BOOK REVIEWS

Swerdlow, N. M. and Neugebauer, O., *Mathematical Astronomy in Copernicus's De Revolutionibus*, Ed. Toomer G. T., Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1984, pp. xxvi+711, $ 88.80.

The aim of the book is to make an analysis of Copernicus's celebrated book with an explanation of the background and also to present Copernicus's work on perimeters along with some steps in the derivation that he omitted.

Part 1 of the book begins with a General Introduction running to about a hundred pages. It contains a sketch of Copernicus's life, a review of Ptolemy's astronomy along with the modifications made by the Morāgha School. The authors also take up Regiomontanus's *Epitome of the Almagest* which is said to have greatly influenced Copernicus. There is a discussion on different texts of *De Revolutionibus* (the authors lay special stress on the autograph manuscript and the 1543 Nuremberg edition).

Next follows an exposition of trigonometry and spherical astronomy that appear in Copernicus's work. It is stated clearly that here there was nothing original. The subject matter of discussion in the remaining four chapters may be guessed from their titles—'The motion of the Earth', 'Lunar theory and related subject', 'Planetary theory of Longitude' and 'Planetary theory of Latitude'.

Part 2 contains the figures which are relevant in the discussions of Part 1 and it presents a bibliography of writings on Copernicus.

The present reviewer is not a student of history of Science and as such it is difficult for him to make any assessment of the book. However, his impression is that the book may well serve as an authoritative text to evaluate Copernicus's contribution in the background of the time in which he lived.

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Subbarayappa, B. V. and Sarma, K. V., *Indian Astronomy—A Source-Book*, Nehru Centre, Bombay, 1985, pp. xi+338.

Through the labours of earlier scholars a number of works on Indian astronomy and their translations into English have seen the light of day. But no attempt was so far made by any scholar to bring out a source-book of Indian astronomy, although a source-book of Jalna astronomy (in Hindi), entitled *Gaṇitānuyoga*, was published in 1970 by Agama-Anuyoga Publication, Sanderao (Rajasthan), which was compiled by Muni Kanhaiyalal 'Kamala', translated by Dr. Mohanlal Mehta, and edited by Pandit Shobhachandra Bharilla. B. V. Subbarayappa and K. V. Sarma have now filled up this gap by bringing out this excellent source-book of Indian astronomy.

Subbarayappa and Sarma have divided their source-book into five major divisions, *viz.*, (i) General Ideas and Concepts, (ii) Astronomical Instruments, (iii) Computations, (iv) Occultation, and (v) Innovative Trends. General Ideas and Concepts have been dealt with under seven heads, *viz.*, astronomy, astronomer, cosmogony, views and concepts, erroneous notions, numeration, and measures of time. Astronomical Instruments under three heads, *viz.*, armillary sphere, observatories, and instruments; Computations under five heads, *viz.*, calendar, stars and asterisms, planets, precession of the equinoxes, and gnomonic shadow; Occultation under five heads, *viz.*, eclipses, phases of the Moon, helical rising and setting of Planets and Stars, conjunction of Planets, and conjunction of Stars and Planets; and Innovative Trends under two heads, *viz.*, novel innovations, and rationale of astronomy. Under each head are arranged topicwise relevant Sanskrit passages and their English translations extracted from various published works on Indian astronomy. Passages whose readymade English translation was not available have been translated by K. V. Sarma himself. Towards the end are given six appendices containing table of Indian eras, bibliography of works on Indian astronomy, general bibliography, glossary of technical terms, *bhūtasaṅkhyā* system of expressing numbers, and sources and translators. Introduction to the book in the beginning gives a survey of Indian astronomy.

The book is well planned and sufficient care has been taken in the selection and arrangement of the passages. The passages selected are generally self-explanatory and suited to the taste of modern scholars. Where explanation is considered necessary it is briefly given in footnotes. For the facility of the reader each Sanskrit passage as well as its English translation is provided with a topic-heading at its top. To satisfy the curiosity of the inquisitive reader inclusion is made of some plates giving views of Maharaja Sawai Jai Singh's observatories at Jaipur and Delhi and of facsimiles of pages of certain interesting manuscripts.

The size of the book is quite appropriate for a source-book. The printing and get-up are excellent. The jacket is well designed—it is artistic and attractive and gives the book a grand look.

As pointed out by Dr. Raja Ramanna in his Foreword, the book has been prepared in a rather short time. The result is that there are misprints, errors and omissions at some places. Since the Sanskrit text and its English translation both are given one below the other they can be easily detected and misprints and errors rectified and omissions inserted by the reader himself. There are, however, inaccuracies in some translations. For example, translation of the two verses cited under 1.4.4 gives the false impression that a *Karaṇa* work is necessarily the most accurate category of Indian works on astronomy and that only this category of works should be used for astronomical computations : the verses really seem to say that one should make use of that *Karaṇa* only which has been tested for its accuracy on the basis of observation. Similarly, translation of verse 31 cited under 7.2.2 gives 30 as the number of solar sidereal revolutions in a period of five solar years, which is not true.

The authors, Dr. B. V. Subbarayappa and Dr. K. V. Sarma, deserve all praise for bringing out for the first time this excellent source-book of Indian astronomy. Historians of science, astronomers and other interested readers will remain thankful to them.

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