

## 科学研究費助成事業 研究成果報告書

平成 30 年 5 月 22 日現在

機関番号：14301  
 研究種目：基盤研究(C) (一般)  
 研究期間：2015～2017  
 課題番号：15K01118  
 研究課題名(和文) Overlapping cosmologies of premodern Asia

研究課題名(英文) Overlapping cosmologies of pre-modern Asia

## 研究代表者

MAK BILL (麦文彪) (Mak, Bill)

京都大学・白眉センター・特定准教授

研究者番号：50747863

交付決定額(研究期間全体)：(直接経費) 3,600,000円

研究成果の概要(和文)：1. 資料の収集：天文学に関する現存資料についてのフィールド調査を、中国、日本、インド、ネパール、タイにおいて行った。また、ブラウン大学とアメリカ哲学協会に所蔵されているピングリーのアーカイブを精査した。これらの成果を、5本の雑誌論文と19の口頭発表において報告した。  
 2. 学際的なネットワークの構築：2003年に同志社大学で発足した仏教天文学研究会の運営を引き継ぎ、研究チームとともに、日本における天文学資料である円通の『仏国曆象編』の会読を2017年に完了させた。2017年には、「京都大学国際シンポジウム：天と地の科学―東と西の出会い」を開催し、成功させた。

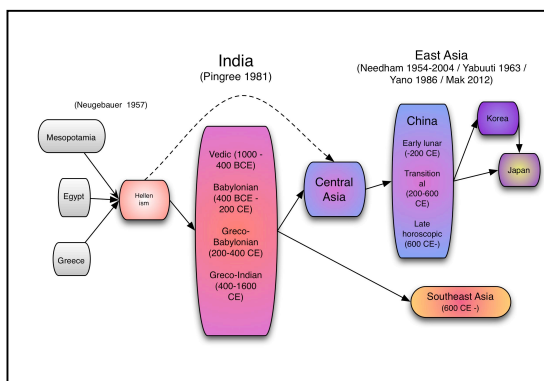
研究成果の概要(英文)：1. Collection of research materials: A number of field surveys on extant astral documents were conducted in China, Japan, India, Nepal and Thailand. Together with a close examination of the Pingree's archive at Brown University and the American Philosophical Society, findings were reported in 5 journal articles and 19 conference talks.  
 2. Interdisciplinary scholarly network: Members of the Buddhist Astronomy Research Seminar 仏教天文研究会 (founded at Doshisha University in 2003) completed the analysis of Entsuu's astronomical treatise 佛国曆象編 (2015-2017). Furthermore, as an effort to promote exchange among Japanese and international scholars in the field, a number of conference panels and conferences were organized, with most notably the three-day Kyoto University Symposium held in October, 2017: Traditional Sciences in Asia 2017 -- East-West Encounter in the Science of Heaven and Earth, where over 30 talks/posters were presented with over 60 participants.

研究分野：科学史

キーワード：科学史 宇宙科学 文化交流史

### 1. 研究開始当初の背景

This research forms a part of a larger project whose goal is to examine the role and development of traditional sciences in the East within the context of the world's intellectual history during the pre-modern era starting from the beginning of the first millennium up to the end of the nineteenth century. The period was generally discussed in "Needham's Paradox" (Why did science not evolve from the East?), when the intellectual cultures in South and East Asia greatly prospered while the West lay largely dormant. The astral science in the pre-modern East was a serious pursuit for the learned society and was an integral part of the network of knowledge among the ancient cultures on the Eurasian continent. In terms of contents, it encompasses a broad range of related subjects including the calendrics, cosmology, astronomy and astrology, which were known collectively as  *jyotiṣa*  in Sanskrit and  *tianwen*  天文 in Chinese. The intricate relationship of the astral lore among various cultures was discovered and examined in the second half of the twentieth century,



pioneered by [Neugebauer 1957], followed by [Pingree 1981] and [Needham 1954-59]. While some works attempt to connect the earlier studies with the large body of East Asian materials extant [Yabuuti 1963, and works of Yano, Takeda and Mak], a complete survey of the contents of the astral science of East Asia had not yet been undertaken.

