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ASTRONOMICAL ICONOGRAPHY IN *TAKAMATSU ZUKA* AND *KITORA* TUMULI: ANOMALIES IN THE ADAPTATION OF ASTRONOMICAL AND COSMOLOGIAL KNOWLEDGE IN EARLY JAPAN

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ABSTRACT

Two of the more remarkable sites of early Japan that have astronomical iconography are *Takamatsu Zuka Kofun* and *Kitora Kofun*. Located south of the ancient capital of *Fujiwara Kyou* in Asuka, these tumuli contain star charts and paintings adapted from China and Korea in what was the first major wave of cultural diffusion of knowledge from the continent in the early centuries of the common era. While the overall layout of the two tombs is similar, the ceiling star charts are quite different. That of *Takamatsu Zuka* is square and includes the 28 *sei shuku* or moon lodges, arranged in correspondence to the four animals of cardinal directions. That of *Kitora* is circular and contains stars visible to an observer of the chart's base latitude. Following discussion of the geographical and historical context of the two tombs, this article provides an explanation of the iconography of each tomb, including the astronomical and cosmological basis of the ceiling star charts and wall paintings, consideration of anomalies and problems related to each tomb's iconography, and a discussion of the implications of the iconography. While the tumuli reflect some of the best-preserved examples of ancient Chinese cosmological principles, they also indicate that tomb builders may not have fully understood these principles in adapting them to the locale of their construction. The iconography provided a symbolic base for reinforcing the hegemonic power of those who ruled and may have had greater importance in that role than in providing an accurate representation of the cosmos.

KEYWORDS: Japan, tombs, star charts, anomalies, *Takamatsu Zuka Kofun*, *Kitora Kofun*

1. INTRODUCTION

Two of the more remarkable sites of early Japan that have astronomical significance are *Takamatsu Zuka Kofun* and *Kitora Kofun*. Located south of the ancient capital of *Fujiwara Kyou* in Asuka, these tumuli contain star charts and paintings adapted from China and Korea in what was the first major wave of cultural diffusion of knowledge from the continent in the early centuries of the common era. While the overall layout of the two tombs is similar, the ceiling star charts are quite different. That of *Takamatsu Zuka* is square and includes the 28 *sei shuku* or moon lodges, arranged in correspondence to the four animals of cardinal directions. That of *Kitora* is circular and contains stars visible to an observer of the chart's base latitude.

The astronomical iconographies of the tombs represent some of the better-preserved examples of ancient Chinese cosmological principles. However, certain anomalies indicate that these principles may not have been fully understood as they were incorporated, especially in construction of *Kitora Kofun*. To better appreciate these anomalies and the implications that they have for understanding how astronomical knowledge developed in the early history of Japan, this article includes: (1) discussion of the geographical and historical context of the tumuli; (2) explanation of the iconography of each tomb, including the astronomical and cosmological basis of ceiling star charts and wall paintings; (3) consideration of anomalies and analysis of problems related to iconography in the tombs; and (4) a discussion of the implications of these anomalies relative to the political and cultural development of early Japan.

2. GEOGRAPHICAL AND HISTORICAL CONTEXT

2.1 Locations

Takamatsu Zuka Kofun and *Kitora Kofun* are both located in proximity to the ancient Japanese capital of *Fujiwara Kyou*, which is at the southern end of the Yamato Plain (see Figure 1). This plain is bounded on the north by Kyoto and on the east and south by large mountain ranges, and is separated from the sprawling city of modern Osaka to the west by a rather small strip of mountains. Much of the activity of early "Ancient Japan" (about 300 BCE to 784 CE) occurred within this area and moved from south to north (see Brown, 1993). Significant capitals included *Fujiwara Kyou* (694-710 CE; modern Asuka), *Heijou Kyou* (710-784 CE; Nara, roughly midway between Asuka and Kyoto), and *Heian Kyou* (794-1868 CE; Kyoto). While there are many tombs of royal lineage in this area that represent different periods and modes of tomb construction, few have been explored due to restrictions of the imperial household. To date, only the tumuli of *Takamatsu Zuka* and *Kitora* have revealed significant astronomical iconography.

Figure 1 Kinki Area of Japan. (From Google Earth)

Fujiwara Kyou (see Figures 2 and 3) was the first capital in Japan to be built using Chinese geomantic principles (Koujirou, 1993: 229-30). It was an almost-perfect location for the establishment of a city based upon these principles. Such configuration generally had specific mountains to the north, east, and west, with rather open space to the south, all representing the celestial animals of those directions and associated with particular seasons. A river flowing from north to south completed the sacred landscape, and the precincts of imperial power would be located in the northern portion of the city with streets

and avenues crisscrossing in cardinal alignment (Figure 2)[1].[i]

