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Scientific Discourse and National/Cultural Identity within the Boundary of Chinese Civilisation: Yabuuti's View on the Dialogue between the Civilisations of China, Korea, and Japan

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[Tsukahara Togo was born in Japan in 1961. He first studied chemistry, then history of science. He received his PhD at Leiden University in 1993 with a thesis on the analysis of the concept of chemical affinity during the process of the introduction of modern Western chemistry in nineteenth-century Japan. He was appointed as lecturer, then Associate Professor at Tokai University in 1994. Since 1999, he has been associate professor at Kobe University, teaching History of Science and Studies on Science, Technology and Society (STS). Professor Tsukahara is now actively involved in research projects related to "Science and Empires," carrying out investigations on Japanese and Dutch Imperialism and their attitude towards, and actions in, the field of science and technology.]

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The late Professor Kiyoshi Yabuuti (1906-2000) is known as a prolific author of works on the history of Chinese science. In this paper, I would like to discuss Yabuuti's contributions to the history of science at the periphery of Chinese civilisation, particularly that of Korea and Japan, examining his works written in the early 70s and 80s. Through this analysis of Yabuuti's historical discourse, I would like to discuss how he viewed China, Japan and Korea, and how he conceived national and cultural identities in relation to science and national boundaries.

In order to do so, my intention is to differentiate my viewpoint from those offered in the other papers here, in the sense that, first of all, this article does not aim at discussing "internal" issues, which are central to Yabuuti's works, but deals with "external" and peripheral issues. Both socially and personally, I did not have a close relationship with Yabuuti, so that by making use of my relatively distant position compared to some other academic offspring of Yabuuti I am trying to see his contributions from an observational position, i.e., a sociologically observational position of academic discourse. Thus, it is my intention to examine his historiography from the perspective of the sociology of "the history of

oriental science" in Japan *per se*. In other words, my positioning is similar to that of anthropologists as they might describe, at the level of micro-analysis, the behaviour of the "academic tribe of the Kyoto Yabuuti family," their "intellectual genealogy," and their "academic ancestor worship." From a macro-perspective, I would like to highlight the "colonial heritage" of Japanese historiography of the history of science, its slight tint of "orientalism," as well as the crucial ambiguity in its positioning of China, Korea, and Japan within the concepts of anti-communism and Japanese nationalism. I hope to describe Yabuuti's personality within the context of these social and political tensions, as a culturally liberal-minded and reflective intellectual.

There is no need to dwell on the fact that Yabuuti's works with their focus on astronomical sciences and calendar-making are standard works in the field of the history of Chinese science. Yet, his research interest was not limited to that area, but encompassed other diverse topics. He is also known as the organiser of the so-called Kyoto Yabuuti school of the history of Chinese science in post-war Japan. His work is not at all isolated, but systematically organised through his school, based at the Institute of Humanities (Jinbun kagaku kenkyūjo 人文科学研究所) at Kyoto University. As is well known, institutionalisation is a key word for the history of science as a discipline, and from this historiographical perspective, Yabuuti's can be viewed as having been the person that institutionalised the "history of Chinese science" in post-war Japan.

Yabuuti is often compared with the Cambridge academic Joseph Needham (1900-1995). Yabuuti and Needham were of a similar age, both were first educated in the sciences, that is bio-chemistry and astrophysics respectively, and both were key persons in the institutionalisation of the history of Chinese (later East Asian) science. Another thing they have in common is the methodology, namely so-called internalism, or historiographical scientism, that they adopted in their historical analysis of science. A further common characteristic is the socio-cultural background of their historical research, namely, their similar (post-) colonial background. During the Joseph Needham memorial session at the XXth International Congress of History of Science in Liège in July 1997, the British and Japanese colonial and wartime scientific background of both their histories of Chinese science was discussed.[1] Both Yabuuti and Needham experienced World War II in China, though they were on opposite sides, and both their later academic works on the history of Chinese science were deeply embedded in, and originated from, their colonial and wartime scientific activities. Some of the most

