Shigeru Nakayama, *A History of Japanese Astronomy, Chinese Background and Western Impact.*
Harvard-Yenching Institute Monograph Series,
Vol. XVIII, Harvard University Press, 1969, $10.00.

This book deals with the development of astronomy in Japan before the Meiji period except the last chapter. In the early periods (6th-16th cent.) Chinese astronomy was dominant in Japan. Then Western astronomy was gradually introduced into Japan after the middle Edo period (18th cent.). Therefore, in the Edo period there existed two different types of astronomy about which Dr. Nakayama explains in detail. It is his main intention to make clear the reason why modern astronomy could not have been established by Japanese scholars in the Edo period in connection with the coexistence of Chinese and Western astronomies. In this book the reason is well analyzed from the view-point of internal development of astronomy as well as that of social, cultural, and philosophical backgrounds of Japan in those days.

This book consists of the following three parts:

Part I The early impact of Chinese astronomy: from the sixth century to the early sixteenth century.

Part II The early impact of the West: from the late sixteenth century to the early eighteenth century.

Part III The period of recognition of Western supermacy: from the mid-eighteenth century to the late ninteenth century.

In addition to the above parts, there are ten Appendices and well prepared Bibliography.

In Part I Dr. Nakayama discusses how Japan introduced Chinese astronomy in the early periods (6th-9th cent.). In this connection, he describes Chinese calendar-making, cosmology, and other astronomical activities which were carried out at Chinese bureaucratic institutions in the T'ang dynasty. Through the analysis of Japanese acceptance of Chinese astronomy, Dr. Nakayama makes an interesting

remark that there was an important difference between Japanese and Chinese astronomical activities although both were mainly carried out at their bureaucratic institutions. Namely, at the Yin-yang Board to which all Japanese astronomical officers belonged astrological activities played more important role rather than calendar-making which was the main job of court astronomers in China. Because of the above recognition, he pays much attention to discuss the Japanese astrological activities about which few works have been written before. General readers might be impressed by the fact that a solar eclipse was still afraid by Japanese court people even after its prediction was done by astrologers, and that considerable numbers of solar eclipses, which never occurred, had been recorded by the asgrologers.

In Part II Dr. Nakayama discusses the introduction of Western astronomy which was mainly carried out by the Jesuits in the 16th to 17th century. The Western astronomy introduced was characterized by the medieval one which had rather poor contents with the lack of knowledge on calendar-making. However, he emphasizes the importance of the *Kenkon bensetsu* (Western cosmography with critical commentaries) and the *Nigi ryakusetsu* (outline theory of terrestrial and celestial globes) which first introduced Aristotelian cosmology into Japan. Besides, Joken Nishikawa found two approaches to astronomy: the heaven of *meiri* (metaphysical) and that of keiki (physical). It is pointed out by Dr. Nakayama that the *shou-shih* calendar, an outstanding achievement of Chinese exact science, was first studied in Japan in this period, and that Harumi Shibukawa finally compiled the *Nihon choreki* (a comprehensive chronology of Japan) in which he attempted to reproduce the calendrical system used in ancient Japan.

In Part III Dr. Nakayama deals with the period starting from 1720 and ending at the early Meiji period (about 1880). In the 1730's the ban on Jesuit works was modified. Therefore, astronomical knowledge was transmitted to Japan through both Dutch books and Chinese versions of Western astronomy. The heliocentric idea was first introduced into Japan by Ryoei Motoki, an official interpreter at Nagasaki. One of Motoki's students, Tadao Shizuki, was known as the person who first tried to reconstruct Newtonian scheme in terms of Eastern natural philosophy. One can recognize the fact that Japanese astronomical studies arrived

at higher level, comparing with those in China in those days. Dr. Nakayama explains correctly the above situation: "although the Chinese had access to many Jesuit treatises on Western astronomy in their own language, they were generally indifferent to Western learning, whereas Japanese interpreters labored prodigiously to learn about Western accomplishments."

The activities of Asada school of non-official astronomers were examined in detail, including their studies on a Dutch translation of Lalande's *Astronomie*. They formulated the *hsiao-chang* method according to which the values of almost all astronomical parameters undergo. Dr. Nakayama highly evaluates the *hsiao-chang* method about which he published a series of interesting papers in the *Kagakusi kenkyu* (Journal of History of Science, Japan) in 1964. On the basis of his own research Dr. Nakayama maintains that the method was the only original idea in Japanese astronomy.

I have shortly summarized Dr. Nakayama's newly published book. There is another book on the development of Japanese astronomy before the Meiji period, which was written by several authors and published by the Japan Academy in 1960. However, Dr. Nakayama's book is more nicely arranged along his own line than the above mentioned book that is a kind of collected paper of several authors. It is very difficult to make any criticism about Dr. Nakayama's book from the view-point of internal development of astronomy itself as well as social, cultural, and philosophical backgrounds of Japan.

Dr. Nakayama's book is based on his thesis to Harvard University (1959). Some parts of the thesis have been rewritten according to his recent researches. His effort to improve the first draft during these ten years should be deeply appreciated. I, as one of his colleagues in Japan, am delighted to recommend this book to those who are interested in the field of Japanese studies as well as that of history of astronomy. The book provides useful informations on the process of a previous underdeveloped country who has arrived at the international level of science.

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