

## Slide notes

- 1 First computer
- 2 Before there were clocks, ancient people noticed familiar patterns of stars were cyclical and were associated with the seasons. The astrolabe works on that principle. The night sky at a location is drawn on a flat surface for the whole year. When you match the pattern you have the time with greater precision. (Show planisphere and how it works)
- 3 The origins of the astrolabe were in classical Greece. Apollonius (ca. 225 BC), the great codifier of conic sections, probably studied the astrolabe projection. Now imagine that you wanted to take the three-dimensional celestial sphere and project it onto a flat, two-dimensional surface. This was the fundamental problem that confronted scholars like Hipparchus, who was born in Nicaea in 180 B.C. The Greek astronomer was able to construct a map by imagining a perpendicular line connecting each star to a point on a plane corresponding to the plane of the Earth's equator.
- 4 The astrolabe was introduced to the Islamic world the mid-eighth century. The astrolabe was fully developed during the early centuries of Islam. Arab treatises on the astrolabe were published in the ninth century and indicate a long familiarity with the instrument (the oldest existing instruments are Arabic from the tenth century, and there are nearly 40 instruments from the 11th and 12th centuries).
- 5 The astrolabe moved with Islam through North Africa into Spain (al-Andalus) where it was introduced to European culture through Christian monasteries in northern Spain. It is likely that information about the astrolabe was available in Europe as early as the 11th century, but European usage was not widespread until the 13th and 14th centuries. The earliest astrolabes used in Europe were imported from Moslem Spain with Latin words engraved alongside the original Arabic. It is likely that European use of Arabic star

names was influenced by these imported astrolabes. By the end of the 12th century there were at least a half dozen competent astrolabe treatises in Latin, and there were hundreds available only a century later.

- 6 First technical manual in English was written by Chaucer in 1391
- 7 Claudius Ptolemy drew heavily from Hipparchus as he prepared his magnum opus, the "Almagest," and other books. In "Planisphaerium," published in 150 A.D., Ptolemy provides a complete description, almost certainly based on ideas from Hipparchus, of the mathematical techniques required to project points on the celestial sphere. The book seemed to be a handbook to construct a working instrument, but no evidence exists suggesting he actually built an astrolabe. He did, however, design and build the **armillary sphere**, a complex predecessor of the astrolabe.

The first authoritative account of what would become the modern, much-easier-to-use astrolabe came from Theon of Alexandria in 390 A.D. OK, so Theon didn't actually build an astrolabe, but historians think he did provide a full blueprint

- 8 The components of an astrolabe
- 9 Our Place in the Universe