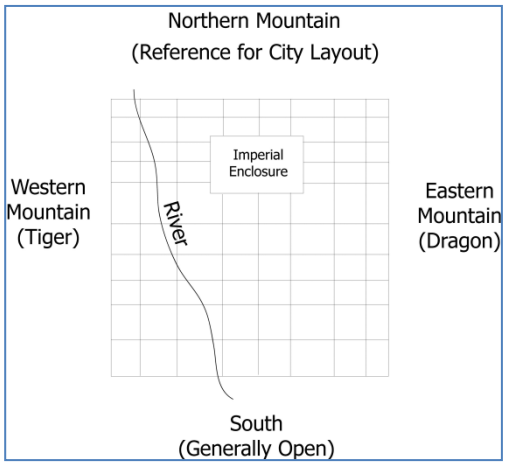

Figure 2 Geomantic Layout of Capital Cities. (Drawing by the author)

For *Fujiwara Kyou* (Figure 3), the northern *Miminashi* Mountain, the survey base for the layout of the capital, represented *Genbu* (the black tortoise or warrior of winter). *Kagu* Mountain in the east represented *Seiryuu*, the azure dragon of spring. In the west, *Unebi* Mountain represented *Byakko* (the white tiger of autumn). Hills and relatively open areas to the south fit a geomantic image of *Suzaku*, the red or vermillion bird of summer. The *Asuka* River still flows from the northwest to the southeast, completing the geomantic landscape.

[1] A full explanation of geomantic principles, cardinality, and relations between geographically based phenomena and astronomical iconography is far beyond the scope of this article. Readers unfamiliar with these and other Chinese cosmological principles may wish to consult works such as Ho (1985), Walters (1989), Major (1993), and Sun and Kistemaker (1997).

Figure 3 Close-Up of *Asuka* Area. Ancient *Fujiwara Kyou* is surrounded by related mountains and topography of geomantic significance. Directions with corresponding "animals" are labeled. Note also that the Asuka River flows from upper left to lower right. (From Google Earth)

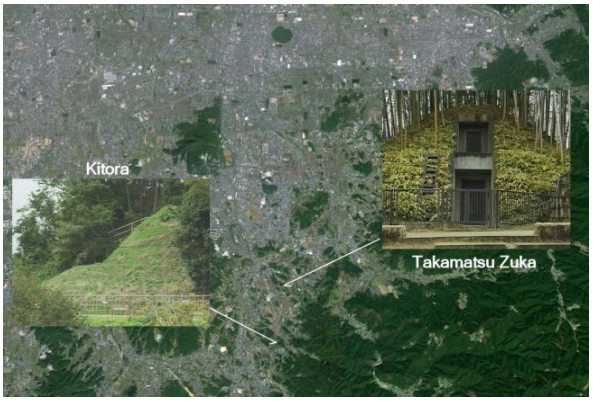

Figure 4 Locations of *Takamatsu Zuka Kofun* and *Kitora Kofun* relative to *Fujiwara Kyou* in modern *Asuka*. (Google Earth and author's photographs)

Such configuration was also seen to mirror celestial counterparts, and tomb construction and iconography such as that discussed in later sections on *Takamatsu Zuka Kofun* and *Kitora Kofun* reflect this perspective. The royal deceased laid to rest in such a configuration, with head to the north and feet to the south, "looks" up at a ceiling that shows a celestial configuration of stars. Above the royal head, on the north wall, is a painting of *Genbu*; to the left on the east wall a painting of *Seiryuu*; to the right on the west wall a painting of *Byakko*; and "beneath" the feet on the south wall a painting of *Suzaku*. In simply looking at a map, stellar configurations matching the animals of east and west may appear to be reversed, just as "right" and "left" appear reversed for anyone looking into a mirror.

As noted in Figure 4, *Takamatsu Zuka* and *Kitora* are located south of *Fujiwara Kyou* and roughly follow a north-south line along the ancient capital's center. The tombs are also in close proximity to the tombs of Emperor *Temmu* and Empress *Jito*, which are just to the north along the same line.

2.2 Historical Context

The precise dates of construction of the *Takamatsu Zuka* and *Kitora* tumuli are unknown. However, dating which includes assessment of location and iconography

indicates that they were probably constructed in the late seventh or early eighth centuries CE (see reports of the Agency for Cultural Affairs, 2004, and the Asuka Village Board of Education, 1999, as well as discussions in Hirose, 1975 and Sugaya, 1994).

Several significant periods are associated with construction of the tombs. What was called the Asuka Period (552-645 CE) gave way to the first really strong imperial dynasty (650-800), named after its founder, the aforementioned emperor *Temmu*, whose empress wife *Jito* was primarily responsible for construction of *Fujiwara Kyou*. Chinese dynastic change, preceding and somewhat parallel to these events, included the Sui (581-618 CE), which gave way to the Tang (618-907 CE).

The encompassing period (600-894 CE), which Sugimoto and Swain refer to as "Chinese Wave I," incorporates the time of tomb construction and was one in which Japan received large infusions of learning, mostly one-way, from both China and Korea. Such knowledge was based on refined Han thought (Major, 1993) and included cosmology (Kai T'ien, Hun T'ien theories), divination (state and personal), methods of astronomical observation (primarily for astrology), mathematics (with varying levels of understanding), calendar-making and time-keeping, Chinese literature and law (Confucian studies), technology (construction and agriculture in particular), religion (Buddhism), and other cultural iconography (furniture, games, musical instruments, ceramics, etc.) (Sugimoto and Swain, 1989: xxiv-xxvi; 29-41; Renshaw, 2013a). Especially in the era of the *Temmu* Dynasty, in which the tombs were most probably constructed, most all of these imports were incorporated into activity centered on enhancing hegemonic power of the ruling elite (Renshaw, 2013b; see also general discussion in Kidder, 1993).