[1] See Tsukahara Togo, Hashimoto Keizo, and Matsumura Noriaki, "Needham's Impact on Japanese History of Science," in Alain Arrault and Catherine Jami (eds.), *Proceedings of the XXth International Congress of History of Science (Liège, 20-26 July 1997)*, Vol. IX, *Science and Technology in East Asia* (Turnhout: Prepols Publishers De Diversis Artibus: Collection de travaux de l'Académie Internationale d'Histoire des Sciences, 2001), p. 87.

important resources for their historical works were collected during colonial times and the war period. Actually, some of the items collected may have constituted exploitation or even military seizure. It is well-documented in Needham's *Science Outpost* that he had been dispatched to the Chinese front lines where he obtained important historical resources. This does not necessarily mean that Needham and other British wartime missions confiscated historical materials, and actually most of these precious materials were donated to him. But my point to note is that this all was embedded in the context of British imperial manoeuvring and its strategic deployment against Japanese military aggression.

On the opposite side of the war-front, Yabuuti's mentor, Professor Shinjo Shinzo 新城新蔵 was the director of the Shanghai Institute of Science, the centre of Japanese colonial science in China. Shinjo was a professor of astronomy, and he was interested in Chinese science and technology as well. Therefore he actively collected Chinese materials on the history of science and technology, which became the basis for the wealth of historical research carried out at the Kyoto Institute of Humanities in post-war Japan. It was on this basis, as the most successful successor of Shinjo, that Yabuuti established his school of the history of Chinese science.

Though originally on opposite sides in the war, at a certain point in the post-war period, Needham and Yabuuti found that they shared the same interests. It was not long before they began to communicate and co-operate with each other. Their relationship is known as one of the most fruitful academic exchanges between East and West.

The sociological aspect of the academic development of historians of Chinese science on a world-wide scale is another interesting topic when scrutinising Yabuuti's activity. Intellectual exchange between Needham and Yabuuti was not limited to the exchange of ideas and resources, but was extended to the exchange of human resources. To name but a few, at Yabuuti's school Nathan Sivin was welcomed at an early stage of his scholarly formation, and a number of historians of Chinese science, such as Christopher Cullen and Donald Wagner were hosted at his institution in Kyoto. Interesting "behavioural patterns" can be observed among a certain generation of historians of Chinese and East Asian science: namely, that to spend a year or more with Needham in Cambridge and/or Yabuuti in Kyoto was a sort of "rite of passage" for this tribe. Cambridge was the shrine presided over by Needham, and Kyoto was the temple disciplined by Yabuuti. Historians of Chinese science are pilgrims paying homage to them. The methodology of "prosopography," used by the French school of annals historians, can also be applied to this case of the historians of Oriental science. In this respect, our session organiser, Catherine Jami, is probably one of the last of a disappearing generation to have had direct contact with both Needham and Yabuuti. There are also cases of exchange the other way round, such as Keizo Hashimoto, who was first an assistant of Yabuuti, then studied under Needham and earned his PhD in Cambridge.

As famous a Japanese historian of technology as Nakaoka Tetsurō 中岡哲郎, well-known also as a leftist critic of science and technology and as the "Japanese Herbert Marcuse," also spent a year with Needham in Cambridge. There, Nakaoka wrote an influential book, which vividly described various issues discussed with Needham.[2]

In comparison to Joseph Needham's *Science and Civilisation in China*, however, Yabuuti's works are less well-known outside the circle of historians of Chinese science. This is mainly because many of his works were written in Japanese and thus not accessible to researchers not familiar with this language. Although his works are less well-known, his insights into, and perusals of, the history of East Asian science should not be overlooked. As Yano Michio has made clear in his paper in our feature issue, Yabuuti's academic merit is centred in his mathematical analysis, which is grounded in his astrophysical expertise. In this sense, Yabuuti might be compared to Otto Neugebauer rather than Joseph Needham, as has been proposed by Nakayama Shigeru from the perspective of the history of astronomy.[3] Mainly focusing on calendrical science, which is also called mathematical astronomy, using technical computation and calculation and delicate analysis of the complicated numerical parameters, Yabuuti studied Buddhist and Islamic influences on the traditional Chinese astronomical paradigm. According to Nakayama, while Western traditions of calendrical astronomy adhered to a geometrical expression of astronomical movements, Chinese calendar makers employed a numerico-empirical approach mixed with observational values and sophisticated interpolation techniques.[4] Such algebraic expression began to constitute the mainstream of the Chinese exact science of mathematical astronomy. There is no need to say more about the astronomical cross-cultural studies undertaken by Yabuuti, as others with more appropriate backgrounds have already presented a fair appraisal of Yabuuti's technical merits and originality in this area. Instead, this paper will continue to discuss his research into the history of Japanese and Korean science, which were seemingly peripheral to his study of the history of Chinese science, though from this peripheral position, the centre can be seen more clearly.

