

Astronomical Research on Ancient Chinese History

Kazushi Sakka sakka@kcg.ac.jp

(The Kyoto College of Graduate Studies for Informatics)

Today's astronomical calculation allows us to find out exact planetary positions on any given date based on orbital data. I have made an original computer program that graphically displays orbits and have been using it in my studies of planetary motion over long time spans.

One of my projects involved calculating the number of times when Mercury, Venus, Mars, Jupiter, and Saturn assemble within 20 degrees in the sky 3000 BC from 3000 AD. The result shows that during the period covered there will be 36 days when the five-planets assembly can be observed from the Earth. Some of those occurrences are reported in historical documents from ancient China.

For example, the *Biography of Emperor Gao* (高帝紀) in *Han-shu* ("The History of the Former Han Dynasty") tells us that as Liu Bang, who was to become the first emperor of the Han Dynasty, prepared to lead his troops into the Qin capital of Xianyang, the five planets gathered in the position of Punarvasu, which corresponds to the Western zodiac sign of either Gemini or Cancer, as an apparent sign of heavenly blessing. During that year of 206 BC, however, Mars is located not in this region but in either Aquarius or Pisces. This contradiction was long attributed to either an error by the transcriber or a deliberate falsification by a later historian. A thorough survey of five planets assembly covering the 300 years from 300 BC has found, however, that a five-planet alignment happened at the end of May 205 BC. although it has been revealed that there is a six-month discrepancy between the actual date of the event and the one mentioned in the document.

Another instance of this planetary configuration being referred to in an ancient Chinese document concerns the one observed in 1059 BC, the third most compact of this alignment in 6000 years. Preceding the event described in the *Biography of Emper 5 or Gao* (高帝紀) by 854 years, it has been confirmed that it happened in the same position, at the same time, and on the same day of the year as the later occurrence.

While there is no mention of this incident in *Shiji* ("Historical Records") or other major chronicles, the 19th volume of *Kaiyuan Zhanjing* (大唐開元占經卷十九), a book of astrology compiled in the days of the Tang Dynasty, contains a statement, "周將殷伐五星聚於房" (When Zhou were going to defeat Yin, five stars assembled in Fang Xiu), which appears to refer to this event.

I try to identify the exact date of Shang-Zhou Revolution based on the positions of Jupiter, the Moon, and the Sun at Wu Wang's military expedition, reported in the *Lu Li Zhi* (律曆志) of *Han-shu*. My conclusion is that the Zhou dynasty launched its attack on the Shang dynasty on November 27, 1047 BC and defeated the enemy in the Battle of Muye on January 20, 1046 BC. The latter date matches the one of Wu Wang's conquest of Shang, determined by the ongoing Xia-Shang-Zhou Chronology Project.