3. TOMB ICONOGRAPHY

3.1 Takamatsu Zuka Kofun

Takamatsu Zuka Kofun was discovered and first opened in the early 1970's (see again Hirose, 1975, and the report of the Agency for Cultural Affairs, 2004, on which most of the descriptions of iconography in this section are based). The tomb measures one meter wide, 2.2 meters deep, and a little more than a meter high. It is now closed and air conditioned, but a full-scale model is viewable in Nara Station.

Paintings on the north, east, and west walls are in fragile but recognizable condition (see, for example, the painting of *Genbu* in Figure 5). Intrusion through the south wall some time after the tomb was built obliterated what was probably a painting of *Suzaku*.

Figure 5 *Genbu* (Black Tortoise) of the North. (Nara Agency for Cultural Affairs)

Not only are the animals of the cardinal directions painted, but the sun appears in gold leaf on the east wall, and the moon in silver on the west. Also adorning the walls are male servants and female consorts in dress of the era. Ironically, such dress is in Korean fashion of the time rather than Japanese (Figure 6).

Figure 6 Ladies in Korean Dress. (Nara Agency for Cultural Affairs)

The ceiling chart is in relatively good condition, and most configurations of the moon stations (*sei shuku*) are easily recognizable. Figure 7 contains a drawing of the square chart with the moon stations surrounding *Shibien* (North Pole) in the center.

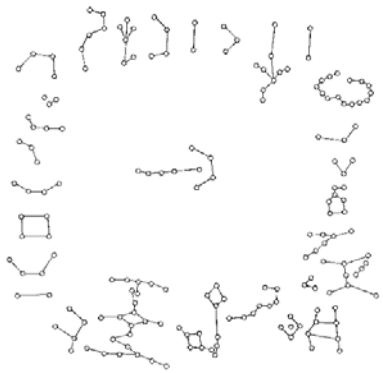

Figure 7 Drawing of Square Ceiling Star Chart in *Takamatsu Zuku Kofun*. Looking up at the ceiling, north is at the top, west to the right, east to the left, and south to the bottom. (Based on Drawing from Nara Agency for Cultural Affairs)

Some have mistaken the central stars as markers for the Little Dipper, but Watanabe (1987: 783) has shown that these represent major imperial figures with mostly minor stars. This center area was known to ancient Chinese as the "Purple Palace." Following Watanabe, this association consists of the crosspiece (Alpha UMi, "Center of the Heavens", the star surrounded by the four connected), the emperor (Beta UMi), the empress (FGW Struve 1694), the crown prince (Gamma UMi), and the cadet prince (4 UMi). The four connected stars are four protecting ministers (51H Cep, 2 Cep, 39H Cep, and a still-unknown corresponding star). Again, ironically, while fitting Chinese imperial perceptions, these symbols were approximated in the Japanese court, emerging in a culture still much attached to indigenous concepts of the cosmos (see Renshaw, 2013b: 500, and the extensive discussion in Matsumae, 1993). Circling the realm of the emperor are the 28 *sei shuku* or moon stations, seven on each side of the chart. Each group of seven corresponds to a celestial animal.

Figures 8 through 18 are useful for understanding the configuration of moon stations and corresponding celestial animals. *Seiryuu*, the azure dragon of the east, may be seen in Figures 8-10. Figure 8 is a drawing of the dragon as it appears on the east wall, and Figure 9 shows the seven associated moon stations on the ceiling chart. Figure 10 shows these stellar configurations as they would appear in the night sky within the constellations of Virgo, Scorpio, and Sagittarius. Star positions for the clusters of the North Pole and moon stations depicted in Figure 10 are based on 1699 designations of *Harumi Yasui* (Watanabe, 1987: 781-87). Each moon station has a key star, usually used in calendar reckoning.

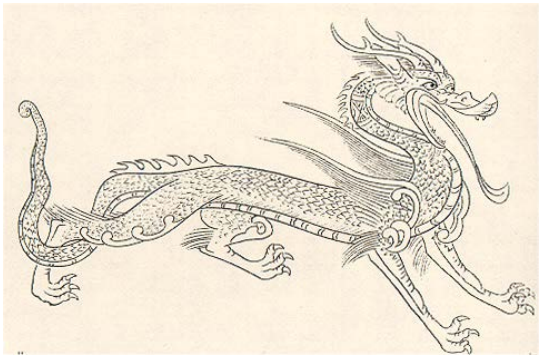

Figure 8 Drawing of *Seiryuu* (Azure Dragon of the East or Spring). (Drawing from Nara Agency for Cultural Affairs)

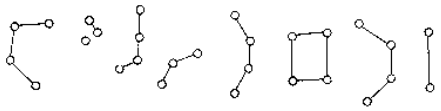

Figure 9 Moon Stations (1-7) of *Seiryuu* as Drawn on the Celing Star Chart. (Based on Drawing from Nara Agency for Cultural Affairs)

