Library - Book Review

Astronomy Before The Telescope

Edited by Christopher Walker

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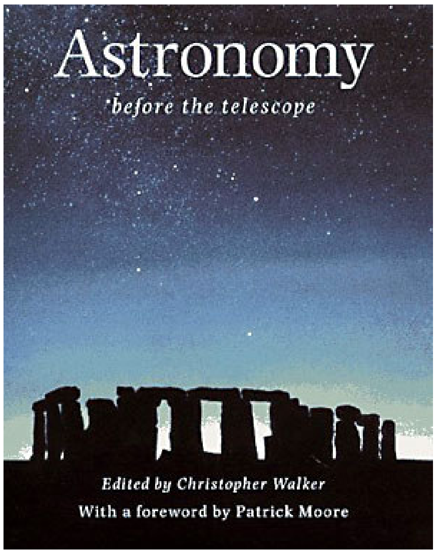

On reading the introductory comments by Patrick Moore regarding this text, I was encouraged to gain an insight into the contributions made by astronomers in the times when investigations were confined to the unaided eye and a wealth of patience and intuition.

The journey from astronomical antiquity begins with studies of astronomy in north-west Europe with its surviving monuments associated with pre-historic ritual and thought. In later times in Egypt we read of the development of the 365-day calendar and divisions of day and night into 12-hours each. On a different plane, the contributions of the Babylonians strongly influenced the development of mathematics in astronomy, particularly when much of the acquired knowledge was transmitted to the Greeks around the second century BC.

The centrepiece of the Greek developments was Ptolemy, whose works, particularly the "Almagest", influenced astronomical thinking well up to the time of Tycho Brahe and Copernicus. Its immediate impact was recorded in developments throughout the Roman Empire and Byzantium. The book also devotes a chapter on progress during the first millennium generally and proceeds to discuss improvements in instrumentation and observational techniques. At most stages of its history, astronomy was intertwined with the demands of astrology and determination of times for religious worship. Instruments mentioned are: sundials, astrolabes, armillary spheres and celestial globes.

Astronomy in India proceeded somewhat in isolation. There was almost no influence from the Greek traditions and observations played a minor role. Its astronomy was advanced chiefly through mathematical contributions. On the other hand, the influence of Islamic astronomy was more widespread. While indebted to Greek, Persian and Indian sources, a significant feat was the progress in mathematical astronomy, particularly the computation of tables for planetary and lunar positions. Trigonometry and spherical astronomy also made considerable improvements. The riches of this work came to Europe through Spain where it was to have its effects noticed up to about 1500.

Throughout the middle ages, progress in many areas was slow and patchy in the beginning. Centres of monastic learning helped to preserve some continuity in transmitting knowledge. Later, as matters improved, astronomy gained a foothold in the curricula of universities. This formed the foundation for the next vital stage – The Astronomy of the Renaissance.

Astronomy in this era forms around four main figures. Regiomontanus, Copernicus, Tycho Brahe and Johannes Kepler. This chapter becomes analytical in its description of now the Ptolemaic conception of planetary motions slowly lost its grip on patterns of thinking in this regard. Regiomontanus realised that observational methods and instruments needed considerable improvements and made further contributions to trigonometry and spherical astronomy. Tycho Brahe's vast observational records became the basis of Kepler's research and the famous three laws of planetary motion. From here and on in to the Renaissance, improvements were made in the domain of instrumentation – this being driven by the long-standing problem of determining longitude at sea, which had to wait until the construction of an accurate chronometer. Navigational instruments experienced rapid improvements during this time.

The later part of the text deals with astronomical traditions in the Chinese, Japanese and Korean cultures and some developments from the Americas and Africa. Here the astronomical thinking is closely linked to the internal culture and customs of the peoples concerned.

The concluding chapter mentions an unexpected aspect: - the use of ancient observations in modern investigations. This was particularly interesting as I had previously read of discrepancies in the times of lunar eclipses as calculated by present methods and those times as noted by the ancients. We have learnt that this was largely due to the secular acceleration of the moon.

In conclusion, the reader cannot help but marvel at not only what investigators were able to find out about astronomy before the telescope, but also at the accuracy with which this was done, considering the limited resources that were available to them by our standards. This is undoubtedly the spirit of Patrick Moore's introductory comment!