



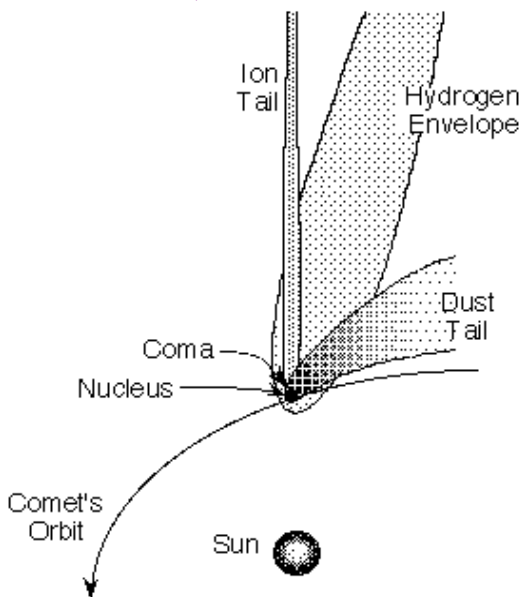
# TWO-TAILED COMET

(Left) “1997 April 4, great-comet Hale-Bopp was producing about 200 tonnes per second in both gas and dust [composing its stunning tail]”. Photo by Malcolm Ellis, Bury, England. **Ancestral Puebloans and Mimbrenos in the ancient American Southwest also noted 2-tailed comets of their day, disguised as simple geometrics on painted bowls we can scarcely read or credit.**



“The picture above shows the two tails of comet Hale-Bopp clearly separated in the plane of the sky. The distinctive blue color, straight and rayed appearance of the ion tail can be seen (zoom the picture if the rays are not obvious). The blue color results primarily from the CO<sup>+</sup> ion, which is here swept into a tail by the solar wind. Hale-Bopp released CO in copious amounts: about 20 - 30% of the gas released was CO (most of the rest was water). The dust tail is white, diffuse and curved. It consists of small dust grains pushed back from the nucleus and coma by solar radiation pressure. Typical dust grains have sizes of about a micron (0.001 mm). At the time this picture was taken (1997 April 4), Hale-Bopp was producing about 200 tonnes per second in both gas and dust.” “The comets are ice-rich bodies that become prominent when heat from the sun causes their trapped volatiles to sublimate. The most visible and distinctive features of comets are the coma and tail. However, most of the mass of a comet is contained within a comparatively tiny central nucleus, and it is this body that is of the highest scientific interest because of its likely identity as a planetesimal from the outer regions of the solar nebula.”

(David Jewitt, [www.ifa.hawaii.edu](http://www.ifa.hawaii.edu))



Additional research papers by S. Bradford are available at [www.comets-petroglyphs-and-supernovae.com](http://www.comets-petroglyphs-and-supernovae.com)



## Components of Comets

When a comet gets close enough to the Sun, it changes into something more spectacular. The picture far left shows the parts of a comet that form when the cold “dirty iceberg” is warmed up by the Sun. The *ion tail* extends away from the sun while the heavier *dust tail* is slower and sometimes curves on this perihelion journey.

Picture by David Doody, JPL, [astronomynotes.com](http://astronomynotes.com).