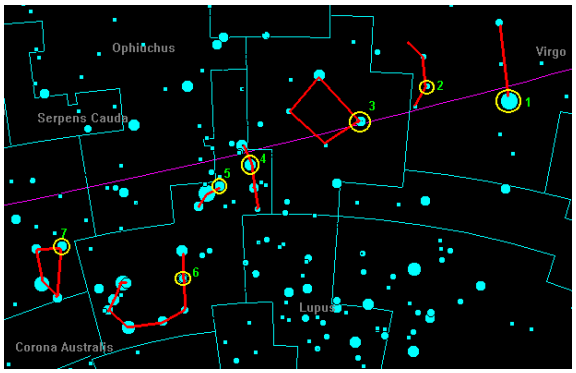

Figure 10 Depiction of Moon Stations of Seiryuu using *The Sky* by Software Bisque and 1699 Star Designations of *Harumi Yasui*. Key Stars are circled in yellow.

Genbu, the black tortoise or warrior of the north, may be seen in Figures 11-13. Figure 11 is a drawing of the tortoise as it appears on the north wall, and Figure 12 shows the seven moon stations of the ceiling chart associated with this animal. Figure 13 shows the star clusters as they would appear in the night sky within the constellations of Sagittarius, Capricorn, Aquarius, Equuleus, and Pegasus.

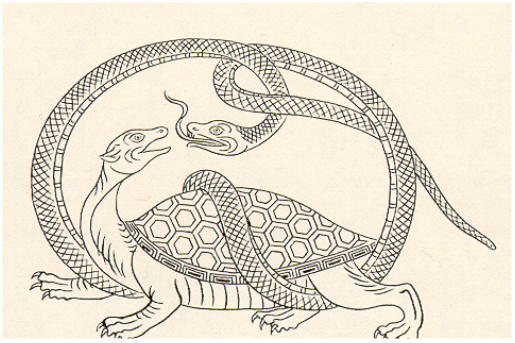

Figure 11 Drawing of *Genbu* (Black Tortoise or Warrior of the North or Winter). (Drawing from Nara Agency for Cultural Affairs)

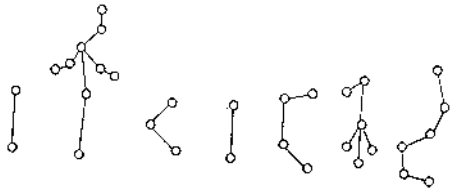

Figure 12 Moon Stations (8-14) of *Genbu* as Drawn on the Ceiling Star Chart. (Based on Drawing from Nara Agency for Cultural Affairs)

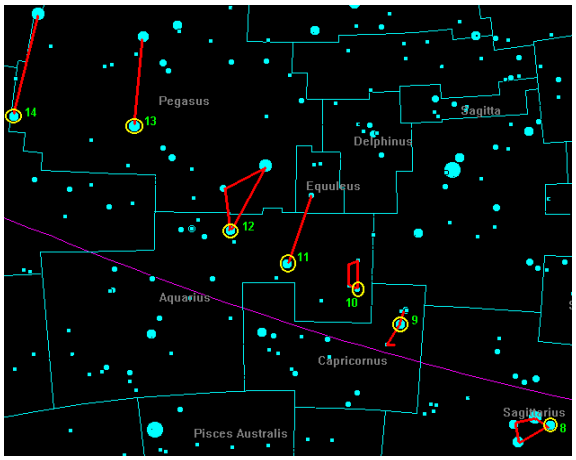

Figure 13 Depiction of Moon Stations of *Genbu* using *The Sky* by Software Bisque and 1699 Star Designations of *Harumi Yasui*. Key Stars are circled in yellow.

An example useful in the later discussion of anomalies in *Kitora Kofun* is that of *Byakko*, the white tiger of autumn. Figure 14 shows a drawing of the tiger as it appears on the west wall of *Takamatsu Zuka Kofun*, and Figure 15 shows the seven moon stations of the ceiling chart associated with this animal. Figure 16 shows the star clusters as they would appear in the night sky within the constellations of Andromeda, Pisces, Aries, Taurus, and Orion.

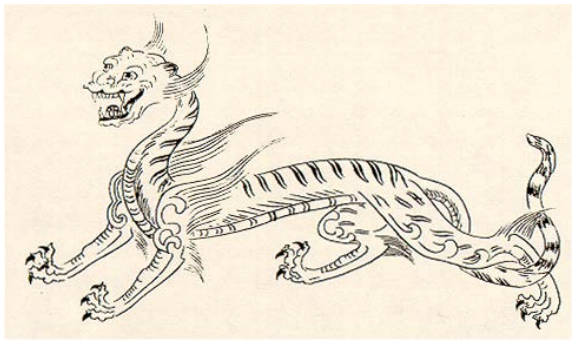

Figure 14 Drawing of *Byakko* (White Tiger of the West or Fall). (Drawing from Nara Agency for Cultural Affairs)

