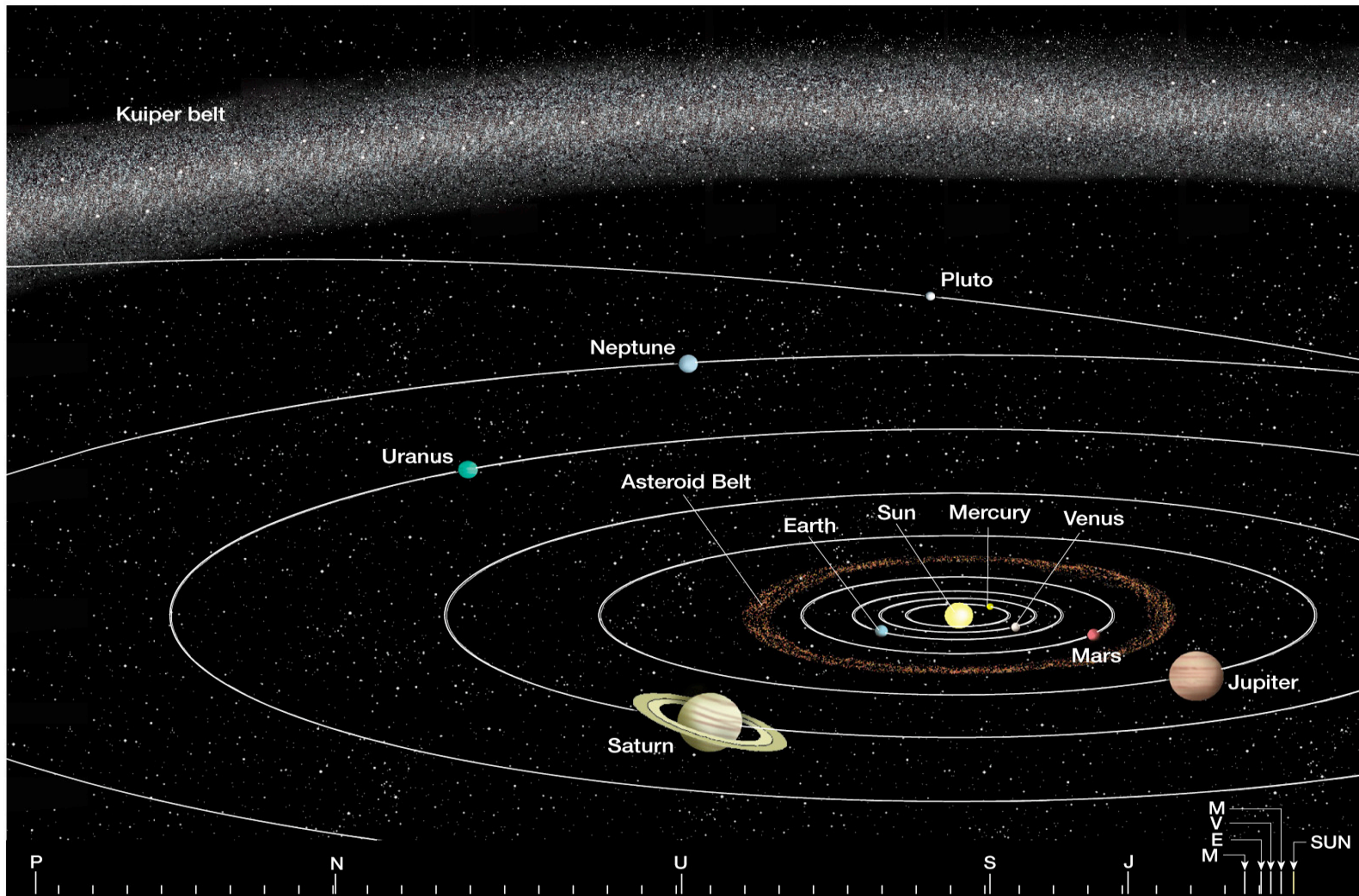




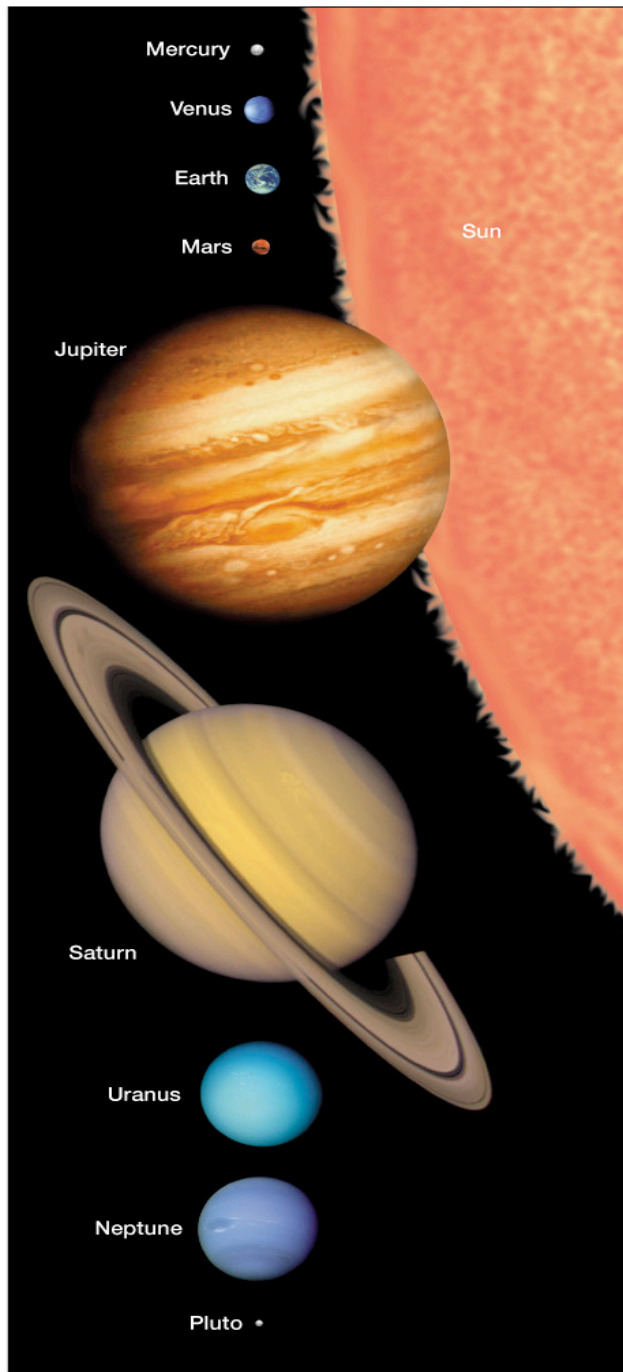
Planetary Geology

■ Solar system includes

- Sun, Nine planets, Moons, Asteroids, Comets And Meteoroids



The planets drawn to scale



■ Two groups of planets occur in the solar system

- **Terrestrial (Earth-like) planets**
 - Mercury through Mars
 - Small, dense planets
 - Rocky surface
- **Jovian (Jupiter-like) planets**
 - Jupiter through Neptune
 - Large, low density, gaseous
 - Massive
 - Thick atmospheres composed of hydrogen, helium, methane, and ammonia
 - Several Moons
- Pluto not included in either group

