

## Reviews

*Gods in the Sky. Astronomy, Religion and Culture from the Ancients to the Renaissance* by Allan Chapman. (London: Channel 4 Books, Pan Macmillan Ltd. 2002), ix + 342 pp., 240 × 155 mm, £18.99.

The author of *Gods in the Sky*, Dr Allan Chapman of Oxford, is an academic historian, well known for his researches in the history of astronomy. The historian's approach is central to the present book, which traces humankind's view of the cosmos from earliest times to the beginnings of modern science. It treats the subject in the context of general cultural developments at each stage, including quite particularly religious ideas and beliefs. It is Dr Chapman's basic premise, outlined in the first chapter, that the rise of monotheism – the belief in one rational, all-powerful Creator of the universe as held in the three great traditions of Judaism, Christianity and Islam – played a pivotal part in the foundation of modern science. He challenges the widely-held notions that science and religion are incompatible, or that in the past the Church was the enemy of scientific progress. He shows that the Middle Ages in Christian Europe were far from 'dark', and describes how centres of learning flourished in northern as well as Mediterranean countries.

The chapters that follow get down to copious historical details, beginning with the ancient civilisations of the Near East two or three millennia BC. These peoples acquired a considerable knowledge of astronomy, constructing calendars, and predicting eclipses, but these activities were carried out purely for the regulation of civil and religious life. The world of human beings was seen as subject to numerous capricious gods who inhabited a cosmos of the vaguest mythological origin. An exception to this primitive cosmology came from the Jews who in the first millennium BC developed their belief in a unique God who created the heavens and Earth from nothing. The story of the Creation in the book of Genesis, "one of the world's most far-reaching and influential narratives", was put on record in the sixth or seventh century BC. The same one God the Creator was carried through in the Old Testament to Christianity. It was also to be fundamental to the faith of Islam, founded in the seventh century AD. Dr Chapman finds it significant that these civilisations from which modern astronomy – and science generally – were to evolve would have in common a belief in one personal Creator God.

The cosmos of the Greeks in their great age of learning (beginning in the sixth century BC) did not include a Creator but was governed by principles of logic and mathematics which were absorbed by their monotheist successors. The Arab world was the principal inheritor of Greek science. Indeed, Arab astronomy, which began as early as the second century AD, was responsible for the longest and most detailed runs of celestial observations of all time, the era AD 900 to AD 1200 being its Golden Age. The fate of astronomy in Europe in the same period was more complex. Popular accounts of the history of science tend to skip from Ptolemy (second century AD) to Copernicus – well over a millennium – in one great leap.<sup>1</sup> Dr Chapman fills in this important interval. Though there was little research, practical astronomy, in the service of the Church, was never neglected. The Council of Nicea in AD 325 fixed the date of the equinox, important for the determination of the date of Easter. Within a few centuries the date had slipped again, and in AD 664 was corrected at the Synod of Whitby in Yorkshire, England. Education was fostered, monasteries flourished, and schools associated with Cathedrals were instituted. The great universities of Paris, Oxford, and Bologna were founded early in the new millennium. All used Latin as the common language, which encouraged the free movement of scholars and of ideas throughout Europe.

The twelfth and thirteenth centuries saw an amazing revival of European learning. The Crusades (c. AD 1100), aggressive though they were, had a beneficial effect on the conquerors, who were thus exposed to Arab culture and learning. Spanish Knights captured the city of Toledo with its magnificent library of Arabic books and of Arabic versions of Greek texts which were now re-translated into Latin and re-introduced to Christian scholars. In the field of science, the Greek and Christian traditions thus brought together appeared at first to be at odds: the Greek cosmos was ruled by a non-personal "first cause" and "prime mover", and was deemed eternal; the Jewish-Christian cosmos was created by God and had a beginning. Great minds endeavoured to reconcile these positions and succeeded in having Aristotle's works accepted as

orthodox in the university curriculum. In the course of time, however, Aristotle's physics with its distinction between terrestrial and celestial matter, and Ptolemy's strict epicycles and crystal spheres, were to be challenged and eventually abandoned. Several factors contributed to this - the great fifteenth century sea voyages of exploration which fostered technology in navigation, geography and geophysics, the invention of printing (the "internet" of the day, as Dr Chapman aptly calls it), the re-discovery of original Greek material through refugee Byzantine scholars from the Ottoman Empire (1543), and to some extent the Protestant Reformation.