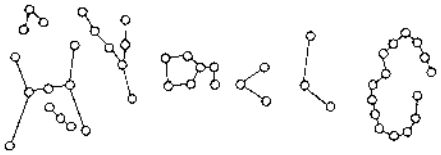

Figure 15 Moon Stations (15-21) of Byakko as Drawn on the Ceiling Star Chart. (Based on Drawing from Nara Agency for Cultural Affairs)

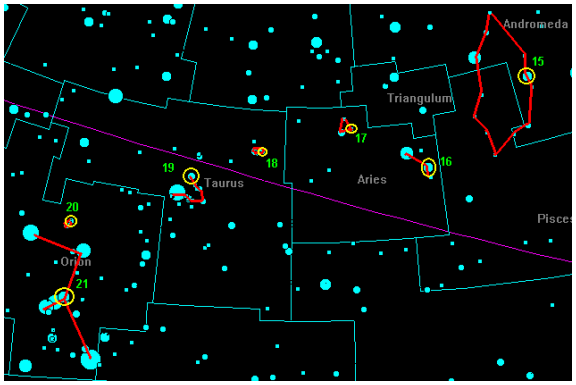

Figure 16 Depiction of Moon Stations of *Byakko* using *The Sky* by Software Bisque and 1699 Star Designations of *Harumi Yasui.* Key Stars are circled in yellow.

As mentioned earlier, the painting of *Suzaku*, the red/vermillion bird of the south or summer, was destroyed. However, Figure 20 in the next subsection shows the painting of this animal found in *Kitora Kofun*. Figure 17 shows the seven moon stations of the ceiling chart associated with this bird. Figure 18 shows the moon-station star clusters as they would appear in the night sky within the constellations of Gemini, Cancer, Hydra, Crater, and Corvus. Star positions in Figure 17 are based on 1699 designations of *Harumi Yasui*, and key stars are circled in yellow.

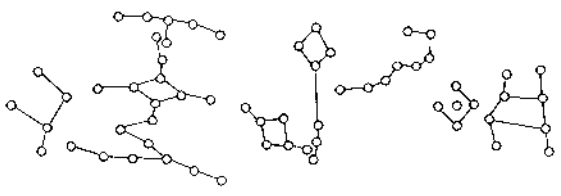

Figure 17 Moon Stations (22-28) of *Suzaku* as Drawn on the Ceiling Star Chart. (Based on Drawing from Nara Agency for Cultural Affairs)

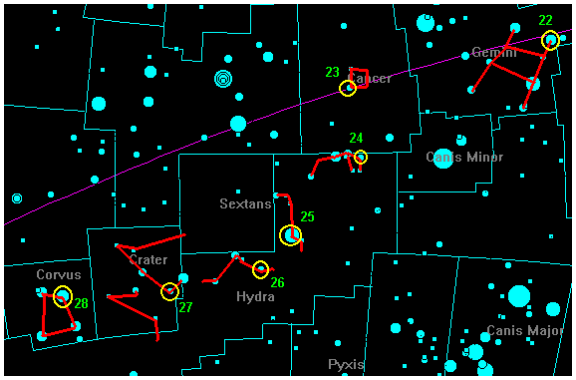

Figure 18 Depiction of Moon Stations of Suzaku using *The Sky* by Software Bisque and 1699 Star Designations of *Harumi Yasui.* Key Stars are circled in yellow.

The reader may easily discern the shape of a "dragon" in the stellar configurations of Figure 10, and perhaps the snout and body of a tortoise can be discerned in the middle of Figure 13. A "tiger" may be a bit more difficult in Figure 16, but a flying bird in Figure 18 seems fairly evident. The reader may wish to consult Renshaw and Ihara (2010) for further explanation of moon stations and key stars along with Chinese characters and meanings for these ancient star groupings.

3.2 Kitora Kofun

The mound of *Kitora Kofun* has been known since antiquity but has never been entered. However, it was probed with a camera in 1998 and again in 2002 (see Asuka Village Board of Education, 1999, and Nara Cultural Properties, 2002, on which most of the descriptions of iconography in this section are based). The tomb measures about one meter wide, 2.2 meters deep, and 1.3 meters high (slightly larger than *Takamatsu Zuka Kofun*). It is now completely closed in order to preserve the iconography.

Wall paintings in *Kitora Kofun* (Figure 19) are not as elaborate as those in *Takamatsu Zuka Kofun*, but all celestial animals are intact, including one of the few surviving images of *Suzaku* (Figure 20) found in Asia.

Figure 19 Inside *Kitora Kofun* looking at North Wall. (Nara Cultural Properties)

Figure 20 Painting of *Suzaku* (Red Bird of Summer) on South Wall of *Kitora Kofun*. (Nara Cultural Properties)

Like *Takamatsu Zuka Kofun*, the tomb appears to have been plundered. However, the probe of 2002 showed stars in *Kitora Kofun* to have been painted in gold leaf, as they were in *Takamatsu Zuka Kofun*. Perhaps the most remarkable painting in *Kitora Kofun* is that of the circular star chart on the ceiling (Figure 21).