Sun (5')...Earth = grape (500')...Pluto = 4 miles

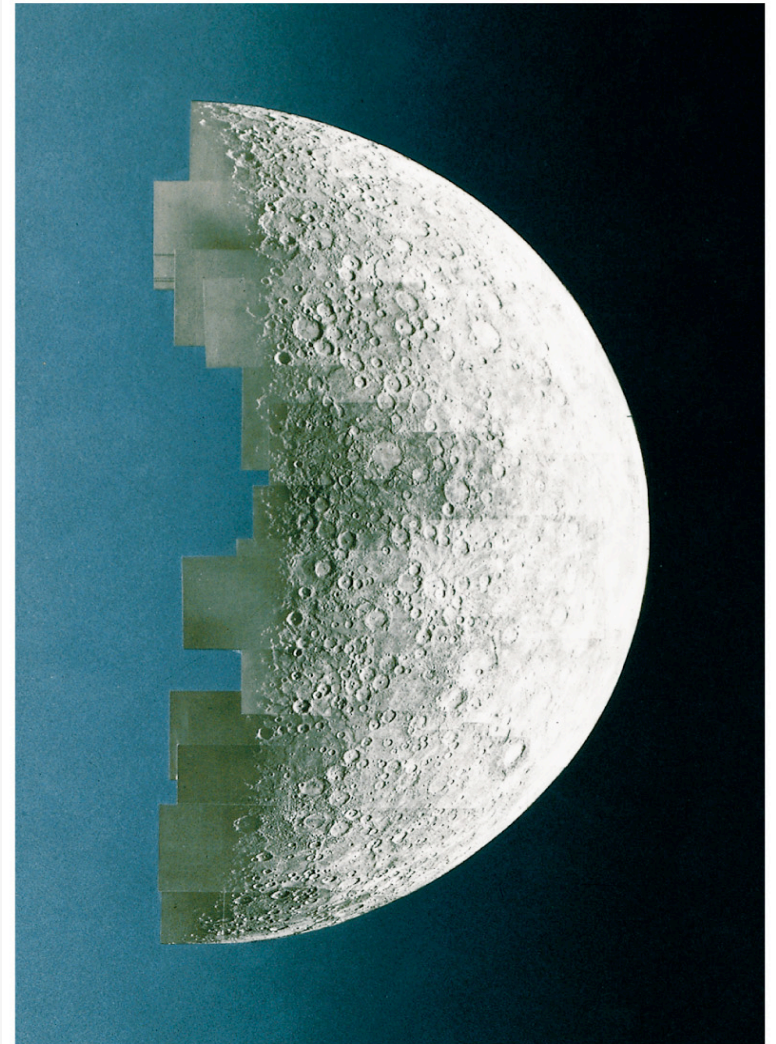
Evolution of the planets

- **Nebular hypothesis**
 - **Planets formed a long time ago**
 - **Condensing from a gaseous nebula**
- **As the planets formed, the materials that compose them separated**
 - **Dense metallic elements (iron and nickel) sank toward their centers**

Planets: A brief tour

■ Mercury

- **Innermost planet**
- **Second smallest planet**
- **No atmosphere**
- **Cratered highlands**
- **Vast, smooth terrains**
- **Very dense**
- **Similar to our moon**



Planets: A brief tour

■ Venus

- **Similar to Earth in**
 - Size
 - Density
- **Shrouded in thick clouds**
 - Atmosphere is 97% carbon dioxide
 - Surface atmospheric pressure is 90 times that of Earth's
 - Covered with Volcanoes and some craters



Our Earth and Moon

✧ General characteristics of our moon

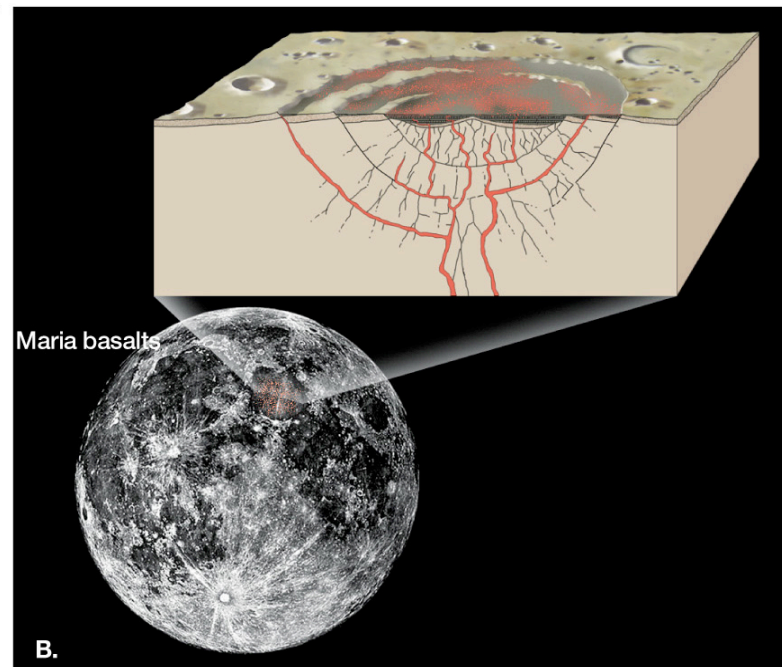
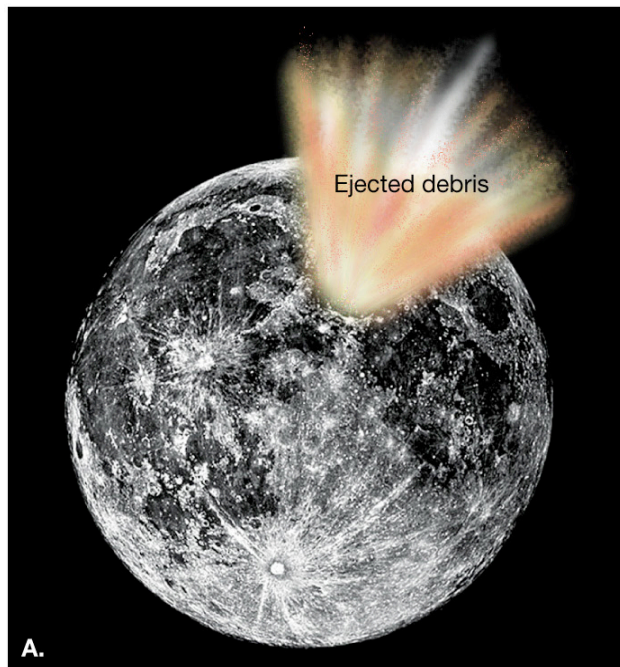
- **Diameter of 2150 miles:unusually large compared to its parent planet**
- **No atmosphere**
- **Bombarded by meteorites**
- **Rocks similar to Earth**



