

- Carnegie Corporation of America 2021. *New York Times*, 4 July issue, page 7.
- De Vaucouleurs, G., 1971. The case for a hierarchical cosmology. *Science*, 167, 1203–1213.
- Einstein, A., 1917. Kosmologische Betrachtungen zur allgemeinen Relativitätstheorie. *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften*, Berlin, Pp. 142–152.
- Gamow, G., 1950. Half an hour of creation. *Physics Today*, 3(8), 16–21.
- Hoyle, F., 1948. A new model for the Expanding Universe. *Monthly Notices of the Royal Astronomical Society*, 108, 372–382.
- Hubble, E., 1929. A relation between distance and radial velocity among the extra-galactic nebulae. *Proceedings of the National Academy of Sciences (of the United States)*, 15, 168–173.
- Lemaitre, G., 1927. Un Univers homogène de masse constante et de rayon croissant rendant compte de la vitesse radiales des nébuleuses extra galactiques. *Annales de la Société Scientifique de Bruxelles*, A47, 49–59.
- Lemaitre, G., 1961. Discussion remarks In Neyman, Page & Scott.
- Neyman, J., Page, T.L., and Scott, E. (eds.), 1961. Conference on the Instability of Systems of Galaxies. *Astronomical Journal*, 66, 533–636.
- Ohm, E.A., 1961. Project Echo receiving system. *Bell System Technical Journal*, 40, 156–162.
- Peebles, P.J.E., 1967. Primeval galaxies. In *Proceedings of the Fourth Texas Symposium on Relativistic Astrophysics*. New York, unpublished.
- Peebles, P.J.E., 1971. *Physical Cosmology*. Princeton, Princeton University Press.
- Peebles, P.J.E., 1980. *The Large Scale Structure of the Universe*. Princeton, Princeton University Press.
- Peebles, P.J.E., 1987. Origin of the large-scale-galaxy peculiar velocity field: a minimum isocurvature model for galaxy formation. *Nature*, 327, 210–211.
- Peebles, P.J.E., 1993. *Principles of Physical Cosmology*. Princeton, Princeton University Press.
- Peebles, P.J.E., 1999. An isocurvature cold dark matter cosmology: II. Observational tests. *Astrophysical Journal*, 510, 531–540.
- Peebles, P.J.E., Page, L.A., and Partridge, R.B., 2009. *Finding the Big Bang*. Cambridge, Cambridge University Press.
- Robertson, H.P., 1929. On the foundations of relativistic cosmology. *Proceedings of the National Academy of Sciences (of the United States)*, 15, 822–829.
- Sandage, A., 1958. Current problems in the extra-galactic distance scale. *Astrophysical Journal*, 127, 513–526.
- Thackeray, A.D., 1952. In F. Hoyle, Secretary, Session of Commission 28 (Extragalactic Nebulae). In Oosterhoff, P. (ed.) *Transactions of the International Astronomical Union VIII* (published in 1954). Cambridge, Cambridge University Press. P. 397.
- Thackeray, A.D., and Wesselink, A.J., 1953. Dis-

ances of the Magellanic Clouds. *Nature*, 171, 693–694.

Trimble, V.F., 1996. The incredible shrinking constant. *Publications of the Astronomical Society of the Pacific*, 108, 1073–1082.

Professor Virginia Trimble
University of California Irvine,
4156 Frederick Reines Hall, Irvine,
CA 92697, USA.
E-mail: vtrimble@uci.edu

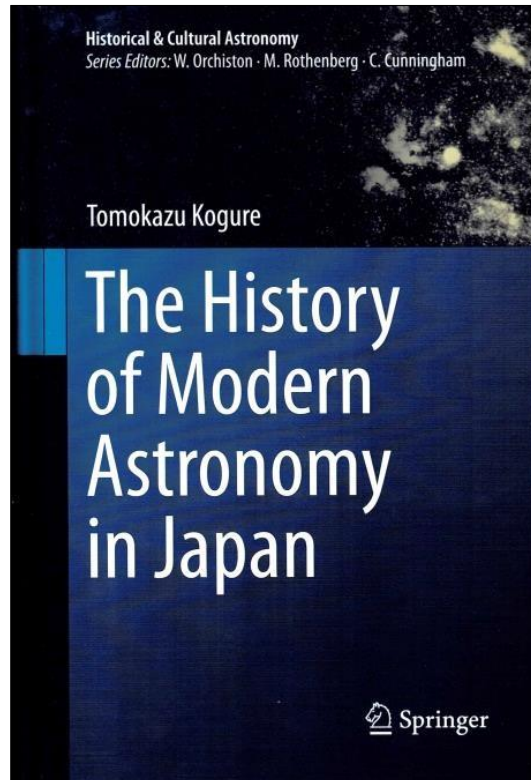
The History of Modern Astronomy in Japan, by Tomokazu Kogure. (Cham, Springer, 2021). Pp. xvi + 295. ISBN 978-3-030-57061-3 (hardback), 160 × 240 mm, €135.19.

