Book Review

Title	**Tools of Astronomy**
Author	**Biman Basu**
Publisher	**Vigyan Prasar** **A-50, Institutional Area,** **Sector 62, Noida-201 307**
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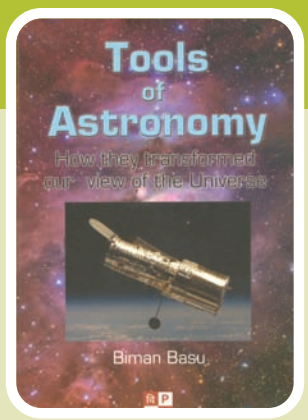

As we all know, astronomy is the study of the Sun, Moon, stars, galaxies and the Solar system, ultimately, of the whole universe. It is perhaps the oldest of all sciences, dating back to the time the humans came to live in the open and wondered about the spectacle in the sky. Periodic occurrence of eclipses and occasional appearance of comets in the sky were fascinating and awe-inspiring. In addition to the curiosity about goings on in the sky, there were practical reasons for studying astronomy. The two of these reasons were the calendar making for measuring time and the use of constellations for navigating on land and on high seas.

Ancient cultures like India, China and others had rich traditions of astronomy. In India, Varahamihira, Aryabhatta and many others made significant contributions to astronomy. Astronomy is an integrated part of the Indian culture. Almost all our festivals—be it *Diwali*, *Holi*, *Eid*, or a *Gurupurubh* (birthday of the *Guru*)—are based on the phases of the Moon and the motion of the Sun. It is a pity, therefore, that our children get so little exposure to astronomy during their schooldays. Earlier astronomy was included in the senior secondary syllabus. However, at the time of revision a few years back, syllabus makers thought it wise to remove astronomy from senior secondary syllabus and replace by a 'modern' topic like communication. At the moment, only the upper primary syllabus has some very elementary ideas of astronomy.

It is in this context that one must laud the programme launched by *Vigyan Prasar* to

popularise astronomy. The present volume, the *Tools of Astronomy* by Biman Basu, is a part of the same programme. Mr Basu is a former Editor of Science Reporter, a popular science magazine brought out by the Council of Scientific and Industrial Research, and is eminently placed to write a book on popular astronomy. The *Tools of Astronomy* tells us the story of how observational tools have refined and developed over time and how they have led to improvement in our understanding of the universe.

Mr Basu starts with the most ancient instruments. These are quite primitive by modern standards. But they show the amazing curiosity of the mankind towards the celestial phenomena and their ingenuity in inventing instruments to satisfy this curiosity. An example is just a number of stones arranged in a certain pattern at Stonehenge in England. This simple device facilitated the observation of phenomena associated with the annual motion of the Sun, and eclipses. Another example is the astrolabe, a multifunctional instrument, which was used to track the movement of the Sun and other heavenly bodies. Mr Basu also describes the various *Jantar Mantars* in India which were used for astronomical observations.

Observations of the phases of the Venus and the four nearest satellites of Jupiter by Galileo with the telescope that he himself fabricated are described in some detail. These observations, as we know, ushered a revolution in science by showing that the earth could not be the only centre about which other bodies could revolve. This was against the entrenched belief at that time that the earth does not move and all heavenly bodies revolve round the earth. As is well-known, and pointed out by Mr Basu, the observations of Galileo supported the heliocentric model of Copernicus, wherein the Sun is at the centre of the solar system. It was left to the work of Kepler and Newton to establish the heliocentric model beyond any doubt.

Mr Basu devotes a considerable part of the book to the developments of telescopes of all types, radio, infrared, optical, x-ray, gamma-ray and rightly so because our only link with the celestial bodies is the electromagnetic radiation that we receive from them. The description of observations by these telescopes takes Mr Basu to the most recent developments in astronomy, including those relating to the planetary studies in our own solar system, discovery of planets outside the solar system, the cosmic black body radiation, gamma-ray sources and the elusive dark energy.

The book has been well brought out. Printing, illustrations and photographs are good. They make the book quite attractive.

It is easy to see that through *Tools of Astronomy* Mr Basu has been able to cover a lot of ground in astronomy which would interest a lot of readers

who are eager to read about astronomy. In the opinion of this reviewer, the utility of the book for readers would have been enhanced considerably, if there had been a section on elements of spherical astronomy explaining the various terms, for example, altitude, azimuth, used in relation to the stellar observations. A glossary of astronomical terms would also have helped readers who are not initiated into astronomy. These are minor reservations. I have no hesitation in recommending this book to those who enjoy learning astronomy.

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