

## Offered Title: Hairy Stars

Humans have had a love-hate relationship with them since we could grunt and point to the sky. Some of the earliest writings describing them come from 1200 B.C.E. China. Scary, maybe even more so than a total solar eclipse, the specter of a bright comet seems to have engendered fear often. I suppose this ghostly apparition with two tails, when bright, would set one's imagination spinning. Magical thinking humans came up with meanings, usually dark and foreboding.

Comets are just extended family members of our solar system. Now that we know about them they aren't so scary, well, except if one is on a collision course with us!

Comets (originally from Greek, meaning hairy star) are small objects, made up of ices, dust, and rocks, (dirty snowballs) orbiting the Sun. The ices consist of water, carbon dioxide, carbon monoxide, methane, and ammonia. Other components of comets include various hydrocarbons, and amino acids. Some findings indicate when combined, cometary and meteorite amino acids might be sufficient to form RNA or DNA. Of course, it's a big stretch from might to actually happening.

When a comet's orbit takes it to the inner solar system, the Sun's radiation causes outgassing as ices melt and sublimate, forming an atmosphere called the coma. The coma is mostly water vapor, but includes other gases, and dust. Solar radiation pressure also drives this atmosphere away from the comet, forming two tails. Dust trails behind the comet and might form a long arching tail. Ionized gases, being lighter, point directly away from the Sun, under the influence of solar radiation.

If you were around in the 1990's you might have seen comets Hyakutake (1996) and Hale-Bopp (1997). Both were spectacular naked eye sights. They were impressive even from my light polluted Houston back yard.

I mentioned the scary thought of a comet heading for us. Comet Shoemaker-Levy 9 broke up and slammed into Jupiter in July 1994. Its effects were visible for weeks. If it were the Earth?

The extended family I mention are the Kuiper belt/Scattered Disc and the Oort cloud. The Kuiper belt, known to harbor dwarf planets, has been in the news lately as possibly containing our solar systems 9<sup>th</sup> planet, a Neptune sized beast. This belt lies outside the orbit of Neptune, around 30 Astronomical Units (1 AU = 93,000,000 miles) and extends to 50 AU. The Scattered Disc is a population of objects with more eccentric orbits that crisscross and go beyond the Kuiper Belt. The Oort cloud is a theoretical spherical stronghold of comets and who knows what else. It appears to begin around 2,000 AU from the Sun and extends to possibly 100,000 AU.

How do we know comets come from these places? Very dedicated scientists studying comets orbital/vector dynamics.

More recently comets have been found in the asteroid belt between Mars and Jupiter.

## What's in the Sky?

July 28; dusk; southwest: A waxing crescent Moon and Jupiter get close.