This book overviews the Japanese history of modern astronomy, with an emphasis on the development of astrophysics mainly after WW II until around 2000. Regarding the history of astronomy in Japan, many books so far written in Japanese have described for the most part calendar-making based on traditional Chinese astronomy, astrology and ethnoastronomy. On the other hand, there are few books treating astronomy as a science, and even fewer to provide a systematic description in English. As some examples of the latter, let me here list the book by Nakayama (1966) that covers the period from ancient times to the 1860s; the one by Bartholomew (ca. 1989) on the formation of the institutional structure of Japanese science that occurred for about six decades after the Meiji Restoration of 1868; and the book edited by Nakamura and Orchiston (2017) that collected the modernization history of astronomy for ten Asian countries.

The author of the book reviewed here is Professor Emeritus Tomokazu Kogure, who has had a long career in research and education in the Astronomy Department at Kyoto University, and whose research specialisation is the spectroscopy of early-type stars (e.g. see Kogure and Leung, 2007). Through his research activities he became interested in the development of the history of astrophysics as well. In 2015 Kogure published a voluminous book in Japanese on the worldwide history of modern astronomy and astrophysics. The eighth chapter in that book treated the history of astrophysics in Japan from its foundation to the 1970s. Kogure mentions that his new book—under review here—is essentially an extended English-language version of his 2015 book, covering the same academic fields and periods down to the end of the twentieth century.

This book consists of eight chapters, that contain many graphs, tables and figures taken from research papers, along with photographs of key astronomers. As an intro-

ductory background before modernization of Japan, the first chapter briefly describes astronomy between 1603 and 1868, covering the national seclusion times of the Samurai regime. In the last decade of the eighteenth century, the Japanese encountered Western astronomy, which resulted in the first successful calendar reform that took account of Kepler's elliptic motion of the planets and the Moon for the first time. Around the same time, Copernican and Newtonian astronomical concepts were gradually accepted by the Japanese.



Chapter Two is devoted to the development of astronomy from 1868 to 1926. Hisashi Terao (1855–1923) was the first to learn modern Western astronomy in Paris, after he graduated from the Tokyo Imperial University. One year after he returned to Japan in 1883 he was appointed a professor at Tokyo University and Director of the newly established astronomical observatory. Two of his students were responsible for the first internationally recognized astronomical discoveries made in Japan, namely the Z-term in the Earth's polar motion by Hisashi Kimura in 1902, and asteroid families by Kiyotsugu Hirayama in 1918. This chapter also describes the life and work of physicist Shinzo Shinjo, known as the founder of the Department of Astronomy at Kyoto University.

Systematic research and education in modern astronomy started in Japan at the three national universities in Tokyo, Kyoto and

Sendai, all major cities of Japan. Chapters 3–5 treat each of these Universities separately using various materials for the period 1926–1945. Similarly, Chapter 6 and 7 concentrate on the postwar development of astrophysics in Japan during 1946–2000, to which Kogure allocates approximately half of the book. The former chapter discusses observational facilities and techniques in optical, infrared, X-ray, radio and high-energy fields, while the latter chapter introduces mainly the research achievements of individual astronomers.

This book cites papers and works of some 320 Japanese astronomers covering the period from the seventeenth century to about 2000. Hence it gives the impression that it is a chronological encyclopedia of Japanese astronomy and astronomers. Although the reviewer noticed that the listing of astronomical achievements puts a little too much emphasis on those of Kyoto University, and some important names and outcomes performed in the field of planetary sciences are missing, such a bias may be inevitable for a book like this written by a single author.

Finally, I would like to conclude this book review by expressing my personal sentiments. A postscript in Kogure's 2015 book tells us that he was born in 1926, meaning that he is now 95 years old. Considering his age, I cannot but help admiring his enthusiasm and efforts in writing this book. As one of the author's compatriots, I welcome the publication of this book and encourage overseas astronomical historians and scientists to read it in order to correctly understand the modern history of astronomy in Japan.

References

- Bartholomew, J.R., ca. 1989. *The Formation of Science in Japan: Building a Research Tradition*. New Haven, Yale University Press.
- Kogure, T., and Leung, K.-C., 2007. *The Astrophysics of Emission-Line Stars*. New York, Springer.
- Kogure, T., 2015. *History of Modern Astronomy*. Kyoto, Kyoto University Press (in Japanese).
- Nakamura, T., and Orchiston, W. (eds.), 2017. *The Emergence of Astrophysics in Asia: Opening a New Window on the Universe*. Cham, Springer.
- Nakayama, S., 1966. *A History of Japanese Astronomy: Chinese Background and Western Impact*. Cambridge, Harvard University Press.

Dr Tsuko Nakamura
Institute for Oriental Studies, Daito-bunka
University, Tokumaru 2-19-10, Itabashi,
Tokyo 1750083, Japan.
E-mail: tsukonk@yahoo.co.jp