### 2. 研究の目的

This research aims to examine the historical phenomenon of overlapping cosmologies and multifaceted worldviews from an Asian perspective by consolidating original texts and other primary sources from various parts of Asia throughout the first millennium, together with secondary materials, thus bringing together the

research results of the past five decades to fill a major lacuna in the study of history of science.

### 3. 研究の方法

The basic premise of this project is to consolidate the works and achievements of the three leading scholars in the field of history of science of the past five decades: Kiyosi Yabuuti, Joseph Needham and David Pingree, and to develop new insights into the subject by incorporating the latest philological and archaeological discoveries. The three-year research project proceeded in three stages: i) Survey; ii) Knowledge database; iii) Academic network.

### 4. 研究成果

#### (1) Survey

A number of field surveys on the extant astral documents were conducted in China, Japan, India, Nepal and Thailand. Together with a close examination of Pingree's archive materials at Brown University and the American Philosophical Society, findings were reported in five journal articles and nineteen conference talks delivered during the project period.

#### (2) Knowledge database

The attempt to consolidate the existing materials resulted in: ① Feasibility study of the digitalization of Pingree's 5-volume *Census of the Exact Sciences in Sanskrit* (CESS), in collaboration with Brown University and the PANDiT Project (Hebrew University); ② Digitalization of Entsu's 円通 astronomical treatise 佛國曆象編 (see link below) under the KANRIPO database.

#### (3) Academic network

An important goal of this project was to foster academic networks both within Japan and overseas, by bringing together scholars specialized in history of science and other related fields to present their latest works and for high-level academic exchange, and thereby to re-establish Kyoto as an international center for the research in historical sciences in Asia. In 2015, as part of the project, the Buddhist Astronomy Research Seminar 仏教天文研究会 founded at Doshisha University in 2003 was successfully migrated to Kyoto University. The members of this research group as collaborators (研究協力者) were supported by this project and completed the analysis of Entsu's astronomical treatise 佛國曆象編 in 2017. Furthermore, as an effort to promote exchange among Japanese and international scholars in the

field, a number of conference panels and conferences were organized, with most notably the three-day Kyoto University Symposium held in October, 2017: Traditional Sciences in Asia 2017 -- East-West Encounter in the Science of Heaven and Earth 京都大学国際シンポジウム：天と地の科学-東と西の出会い, where over 30 talks/posters were presented with over 60 participants. Other academic events organized as parts of this project:

① Conference: International Workshop on Traditional Sciences in Asia (IWTSA 2015), Kyoto, 17-19 Jun 2015 (3 Japanese speakers, 10 overseas, 2 Japanese lectures).

② Panel: “Overlapping cosmologies and cosmographies in pre-modern Asia,” The 19<sup>th</sup> Asian Studies Conference Japan, Tokyo, Japan, 20 Jun 2015 (2 Japanese speakers, 6 overseas).

③ Conference: “Cosmos, East and West: Astral Sciences in South and East Asia and their Interaction with the Greco-Roman World.” Institute for the Study of the Ancient World, New York University, New York, U.S., 27 Feb 2017 (2 Japanese speakers, 4 overseas). [In collaboration with NYU, with support from 国際共同研究加速基金 15KK0050]

④ Panel: “Astrology and magic in Thai Buddhism,” SEASIA 2017, Bangkok, Thailand (2 Japanese speakers, 2 overseas) [With support from 基盤研究 A (研究代表者：片岡樹) 科学研究費補助金 16H01895]

⑤ Panel: “Buddhist Cosmology and Astral Science,” XVIIIth Congress of the International Association of Buddhist Studies, Toronto, Canada, 21 Aug 2017 (3 Japanese speakers, 2 overseas) [With support from 国際共同研究加速基金]

⑥ Traditional Sciences in Asia 2017 -- East-West Encounter in the Science of Heaven and Earth 京都大学国際シンポジウム：天と地の科学-東と西の出会い [With support from Kyoto University; see above]