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[2] Nakaoka Tetsurō 中岡哲郎, *Igirisu to Nihon no aida de: Kenbiriji no nikki kara* イギリスと日本の間で：ケンブリッジの日記から (Between England and Japan: Notes from [my] Cambridge Diary; Tōkyō: Iwanami Shoten 1982).

[3] Nakayama's remark on the similarity of Yabuuti to Neugebauer can be seen in the abstract of his presentation planned in Mexico. See: Book of Abstracts, 1, Symposia, XXIst International Congress of History of Science, at Mexico, pp.18-19. Nakayama also has written an article on Yabuuti's school in "Kyoto Group of the History of Chinese Science," *Japanese Studies in the History of Science* 9 (1970), pp. 1-4.

[4] For the general features of calendar making, see Nakayama Shigeru, *A History of Japanese Astronomy* (Cambridge, Mass.: Harvard University Press**,** 1969).

Works on Japanese Astronomy

Here, I should first note that although in Yabuuti's works Japanese and Korean history appear to be geographically peripheral to China, they are not peripheral thematically, as they are systematically connected to his central concerns. For instance, in 1972 he wrote a book for the general public on the Chinese origin of Japanese science and Japanese modification and application of Chinese science. This book is entitled *Chūgoku no kagaku to Nihon* 中国の科学と日本 (Chinese Science and Japan)[5] and was published in a revised and more accessible version in 1978.[6] It became one of the standard works in the field, and was well received by Japanese readers. Previously, research into Chinese history and Japanese history were carried out independently as separate disciplinary fields. Yabuuti, however, emphasised the continuity between the two. He argued that there existed a constant influence of the then advanced China on Japan, and that this influence was not passively received in Japan, but positively recognised and applied by Japanese scientists. The cross-cultural scientific exchange of numerical calculations and techniques for calendar-making, for instance, are vividly described in his book.

Although it is obvious that Yabuuti's focus of historical research was always on Chinese astronomy, he also studied historical examples of Japanese astronomy. Admittedly, his research on Japan was relatively small in quantity, yet its quality should not be underestimated. For instance, his works on the achievements of Japanese "Dutch scholars" in the Edo period, such as Yamagata Bantō's 山片蟠桃 astronomy, are well known. Before he studied Yamagata, he had written occasionally since the 1950s about Japanese astronomy and Western impacts on it,[7] especially on the significance of Dutch Studies (Rangaku **蘭学**) for the history of Japanese astronomy. This was followed, in the early 70s, by his systematic and in-depth research on Yamagata Bantō's study on Western astronomy, the result of which was published in the *Rangaku shiryō kenkyūkai kenkyū hōkoku* **蘭学資料研究会研究報告** (Bulletin of the Institute for Research on Dutch Studies Material).[8] Yamagata lived in Osaka and was well-known as a

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[5] Tōkyō: Asahi Shimbunsha, 1972.

[6] Tōkyō: Asahi Shimbunsha, 1978.

[7] See, e.g., "Seiyō temmongaku no Nihon e no eikyō" **西洋天文学の日本への影響** (The Influence of Western Astronomy in Japan), in *Jūhachi seiki no shizenkagaku* **十八世紀の自然科学** (Natural Science in the Eighteenth Century), ed. by Kobori Akira 小堀憲. Tōkyō: Kōseisha, 1957.