Figure 21 Circular Star Chart on Ceiling of *Kitora Kofun*. (Nara Cultural Properties)

Following the probe by special camera of *Kitora Kofun*, much of the work regarding the astronomical significance of this chart was conducted by Miyajima and Yamada (1999). Miyajima (1999) was primarily responsible for analysis.

An enlarged drawing of the chart may be seen in Figure 22. As seen in this drawing, the chart includes many constellations as well as several circles. According to Miyajima (1999), the exact origin of the chart's basis is impossible to determine, but it was probably based on Han thought (noted in the earlier discussion of historical context) and charting methods developed in the late centuries BCE. As were most charts of Chinese derivation, it is centered on the North Pole. Different from the square chart in *Takamatsu Zuka Kofun*, this circular chart was not meant to represent moon stations but rather to provide a view of the heavens from the observer's position on earth. The inner circle (or north horizon circle) includes stars which are never seen to set. The outer circle includes all stars visible to the observer; those outside of this circle would be too far south to see at any time of the year. Circles were also painted representing the celestial equator and the ecliptic.

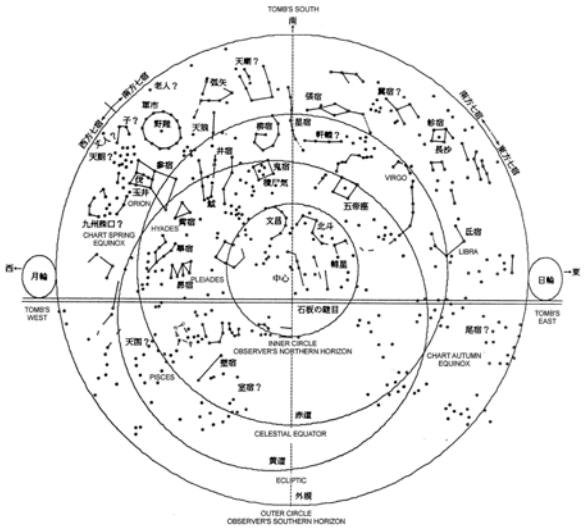

Figure 22 Drawing of Circular Star Chart on Ceiling of *Kitora Kofun*. Inner and outer circles, celestial equator, ecliptic, and points of equinoxes as well as a few familiar constellations have been noted by the author as well. (Adapted by the author from Miyajima and Yamada, 1999: 61)

4. ANOMALIES

Of the two tombs, *Kitora* appears to have more significant anomalies than does *Takamatsu Zuka*. The anomalies of *Takamatsu Zuka Kofun* seem to be less ones of error than of cultural misplacement. While the location of the tomb indicates a personage of royal lineage, the paintings reflect strong Korean influence, and as noted earlier, the divine nature of the chart itself reflects a stratum more in line with Chinese imperialism than with what was present or even developing in Japan at the time of tomb construction. Anomalies in *Kitora Kofun* seem to reflect a process in which principles derived from the continent were used but not fully understood or were used without appropriate adaptation for the tomb's Japanese locale.

4.1 Constellation Positions and Equinoxes in the Chart of Kitora Kofun

Stellar aspects of the chart in *Kitora Kofun* are not drawn with complete accuracy. The autumnal and spring equinoxes are in error, accounting for precession in any epoch. These be located nearer where Virgo and Pisces are labeled on the chart, assuming they are accurately placed.

Miyajima (1999) notes that it was a common practice for ancient cartographers of circular charts to draw the ecliptic as a circle. Because the ecliptic is at an angle to the celestial equator, a circle on a planar chart could never accurately portray the oblique shape of the ecliptic, of which any point would be in spherical angular measurement from the celestial equator. However, in most ancient charts, at least the points of the equinoxes were generally drawn with accuracy, something that the artist of *Kitora Kofun* obviously did not do.

4.2 Observer Latitude in Kitora Kofun

In most circular East Asian star charts, a *Seikyo Houi Zuhou* graphical rule was used (Miyajima and Yamada, 1999: 57-58). Basically, this rule is that the planar distance from the north pole (center as indicated on the chart) to any star (or other point on the chart) is proportional to the spherical angular measurement from the celestial north pole to that star (called *Kyo Kyoku Do*). This ratio should be constant for all stars. As noted in the chart in Figure 22, the small inner circle marks those stars which are seen to not set in the North; hence the distance from the center of the chart to this circle (the circle's radius) should be proportional with the angle from the north pole to the observer's northern horizon which, of course, would be the observer''s latitude. The distance from the center of the chart to the celestial equator should be proportional with 90°. Ancient cartographers using the *Kyo Kyoku Do* would consider the celestial equator to have a celestial latitudinal measure of 90° rather than 0° declination, as in modern usage; stars south of the celestial equator would have a *Kyo Kyoku Do* greater than 90°. Using these principles, the distance represented by a line drawn from any point on the inner circle through the center of the chart to a point opposite on the horizon circle should be proportional to the observer's horizon-to-horizon angular measure. Figure 23 may help in visualizing this.

The ratio of the radius of the inner circle of the star chart to the observer's latitude should be equal to the proportion of the radius of the celestial equator circle to 90°.