<引用文献>

- ① Neugebauer, O. 1957. *The Exact Sciences in Antiquity*. 2nd - unabridged and corrected edition published in 1969. New York: Dover.
- ② Pingree, David. 1981. *Jyotiḥśāstra: Astral and Mathematical Literature*. Wiesbaden: Harrassowitz.
- ③ Needham, Joseph. 1954-59. *Science and Civilization in China*. Vol. 1-3. Cambridge, England: Cambridge University Press.
- ④ Yabuuti Kiyoshi 藪内清、1963、中国中世科学技術史の研究、東京、角川書店

5. 主な発表論文等

(研究代表者、研究分担者及び連携研究者には下線)

[雑誌論文] (計5件)

- ① MAK BILL, The Transmission of Buddhist Astral Science from India to East Asia - The Gandhāran and Central Asian Connections, *Historia Scientiarum*, 査読有、24-2 巻、2015、59-75
- ② MAK BILL, Astral Science of the East Syriac Christians in China during the late first millennium AD, *Mediterranean Archaeology and Archaeometry*, 査読有、16-4 巻、2016、87-92.
- ③ Geslani, Marko, Bill Mak, Michio Yano, Kenneth Zysk, Garga and early astral science in India, *History of Science in South Asia*, 査読有、5. 1 巻、2017、151-191 DOI: <https://doi.org/10.18732/H2ND44>
- ④ MAK BILL, Tithikarmaguṇa in Gārgīyajyotiṣa - Tithi worship according to a number of early sources、印度學佛教學研究、査読有、66-3 巻、2018、985-991
- ⑤ MAK BILL, “The First Two Chapters of Mīnarāja’s *Ṛddhayavanajātaka*” . *Zinbun*, 査読有、48 巻、2018、1-31

[学会発表] (計19件)

- ① MAK BILL, The Legacy of Greek Astral Science in China, Japan and Southeast Asia (poster presentation)、International Workshop on Traditional Sciences in Asia 2015、2015年6月17-19日、京都大学、京都
- ② MAK BILL, Greek Astral Science in China: Nestorians, Perso-Arabs, and the Jesuits、19th Asian Studies Conference Japan、2015年6月20日、明治学院大学、東京
- ③ MAK BILL, The astronomical knowledge of the Buddha, sages and foreigners - The

Question of Authority in Buddhist Astral Science in South and East Asia, The Twelfth Biennial History of Astronomy workshop, 2015年6月24-28日、University of Notre Dame, Notre Dame, IN, アメリカ

④ MAK BILL、A new edition of the Yavanajātaka based on the newly discovered manuscripts、16th World Sanskrit Conference (International Association of Sanskrit Studies)、2015年6月29日、Silpakorn University, Bangkok, タイ

⑤ MAK BILL、Zodiac in South and East Asia: Transformation and interaction with indigenous astral science as seen from textual and iconographical sources、The 14th International Conference on the History of Science in East Asia, 2015年7月6-10日、École des Hautes Études en Sciences Sociales (EHESS), Paris, フランス

⑥ MAK BILL、Budhisma Kosmo, 68a Internacia Kongresa Universitato (IKU) / 100a Universala Kongreso de Esperanto, 2015年7月25日-8月1日、Lille, フランス

⑦ MAK BILL、Astral Science from the Near East to China in the late first millennium AD -Dorotheus in Pahlavī and Duli Yusi Jing in Chinese、SEAC 2015 Annual Conference, 2015年11月9日、Rome, イタリア

⑧ MAK BILL、Kumārajīva's astral learning as seen in his translation/compilation of Dazhidulun、International seminar on Kumārajīva studies, 2016年4月24日、World Buddhist University, Bangkok, タイ

⑨ MAK BILL、タイにおける天文学と占星術、第143回仏教天文学研究会、2016年5月20日、京都大学人文科学研究所

⑩ MAK BILL、How Greek was Greco-Indian and Greco-Chinese astral science?" Conference paper、Cosmos, East and West: Astral Sciences in South and East Asia and their Interaction with the Greco-Roman World, 2017年2月27日、Institute for the Study of the Ancient World, New York University, New York, アメリカ