It was in the wake of these events that the scientific giants - Copernicus, Tycho Brahe, Kepler, and Galileo - carried out the labours that transformed astronomers' - and humankind's - view of the universe. Copernicus' theory of the Sun-centred solar system (though worked out years earlier) was published when he was on his deathbed (1543). Galileo's championing of that theory gave rise to his famous clash with the Inquisition in 1633 (an episode now candidly regretted by the Catholic Church). Dr Chapman's exposition of the ambiguous status of the Copernican theory at that period, and of the peculiar circumstances of the Galileo affair, provides informed enlightenment of a story that has been prone to bias, if not deliberate distortion, notably by the agnostic movement of the late nineteenth century.

The book ends with a brief look at the development of cosmology from that time until the present, and a recapitulation of the original proposition - that the emergence of a scientific picture of the universe is a result of the fusing of Greek modes of logical thought with monotheism or belief in one Creator God. It is certainly the case that the scientists responsible were all monotheists. The question is whether that revolution could have occurred otherwise. Dr Chapman argues powerfully that it could not; that the belief in a God who designed the universe was what motivated rational human beings, deemed to be created in His image, to observe and to endeavour to understand it. Contrary to popular notions, the scientific revolution of the sixteenth and seventeenth centuries did not represent a revolt against religious belief but against dogmatic classical philosophy. In fact, Church scholars, in late medieval times, had been the first to question that philosophy. On the general question of the relation between science and religion, Dr Chapman provides much food for thought. He counters the modern myth that would present science as "true" and "unprejudiced" by reminding us that science itself is not nature, but rather "a system of investigation which aspires to explore nature's inner logic, but which is itself invented and managed by fallible men and women". Both science and religion are branches of intellectual activity which are not fundamentally antagonistic to each other. He cites the traditional participation of the Catholic Church in scientific research, which is much to the fore in the present day; and the active academic collaboration growing up between modern scientists and theologians. (An example of the latter is the conference of distinguished scholars from Christian, Jewish and Islamic backgrounds held at the Pascal Centre for Advanced Studies in Faith and Science in 1998 whose published proceedings were reviewed in the last number of this journal.)<sup>2</sup> The book, for all that, is by no means entirely metaphysical. It can be read quite straightforwardly as a fascinating and instructive history of the development of cosmology from earliest times until the Copernican revolution. It is written in the author's highly readable jargon-free style, and contains much unexpected information, not encountered in the usual histories - from Egyptian mythologies, Islamic observatories, Gothic architecture, the medieval universities, to experimental physics in England in the Elizabethan age.

There is an excellent bibliography, divided into historical periods; and readers who as a result of Dr Chapman's analysis wish to delve further into, say, medieval science, will find expert "further reading" lists there. The book is well produced, with a set of interesting colour illustrations and some black and white drawings, and is very reasonably priced.

## References

- 1 E. Theodossiou *et al.*, 2002. From Pythagoreans to Kepler: the dispute between the geocentric and the heliocentric systems. *Journal of Astronomical History and Heritage* 5(1):89-98. This excellent account, devoted specifically to the progress of astronomy, says: "The original Ptolemaic geocentric system remained unaltered and largely undisputed for more than fourteen centuries".
- 2 Clive Davenhall. 2002. Review of J.H.Brooke, M.J.Ostler and J.M. van der Meer (eds.) 2001. *Science in Theistic Contexts: Cognitive Dimensions*. *Journal of Astronomical History and Heritage* 5(1):100-101