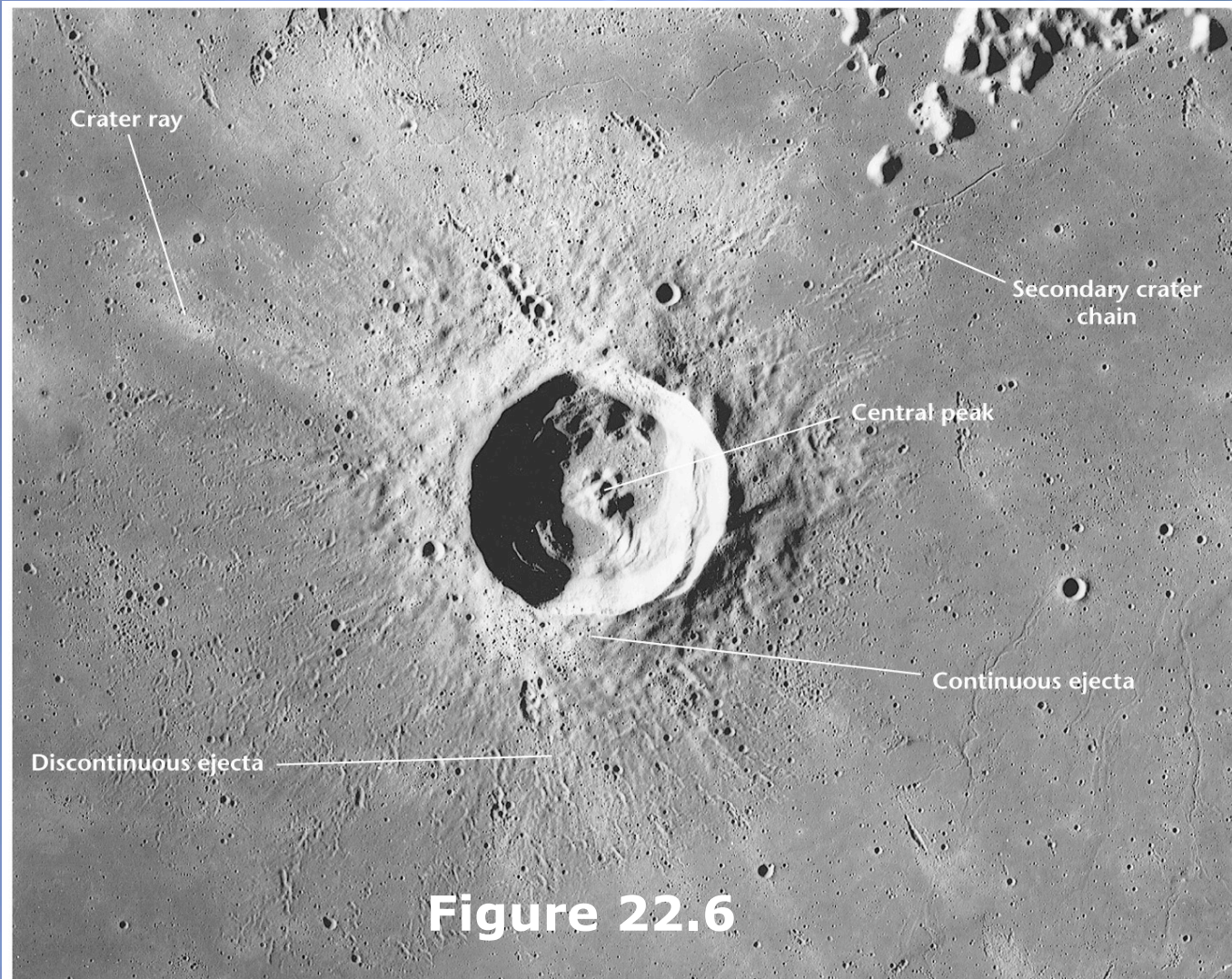
The Moon's Surface

■ Lunar surface

- Three types of terrain
 - **Maria**-- Latin for "sea"-lava
 - **Craters**- Impact features from meteorites
 - **Ejecta**-- light colored spray



A 20-km-wide crater on the Moon