[8] "Yamagata Bantō no temmongaku setsu" 山片蟠桃の天文学説 (The Astronomical Theory of Yamagata Bantō), *Rangaku shiryō kenkyūkai kenkyū hōkoku* **蘭学資料研究会研究報告** *The Bulletin of the Institute for Research on Dutch Studies Material* vol. 15, no. 251 (1971), and vol. 21, no. 271 (1973).

Confucian scholar, running his own school. This research on Yamagata was one of the most in-depth of its kind. Moreover, Yabuuti also did some work on Buddhist astronomy in the Edo period in 1965.[9]

Besides these works, Yabuuti worked on the "Hazama family archive" (Hazama ke-monjo 間家文書), the records of a family of astronomers from Osaka, although no systematic publication has resulted so far. He also did some study of the scientific instruments used by the Hazama family astronomers, and co-operated to preserve this collection. The Hazama family had inherited scientific instruments, mostly astronomical instruments, which were rare and valuable historical materials in late eighteenth- and early nineteenth-century Japan. Thanks to the efforts made by Yabuuti and his school, the collection is now kept in the Osaka Municipal Museum.[10]

The Hazama family was a merchant-scholar family who lived in Osaka, well-known for their expertise in astronomical observation and mathematics. In 1795, both Hazama Shigetomi 間重富 (1756-1816) and Shigeyoshi 重新 (1786-1838), father and son respectively, were invited to move from Osaka to Edo, to the Tokugawa governmental bureau of astronomical observation and calendar-making together with the famous and capable astronomer Takahashi Yoshitoki 高橋至時 (1704-1804). Not many scientific instruments are known to have survived from this Edo observatory. Therefore, from the point of view of historical research on scientific instruments in Japan, Yabuuti's efforts in studying this collection and keeping it together for preservation at the Osaka Municipal Museum should be regarded as a highly important contribution.

In Yabuuti's studies of Japanese astronomy, it is possible to point out the local and regional character of his work on Japanese science. Differing from his studies on China, which usually did not have any geographical limitations and which dealt with the universality of influences, including those of Islamic, Buddhist, as well as Jesuit astronomy, his research on Japanese astronomy has more to do with scholars living or active in Kyoto and Osaka (that is, Kansai) area. This was not because he was somehow remiss or unaware, but was rather due to the fact that

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9 "Edo jidai ni okeru bussetsu temmongaku no teishō" **江戸時代における仏説天文学の提唱**（Buddhist Astronomical Theories Advocated in Edo Japan), in *Saigusa Hiroto kinen rombunshū* 三枝博音記念論集 (A Festschrift for Prof. Saigusa Hiroto; Tōkyō: Daiichi hōki shuppan, 1965).

10 The Hazama collection of scientific instruments was studied by Kazu Tsuguto 嘉数次人.This contribution is published in the catalogue: *Hazama Bunko: Chōnin temmongakusha Hazama Shigetomi to Ōsaka* 羽間文庫：町人天文学者間重富と大阪 (The Hazama Collection: The Merchant-Astronomer Hazama Shigetomi and Ōsaka; Ōsaka Municipal Museum, 1999), pp. 1-17. Hazama was originally written as 間, but the family is now using the characters of 羽間. Thus, usage is not consistent in the catalogue, and Hazama Shigetomi is written as 間, while Hazama Bunko is written as 羽間. In this paper, except for the title of this catalogue, I use Hazama 間.

Yabuuti wanted to make use of the opportunity whenever he came across some local materials concerning his field. He based such "opportunistic" contributions on historical insights gained from his research into Chinese astronomy. Interestingly, his perspective was global when viewing Chinese science, but rather domestic and local with regard to Japanese science. In this sense, we can see Yabuuti as a man of "thinking globally, acting locally." This systematic combination of his works on Chinese and Japanese astronomy then provided stimuli to each area.

