after the sixth century and in which Yellow Dragon was depicted on the central ceiling prop can thus be understood in connection with the contents of the inscriptions. In other words, I am of the opinion that the sixth century Five Deities system must be understood as a continuance of the concept of the Yellow Dragon concept that represents the world and the Heavenly Emperor/Supreme Being, a belief that was established during the fifth century (Kim 1996b: 20-3).

Second, concepts related to Daoist thought, such as the emphasis on the concept of the Southern Dipper as corresponding to the Big Dipper instead of being one of the twenty-eight constellations, can be directly found in materials related to Koguryo astronomy.

The contrast between the Northern Dipper and the Southern Dipper that argued that the Northern Dipper regulated death and the Southern Dipper life, is understood against the background of Daoist divinatory techniques.²³ This is also related to the later popularity of the belief in the Old Man of the South Pole Star, also called the star of long life. The fact that there is a distinct Daoist atmosphere to much of the other non-astronomical motives in murals also supports the possibility of such a background of beliefs.

Third, we can think of a background that reflects the avid interest in the Big Dipper in Koguryo murals, as is attested by the folk beliefs associated with the Big Dipper that are popular to this day, or by the prehistoric drawings on stone props and stone coffin lids of the Big Dipper.

It is furthermore difficult to dismiss completely the possibilities of the introduction of other, as of yet unknown, interpretative systems of constellations, when we think of the cultural and historical context presented by the considerable communication with western Asia by way of the Silk Road and the steppes.

The background of beliefs of Koguryo astronomy can then be looked for in its traditional connectedness, contemporary demands, Chinese influences or non-Chinese alternatives, but more research is needed to determine from which point of view one should view this problem. Nevertheless, the reason that this exploration should be undertaken without hesitation is the fact that this is not just for the sake of understanding the *Weltanschauung* of Koguryo, but that it is in a broader perspective very important for the understanding of the question of exchange in Korean cultural history. A further reason is provided by the fact that astronomical thought is in the first place formulated based upon objective data, gained by the observation of heavenly bodies, and as such offers clearer materi-

23. Buddhist divinatory techniques have exercised a deep influence upon the formation of divinatory significance of the Big Dipper. The seven stars that form the Big Dipper have Daoist names, but the belief that these seven stars are led by a bodhisattva is because of Buddhist influences. Therefore, there are difficulties in interpreting the symmetry between the Northern Dipper and the Southern Dipper in a purely Daoist framework. The problem of mutual influences between Buddhist and Daoist divinatory techniques is a subject that is important in order to understand the background of the development of astronomical thought and it is also a subject that requires much further research.

als for comparative cultural history.

Last, let us take a look at some of the questions that are related to this exploration and that need future research. The first problem is what kind of concept the two symmetrical Big Dippers on the ceiling slab of the Changch'on no. 1 tomb reflect. It would seem that the Big Dipper depicted in the south is not a simple Big Dipper, since it can be interpreted to have either eight or nine stars (Kim 1996a). An inquiry into the background of beliefs giving meaning to this is not easy. Here again it is a question of whether we can read Daoist divinatory techniques from this.

Second, if in-depth research would be undertaken into as of yet unidentified constellations in the Byol tomb and the Usanri tombs no. 1 and no. 2 and into the N, W, U and V-shaped constellations that have only been discovered in Koguryo astronomical charts, this would result in real progression in the study of Koguryo astronomy.

Third, the points that the scene of the monk and the Eight Trigrams for Divination in the Jian no. 4 tomb of the fifth group suggests are not few. Through this material I have already examined the possibility that the Han dynasty numerological thought was introduced to Koguryo and the esoteric tendencies of Koguryo Buddhism. I furthermore raise the possibility that this material has the diagrammatic significance of the Eight Trigrams of Divinations of King Wèn (Kim 1996b). More profound philological and archeological research is needed on this subject.

Fourth, it needs to be noticed that in the Japanese Takamatsu Tomb (excavated in the 1970s) constructed by refugees from the Korean Peninsula (*gwihwain*) in the Nara region, paintings of the Four Deities, the sun and the moon and astrological charts have been discovered that bear a close resemblance to Koguryo tomb murals. This tomb is important in the respect that it might be able to fill in the blanks between Koguryo and Goryeo. Considerable research has already been done into the relations between Chinese and Koguryo tomb murals²⁴, but there are very few detailed studies of comparative astronomy, and

24. See Yoshida 1972:52-64; Arimitsu 1972b: 65-72; Arimitsu 1972a: 281-94; and Tamura 1981:1-12. The first three articles compare the Takamatsu Tomb with Chinese and Koguryo tombs, focusing on the paintings of the Four Deities, the overall artistic elements, and the styles of the tombs. The fourth one puts forth the opinion that fifth century Koguryo believed in Maitreya because of an inscription in the Dokhungri Tomb about Maitreya also appears in the Maitreya sutra translated by Zú Fú-hù. It also links the concept of constellation paintings to the Buddhist concept of constellation *kalpa* and supposes that the person interred in the Takamatsu Tomb, which shows Buddhist elements, was a person connected to the Maitreya faith.