Origin of our Moon

❖ Lunar history--2 Theories

- Capture Theory--Too Large
- Collision Theory--Very Similar Rocks



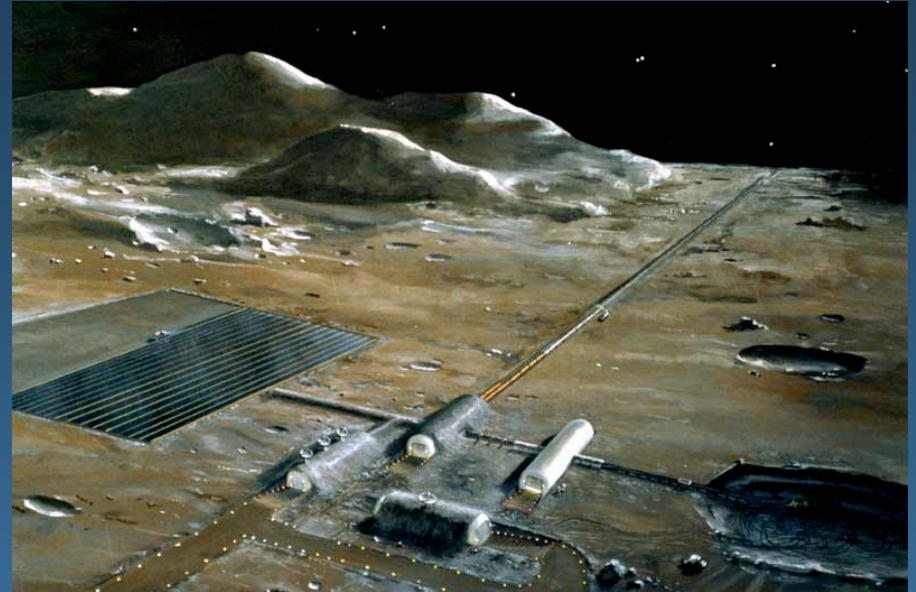
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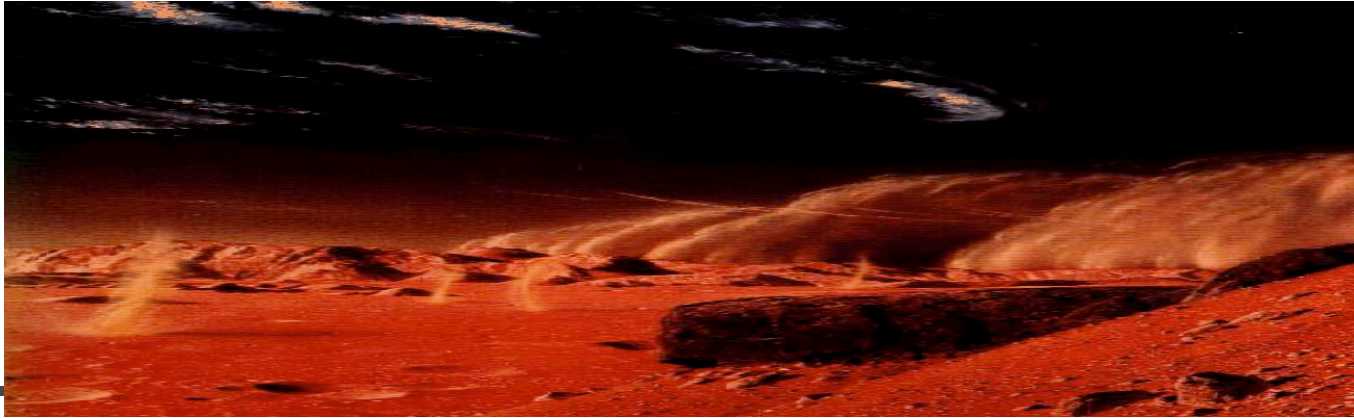
Importance of Moon

