Parsecstones in Astronomy - 1

J V Narlikar

In astronomy, as in the rest of the sciences, the path of progress towards the truth has not always been straight and narrow. It meanders with occasional wrong turnings. In this series of snippets we describe some of the significant developments, largely maintaining a chronological sequence.

Measurements of the Radius of the Earth

Erastosthenes of Cyrene (ca 276-195 B.C.) was nicknamed Pentathlos as well as Beta because of his expertise in several fields like, philosophy, literature, geometry, geography, astronomy , etc., in each of which he was second only to the best. At the relatively young age of forty he was appointed in-charge of the famous Alexandria Library. Amongst his astronomical exploits was one that began right at home. He used astronomy to measure the circumference of the earth.

By hindsight his method seems very simple. He found that at Syene the sun shone directly overhead (so as to be seen on the deep surface of a narrow well) while at the same time it was about 7.5° from the zenith at Alexandria located some 500 miles north on the same meridian. Thus he calculated that the distance of 500 miles produces an angle of 7.5° at the centre of the earth. So an angle of 360° would correspond to 24000 miles. His actual estimate was 24662 miles which falls short of the modern estimate of the earth's circumference by less than 200 miles.

In a highly perceptive passage Eratosthenes also conjectures : "If the extent of the Atlantic Ocean were not an obstacle, we might easily pass by sea from Iberia (Spain) to India, keeping in the same parallel."