

Asteroid Belt

Bode's Law

It was thought that the sequence of planets and distances had a pattern. Taking Mercury as 4 and adding 4 to the geometrical series 3, 6, 12, 24 etc gives the approximate distances of the planets unto Uranus. Beyond this the relationship breaks down and the sequence is probably a coincidence. However, if the sequence was valid it would predict a planet at 280 million miles from the Sun.

The search for such a planet resulted in the discovery of many small objects orbiting the Sun in a belt between Mars and Jupiter but no planet sized object. This became known as the asteroid belt. The first asteroids to be found were named Ceres, Pallas, Juno and Vesta. It is thought that the gravitational influence of Jupiter prevented a planet being formed.

Recently new definitions have been produced prompted by objects in the Kuiper Belt (to be discussed in another session) being found of similar size to the former planet Pluto. This led to the creating of a new class of objects which have been called Dwarf Planets. These are large enough for gravity to have caused them to be near spherical but they have not cleared their orbits of other orbiting objects. This new definition promoted Ceres to the category of Dwarf Planet. The other objects orbiting in the asteroid belt are being called Small Solar System Objects or SSSOs. I think this is due to the distinction between asteroids and comets being less clear than was once thought.

Since 1947 no year has passed without at least one new asteroid being found. By 2010 130,000 have been found. Despite this, the combined mass of the asteroids is less than the mass of the Earth. Ceres accounts for 32% of the mass of the asteroids. Ceres plus the combined mass of the three most massive SSSOs (Vesta, Pallas and Hygiea) account for 52% of the total asteroid mass.

Not all the asteroids orbit in the asteroid belt. Those that do not have been classified as follows:-

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| Vulcanoids | Orbit closer to the Sun than Mercury. These are theoretical objects as none have been found yet. |
| Atens | Mean distance from the Sun is less than one astronomical unit |
| Apollos | Mean distance from Sun is more than one astronomical unit, but their orbits do cross Earth's orbit. |
| Amors | Cross the orbit of Mars but not that of Earth. |
| Trojans | Move in same orbit as a planet approx 60 degrees ahead or behind the planet. Jupiter has lots, Mars and Neptune have several. |
| Damocloids | Wanderers. Move between inner and outer parts of the Solar System. |
| Centaur | Perihelia greater than that of Jupiter but less than that of Neptune. |
| Composition | Three types. Carbonaceous, Silicaceous and Metallic (nickel/iron) |