- **Exploration Base**
 - **Lunar Ice**



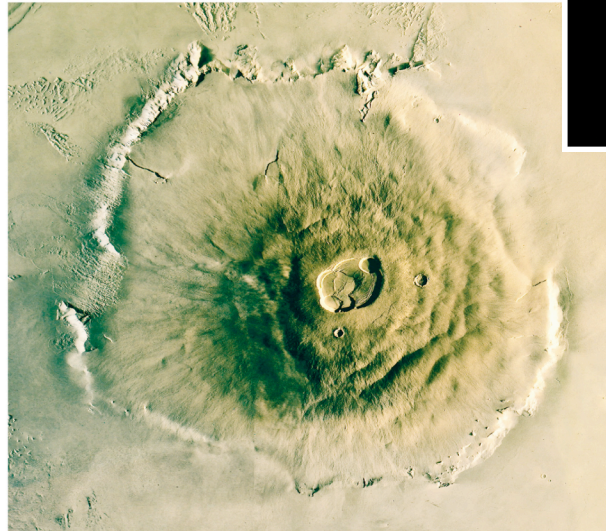
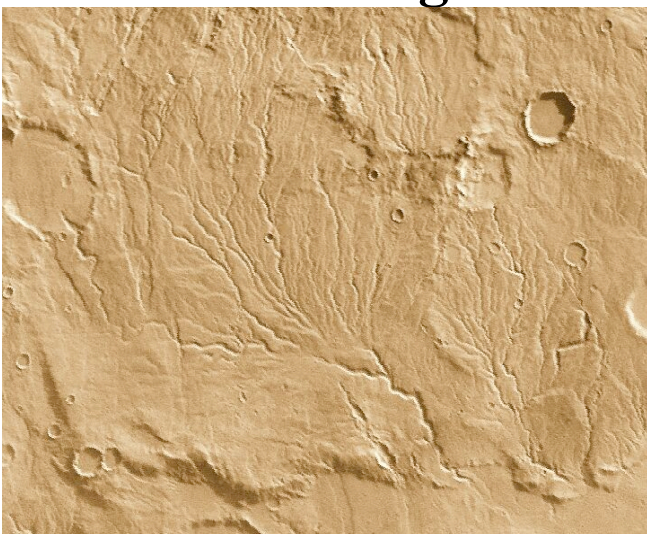
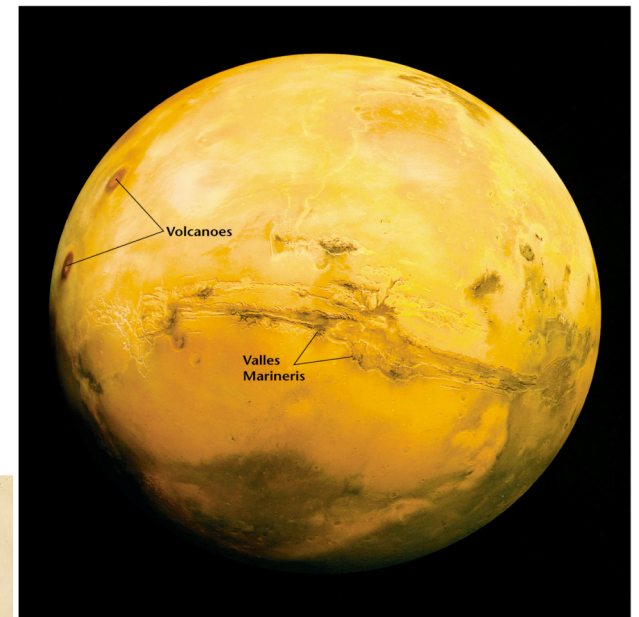
- **Moon controls**
 - **Ocean Tides**
 - **Rotation Speed of Earth**
 - **Tilt of Earth, 23 degrees**