Comparative Study on Differences in the Acceptance and Development of Chinese Science in Korea and Japan

In the 1980s, when Yabuuti was actively involved in the Korea-Japan bilateral history of science seminars, he discussed the achievements of traditional Korean science in several papers. In a speech given at the Korea-Japan history of science seminar in 1982, he addressed the importance of studies of the early history of Korean science. He specifically remarked that in the Three Kingdoms period of Korea (fourth to seventh centuries), Paekche 百 済 dynasty chronology gives more exact year counting than the Japanese classics. Moreover, Korean culture is important because the first wave of Buddhism introduced into Japan also came from Paekche, as were the three "Doctors" skilled in predicting the future, calendar-making and medicine, and the "Teacher" of medicinal drugs, thus bringing civilisation and scientific culture to Japan. Korea's cultural influence on Japan continued from the Paekche period into medieval and pre-modern times . Yabuuti especially points to the publication of Korean editions of Chinese mathematical books, which disappeared in Ming and Qing China, but were preserved in Korea and via Korea exerted a positive influence on the development of algebraic mathematics in Japan during the Edo period.

We should also note that at the second Korea-Japan history of science seminar held at Kyoto in the following year, in 1983**,** Yabuuti discussed differences and similarities in the acceptance of Chinese science in Korea and Japan. By this, he not only tried to draw attention to the different natures of each scientific tradition, but also claimed that because of the colonial and aggressive attitude of the Japanese toward Koreans after the Meiji restoration in the nineteenth century, the Japanese in general tended to regard Korea as a lesser, affiliated part of China, and that Japanese historians tended to see Korea merely as a small and unimportant stepping-stone in the transmission of Chinese science and culture to Japan. Yabuuti spoke up for the need to change this regrettable situation and called for more respect to be paid to the independent scientific attitudes in the three (or, perhaps more aptly, multi-layered) cultures. Yabuuti gave examples of original Korean scientific achievements, such as the manufacture of Korean Celadon ceramics, the invention of the Korean Hangul writing system, as well as printing

technology, which was more advanced than in China. Thus, Yabuuti distinguished three national (or cultural/regional) identities of science, and he also acknowledged something like a "plurality" or "multitude" of different formations of scientific culture within the Chinese cultural sphere. Not only was his viewing angle unique, but it also provided a culturally multi-layered perspective that included Korean science. In this regard, we can say that viewing from peripheries can create a sound basis for academically profitable analysis.

In sum, Yabuuti noted continuity between Japan and China, yet in the case of discussions involving Korea he emphasised discontinuity among the three. In viewing East Asian science, the terms of continuity/discontinuity are important conceptions and can be paraphrased to mean commonality and diversity. Was Yabuuti contradicting himself when discussing the two together, yet applying them differently from case to case? In my view, Yabuuti was not confusing the issue, because it is necessary to use the measures of both commonality and diversity when approaching the three nations in a comparative perspective. The differentiating adoption of these conceptions in the above mentioned cases must have been considered by him as a means to correct previous and current historiographical biases in relation to China, Korea and Japan. Therefore, continuity/discontinuity, commonality/diversity are not contradictory conceptions applied in the same argument, but function as an appropriate framework for viewing and systematising multi-cultural diversity in the history of East Asian science.

Lastly, I would like to remark that at the XXth International Congress of History of Science in Liège in 1997 we had a memorial session on Joseph Needham. Now, here at the XXIst congress in Mexico in 2001, there is a special session in memory of Yabuuti Kiyoshi. Within four years, on both sides of the turn of the century, we saw the departure of the two most important scholars of our field, the history of East Asian science; they literally became "history." We are now realising that we owe to them a great deal of revelation, insight, and innovation. Present historians living in the age of the two most important "paradigm setters" in the East and the West are becoming increasingly aware that the so-called "modern Western triumphant view" of science has been substantially relativised and that an internalist methodology, that is, to study the history of science on the basis of the knowledge of modern Western science, is not sufficient any more as it once was considered to be. Instead, we are now questioning Western, Chinese or East Asian science and their production of knowledge within their specific and particular socio-cultural contexts. By this we are hoping, and actually endeavouring, to build an East-West bridge between the various histories of science and technology in our twenty-first century, on the stable foundations built on both sides by Joseph Needham and Yabuuti Kiyosi in the twentieth century.