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# The Moon in the Night of Nirvana

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I have been focusing on the depictions of the moon in literary works. A famous *haiku* by Yosa Buson, featuring the moon, is a popular science teaching material for Grade 9 students in Japan to infer the moon's shape. Because he wrote the haiku when he left the Maya temple in Kobe and saw the beautiful scenery in front of him, I found that he might have been reminded of the "Nirvana" drawing (Figure 1). The *haiku* not only expresses the beauty of nature as claimed by Masaoka Shiki, but also embeds the impermanence of human life and death and the eternal transition of the natural world[2][3].


Figure 1. Nirvana [1]

In Japanese literature, the moon generally refers to autumn, but the full moon in spring seems to represent Nirvana. The disciples in the drawing must have thought of Buddha when they saw the rising moon after he died. How high did the moon go up? The moon occasionally rises unexpectedly high, sometimes at altitudes above 80 degrees in Japan.

Buddha died in Kushinagar, which is located 26.7 degrees north latitude, on the night of the full moon on February 15 in the lunar calendar. However, there are some theories regarding the year of his death that cannot be clarified; for example, Theravada Buddhism estimates it to be 544 BC, while Hajime Nakamura believed it was 383 BC.

Table 1. Moon of the Estimated Night of Nirvana

| Estimated Year (BC) [4] | Altitude of the Moon [degree] | Time of Moonrise | Remarks |
|---|---|---|---|
| 949 | 66.7 | 18:04 | Shobo Genzo |
| 544 | 69.2 | 16:38 | Theravada |
| 486 | 65.3 | 17:53 | Shusho Tenki |
| 386 | 66.7 | 16:56 | Ui Hakuju |
| 383 | 71.7 | 17:25 | Nakamura H. |

The observed altitude of the moon changes greatly depending on the latitude and its positional relation with the sun (moon age). In addition to the obliquity angle of 23.4 degrees, the angle of 5.1 degrees between the lunar orbit and the ecliptic planes must be considered. The moon orbits the barycenter and the lunar orbit plane, keeping its inclination, and rotates in the opposite direction to the orbit movement in a cycle of about 18.6 years (causing the earth to nutate). The National Astronomical Observatory Japan provides a website that instantly calculates the moon's altitude, rising time, and direction based on the observed place and date [5].

Table 1 shows the altitude and the time of moonrise for each theory. The altitude of the full moon of that night at Kushinagar, while not exceptionally high, was high enough. Figure 1 shows a drawing of the sunset time (moonrise time) of one of these. This calculation depends on the calendar and may be revised in the future.

**Keywords:** Moon Altitude, Nirvana, National Astronomical Observatory Japan.

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