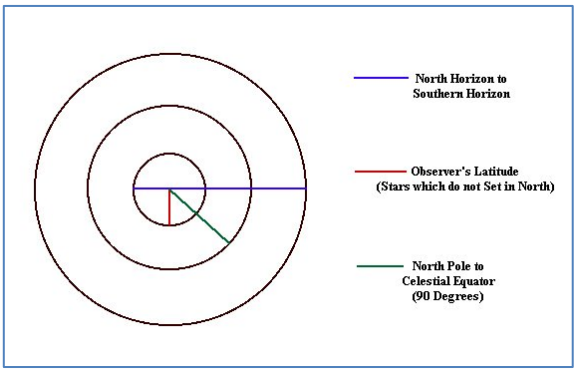

Figure 23 Chart for Understanding Observer Latitude for Star Map in Kitora Kofun. (Drawing by the author)

Using the original chart supplied by the Asuka Village Board of Education (1999), the radius of the inner circle appears to be about ~19.5 mm, and the radius of the celestial equator circle ~46 mm. The following equation should hold: 19.5/L = 46/90, where L is the observer's latitude. This equation yields a value of L=38.15. Of course, any value cannot be considered absolute, as errors may come from at least three sources: plotting error by the artist, distortion due to the camera probe, and uncertainty with regard to the original observation. Miyajima (1999) points out that measures for ancient star charts were generally made based on observations from the ancient capitals. The latitude of *Fujiwara Kyou* in Asuka is ~34.47°. The closest capital of early centuries CE with a latitude of 38°-39° would be the capital of *Kokuryo* (close to present-day *Pyong Yang,* latitude ~39.02°). Given the earlier discussion regarding importation of knowledge from China and Korea, it seems most probable that the original chart was created by an astronomer in *Kokuryo* using Chinese methods of celestial cartography and adapted for that location's latitude. However, such adaptation was apparently not made when the chart was brought to Japan.

4.3 Dating of Kitora Kofun *Chart*

To determine a theoretical date of observation for the chart in *Kitora Kofun*, it is necessary to know the "center" or North Pole and whether or not it matches the point indicated by the artist. If such can be found with some accuracy, then a theoretical date of observation can also be determined (Miyajima and Yamada, 1999: 58, 62).

For any epoch, every star has a *Kyo Kyoku Do* (easily determined from the star's declination, if plotted accurately) and a celestial longitude or right ascension. Given the probable methodology of original chart construction, certain stars which were used in calendar determination probably have a certain degree of accuracy in plotting but may suffer from the same error sources mentioned earlier. The question would be: Is there an epoch where the differences between the ratios of planar chart distances to declination for all such reliable stars are a minimum? If such a point can be determined, then from the celestial longitude or right ascension established, a theoretical boundary for a consequent date of observation can be obtained (See Figure 24).

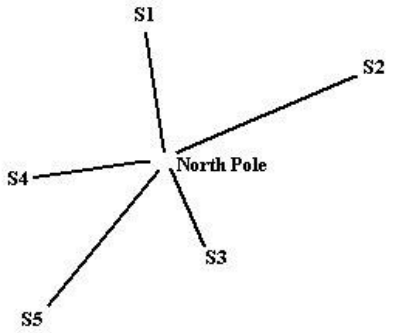

Figure 24 Theoretical Determination of North Pole. (Drawing by the author)

Each line from a star (denoted S1, S2, ... in Figure 24) to a central point on the chart (North Pole) should be proportional to celestial angular measurement from the North Pole to that star. If positions of stars are matched such that differences in these proportions are a minimum across all stars, then the central point should be a best estimate of the center or North Pole of the chart. Utilizing this least squares method, "True North" was found to be only slightly different from the chart position. The line of best fit may be seen in Figure 25. Using this method, Miyajima determined a probable date of observation as 65 BCE "plus or minus 250 years" (Miyajima, 1999).

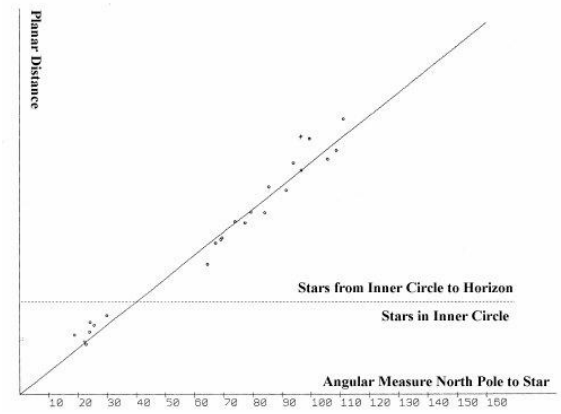

Figure 25 Theoretical Determination of North Pole Using Least Squares. (From Miyajima and Yamada, 1999: 62; notations added by the author)

Even at "plus 250 years" from 65 BCE, the date of observation for the chart in *Kitora Kofun* far precedes the time period in which the tomb was most probably constructed. It does, however, fit nicely within that period of Han thought when methodologies for such charts were being developed.