Table 4 Table of Astronomical Elements in Koguryo Tomb Murals

	Name of tomb	Period	Ceiling style	Big Dipper	S. Dipper	E. Double Three Stars	W. Double Three Stars	Sun/moon	Four Deities	Central ceiling prop	28 constellations
1	Anak 3	357	Parallel triangular	△				○			
2	Boksari	Late 4 th c.	Arch-shaped dome	○		△	△	○			
3	Anak 1	Late 4 th -early 5 th c.	Parallel triangular	○	○	△	N	○			
4	Dokhugri	408	Arch-shaped dome	○	○	○	W, U	○	(5planet)		△
5	Yaksuri	Early 5 th c.	Arch-shaped dome	○	Pleiades	○	○	○	○	?	
6	Dongamri	Early 5 th c.	Parallel triangular	(star fragment)							
7	Gakjeo (Jian)	Early 5 th c.	Octagonal	○	○	○?	○	○	○		
8	Byol	mid 5 th c.	Arch-shaped triangular dome	○			△	○	○	?	△
9	Muyong (Jian)	1 st half 5 th c.	Octagonal	○	○	○	○	○	○	Lotus	
10	Hahaebang 31	mid 5 th c.	Parallel triangular				△			(star fragment)	
11	Chonwangjisin	mid 5 th c.	Octagonal	○	○	○	○	○			
12	Daeanri 1	Last half 5 th c.	Octagonal	○				○	○	Lotus	
13	Samsil (Jian)	1 st half 5 th c.	Parallel triangular	○	○	△		○	○	Sun, moon, constellations	
			(2 nd room)								
14	Jangchon 1	mid 5 th c.	Parallel triangular	○ (2)				○	○	Lotus (ante-chamber)	
			(main room)								
15	Ssangyong	End 5 th c.	Parallel triangular	○		○	○	○	○	Lotus	
16	Suryop	End 5 th c.	Arch-shaped parallel dome	○				○	○	?	
17	Dokhwari 1	End 5 th c.-early 6 th c.	Octagonal	○	○			○	○	Lotus	
18	Dokhwari 2	End 5 th c.-early 6 th c.	Octagonal	○	○			○	○	Lotus	○

	Name of tomb	Period	Ceiling style	Big Dipper	S. Dipper	E. Double Three Stars	W. Double Three Stars	Sun/moon	Four Deities	Central ceiling prop	28 constellations
19	Usanri 1	Last half 5 th c.	Arch-shaped parallel dome			△	△	○	○	Constellations.	△
20	Usanri 2		Arch-shaped parallel dome								△
21	Gaema	1 st half 6 th c.	Parallel triangular	○		△	△				
22	Jinpari 4	1 st half 6 th c.	Octagonal	○				○	○	28 const.	○
23	Tonggusasin	2 nd half 6 th c.	Parallel triangular	○	○			○ (Fúxí Nūwā)	○	Yellow Dragon, constellations	
24	Jian 4 (Jian)	1 st half 6 th c.	Triangular	○	○			○ (Fúxí Nūwā)	○	Yellow Dragon, constellations	
25	Jian 5 (Jian)	1 st half 6 th c.	Triangular	○	○			○ (Fúxí Nūwā)	○	Blue Dragon, White Tiger, constellations	

○: certain △: probable ?: difficult to interpret

Source: Kim 1996b.

the research that approaches the subject in a way we have done are very recent (Im 1987).

Fifth, according to the explanation by Kwon Geun that is engraved at the lower part of the second oldest stone astronomical chart in the world, Chonsang yolcha bunya jido (1395 C.E.), Koguryo possessed stone astronomical charts, but these were old and there were many erroneous constellation names in them, so it was decided by the Astronomical Bureau to make a new chart that would correct these errors. Before establishing whether this record is true or not, profound research of a wide scope is needed because the message this record conveys suggests a close connection between Koguryo and Joseon astronomy.²⁵

25. Kim 1997 was translated by Remco E. Breuker, Leiden University. I made a partial amendment of the article to accept some results from my recent study.

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