⑪ MAK BILL、The lineage of 'foreign' planetary worship in ninth-century China -ritualistic elements of the Qiyao rangzai jue 七曜攘災決, 2017 Annual Conference of the Association for Asian Studies, 2017年3月16日、Toronto, カナダ

⑫ MAK BILL、Transmission of Greco-Babylonian planetary science and horoscopy in India and China, Inaugural Otto Neugebauer Lecture in the History of the Exact Sciences in Antiquity, 2017年5月2日、Brown University, Providence, アメリカ

⑬ MAK BILL、The Buddhist transmission of Grahamaṭṭkādharmaṇī and other planetary astral texts, XVIIIth Congress of the International Association of Buddhist Studies, 2017年8月21日、University of Toronto, Toronto, カナダ

⑭ MAK BILL、Gārgīyajyotiṣa における Tithikarmagūṇa -- 初期の諸文献にもとづく ティティ儀礼、日本印度学仏教学会第六十四回学術大会, 2017年9月2日、花園大学, 京都

⑮ MAK BILL、Greco-Babylonian astral science in Asia - Patterns of dissemination and transformation, 京都大学国際シンポジウム: 天と地の科学-東と西の出会い, 2017年10月26日、京都大学, 京都

⑯ MAK BILL、The "science" of astrology in Thai Buddhism: Past and present, SEASIA 2017, 2017年12月17日、Chulalongkorn University, Bangkok, タイ

⑰ MAK BILL、A Critical Edition of the Jyotiṣa Materials of the *Gargasamhitā*、International Seminar - Sanskrit Śāstra Literature: Perspectives & Relevance, 2018年1月15日、University of Calcutta, Kolkata, インド

⑱ MAK BILL、Garga and the Astronomical Chapters of the *Gārgīyajyotiṣa*, The 228th meeting of the American Oriental Society, 2018年3月17日、Pittsburgh, アメリカ

⑲ MAK BILL、*Gargasamhitā* and Vedic astral science in China - Early evidences of foreign transmission of the science of the Heavens from the 'West', Joseph Needham Symposium on Early Cultural & Scientific Transmission across Eurasia with China, 2018年3月26-27日、香港中文大学, 香港

[図書] (計1件)

① 矢野道雄著、MAK BILL 英訳、Aditya Prakashan 出版、Esoteric Buddhist Astrology, 2018(in print)、165

〔その他〕  
ホームページ  
京都大学国際シンポジウム：天と地の科学—  
東と西の出会い  
<http://wdc2.kugi.kyoto-u.ac.jp/ictsa2017/>

仏教天文学研究会  
<http://www.zinbun.kyoto-u.ac.jp/~mak/butttenken/schedule.html>

『佛國曆象編』のWeb化  
<http://www.kanripo.org/text/KR3f0057/>

## 6. 研究組織

### (1) 研究代表者

MAK BILL (麥文彪)  
京都大学・白眉センター・特定准教授  
研究者番号：50747863

### (2) 研究分担者

武田時昌 (TAKEDA, Tokimasa)  
京都大学・人文科学研究所・教授  
研究者番号：50179644

### (3) 連携研究者

矢野道雄 (Yano Michio)  
京都産業大学・名誉教授  
研究者番号：40065868

### (4) 研究協力者

上田真啓 (Ueda Masahiro)  
京都大学・非常勤講師

梅林誠爾 (Umebayashi Seiji)  
熊本県立大学・名誉教授

岡田正彦 (Okada Masahiko)  
天理大学・教授

小林博行 (Kobayashi Hiroyuki)  
中部大学・准教授

佐々木聡 (Sasaki Satoshi)  
大阪府立大・特別研究員

清水浩子 (Shimizu Hiroko)  
大正大学・講師

白雲飛 (Bai Yunfei)  
大阪府立大学・客員研究員

平岡隆二 (Hiraoka Ryuji)  
熊本県立大学・准教授

前原あやの (Maehara Ayano)  
関西大学・非常勤講師

宮島一彦 (Miyajima Kazuhiko)  
中之島科学研究所・研究員／  
同志社大学・嘱託講師