4.4 The Reversed Tiger in Kitora Kofun

One of the more visually striking anomalies of *Kitora Kofun* is seen in the painting of *Byakko*, the white tiger of the west. Stellar configurations (again refer to Figures 8-18) and cosmological yin/yang distinctions of the animals (North, 1993: 124-28) show that the accurate position of the yang animals *Seiryuu* (azure dragon) and *Suzaku* (red bird) would have them facing right, and the yin animals of *Byakko* (white tiger) and *Genbu* (black tortoise) facing left. The painting of the tiger found in *Takamatsu Zuka Kofun* (Figure 26) faces left; that in *Kitora Kofun* faces right (Figure 27). .

The basic template for rendering the animals appears to be the same for both *Takamatsu Zuka Kofun* and *Kitora Kofun*. However, the artist of *Kitora Kofun* apparently reversed the template used for rendering the tiger. While this may seem trivial, the reversal of this animal placed it in direct confrontation with the smooth flow of yin/yang movement through the seasons (see again North, 1993: 79, 125), something which may not have boded well for the tomb's occupant.

Figure 26 White Tiger of the West in *Takamatsu Zuka Kofun*. (Nara Agency for Cultural Affairs)

Figure 27 The Reversed White Tiger of the West in *Kitora Kofun*. (Nara Cultural Properties)

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5. IMPLICATIONS

What has been found in and what is known about *Takamatsu Zuka Kofun* and *Kitora Kofun* has led to many questions, none of which are easily answered. Who were the tomb occupants? Why were they laid to rest in the symbolic cosmos represented by the tomb iconography? Who were the tomb artists, and what was their cultural and educational background? How similar is the symbolism of tomb iconography to the then-prevalent Japanese views of the cosmos? Specifically, in *Takamatsu Zuka Kofun*, why does the iconography not reflect more Japanese culture of the period? Why the apparent copying, without full adaptation, of principles to the Asuka locale in *Kitora Kofun*? Why the mistakes in placement of constellations? Given the importance of correct delineation of cosmological symbols in China as a sacred base for life and death, why the almost blatant mistake in the painting of the tiger in *Kitora Kofun*? Symposiums held since discovery of the tombs have shed little light on such questions. Some questions, such as those related to who occupied the tombs and who the artists were, may never be answered. However, relatively recent and agenda-free research in the political bases of imperial history in early Japan has become more prevalent, as well as interdisciplinary perspectives that may address, at least to some degree, issues raised by the tomb iconography (Renshaw, 2011).

Perhaps one of the most significant historical bases for understanding anomalies in the tombs comes from the aforementioned fact that the period of construction of the tombs was one in which much knowledge regarding astronomy and cosmology was being imported both directly from China and indirectly from Korea (Renshaw, 2013a). This knowledge was brought by formal envoy and also was being diffused through the immigration into Japan of individuals with varying stature. Much of the astronomical information was being imported wholesale, without full understanding or with just enough understanding to provide bases for calendar construction, astrology and divination

(Sugimoto and Swain, 1989: 1-102; Nakayama, 1969). As such, it seems reasonable to assert that artists of both tombs may have copied iconography without fully understanding the principles behind what they were painting.

Renshaw (2013b) has also indicated that principles were being incorporated within an historical period that saw some of the strongest and most significant growth in political power in Japanese history, power that was to result in a dynastic structure that has lasted in one form or another ever since. Such power was essential to unify a largely disparate set of local chiefdoms and provide a stable food supply for a large population growing to serve the imperial elite. Historically, as in many emerging political systems, use of indigenous and imported symbolism in hegemonic ways was essential for the development of singular imperial power. The common citizen could readily see the practical benefits of new methods of construction and agriculture resulting from imports, but imported geomantic forms reflecting divine cosmology also provided citizens with symbolism that further reinforced the celestial divinity of those who ruled. Again, it was not essential that such celestial symbolism be empirically accurate, but that people perceive it as an accurate picture of the position of those who ruled within their daily life (see also Ooms, 2009: 154-86).

It cannot be denied that the tumuli discussed here contain remarkable examples of iconography related to ancient understanding of astronomical phenomena and cosmology in Asia. It is also clear that certain problems exist in the iconography, and reasons for these are not easily explained. From the standpoint of cultural astronomy, the anomalies of *Takamatsu Zuka Kofun* and *Kitora Kofun* provide further evidence that, historically, creating symbolic structures related to astronomical phenomena is not always the result of an attempt to gain stronger insight into empirical reality or even to accurately describe the complex mythological or philosophical systems developed in any era. Rather, astronomical "understanding" is often the construction of a social and political "reality" that has pragmatic usefulness, often to those who seek or have power. As such, future research regarding these tombs may not necessitate determining exactly why the anomalies exist or who was responsible, or even who was buried in the tombs, but rather the complexity of how the iconography served a social and cultural purpose for ruler and ruled in ancient Japan.

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NOTES

[i] A full explanation of geomantic principles, cardinality, and relations between geographically based phenomena and astronomical iconography is far beyond the scope of this article. Readers unfamiliar with these and other Chinese cosmological principles may wish to consult works such as Ho (1985), Walters (1989), Major (1993), and Sun and Kistemaker (1997).