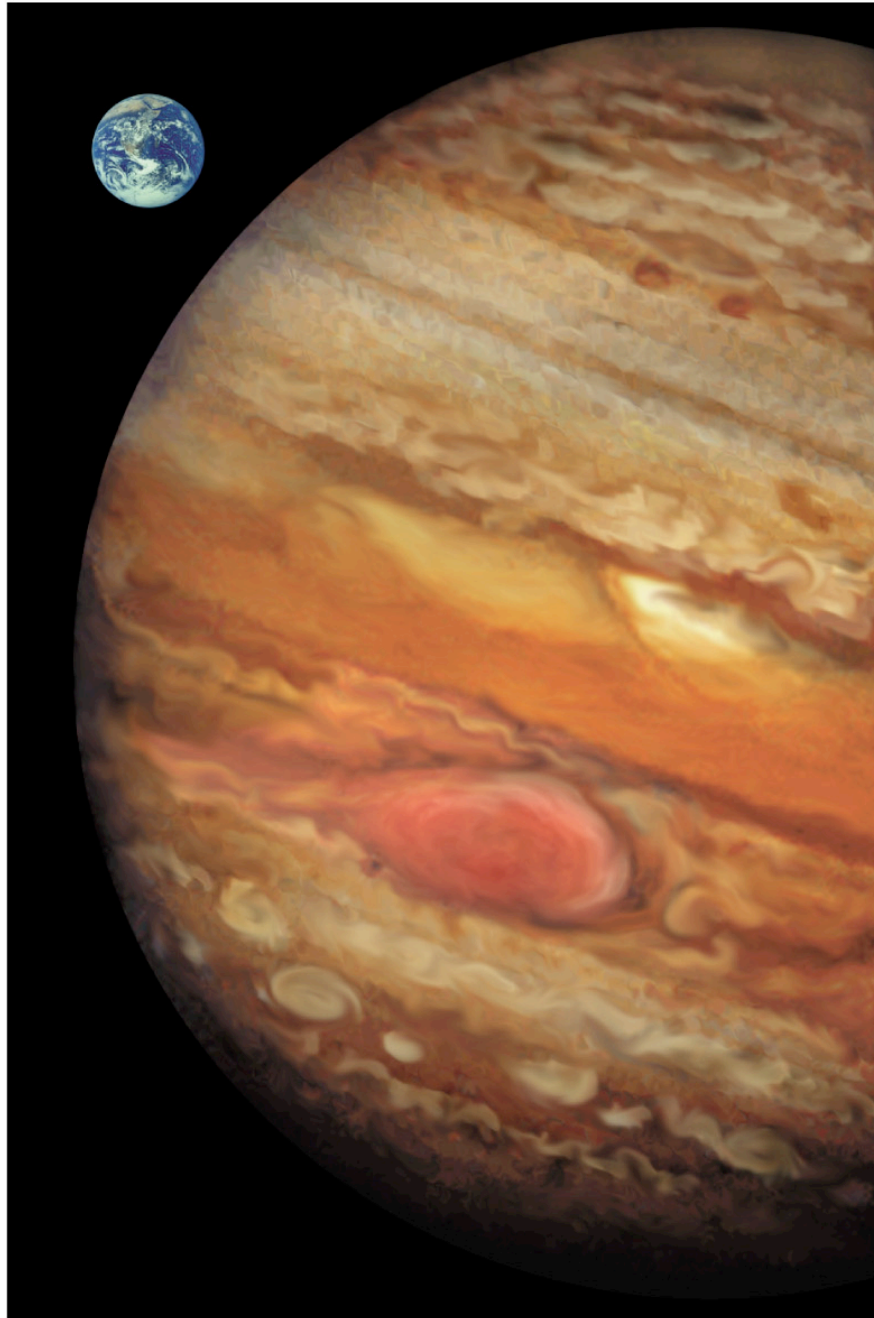


■ Mars

- **Called the rocky "Red Planet"**
- **Thin CO₂ Atmosphere (1% Earth's)**
- **Large Volcanoes and Canyons**
- **Drainage Patterns--Water?**

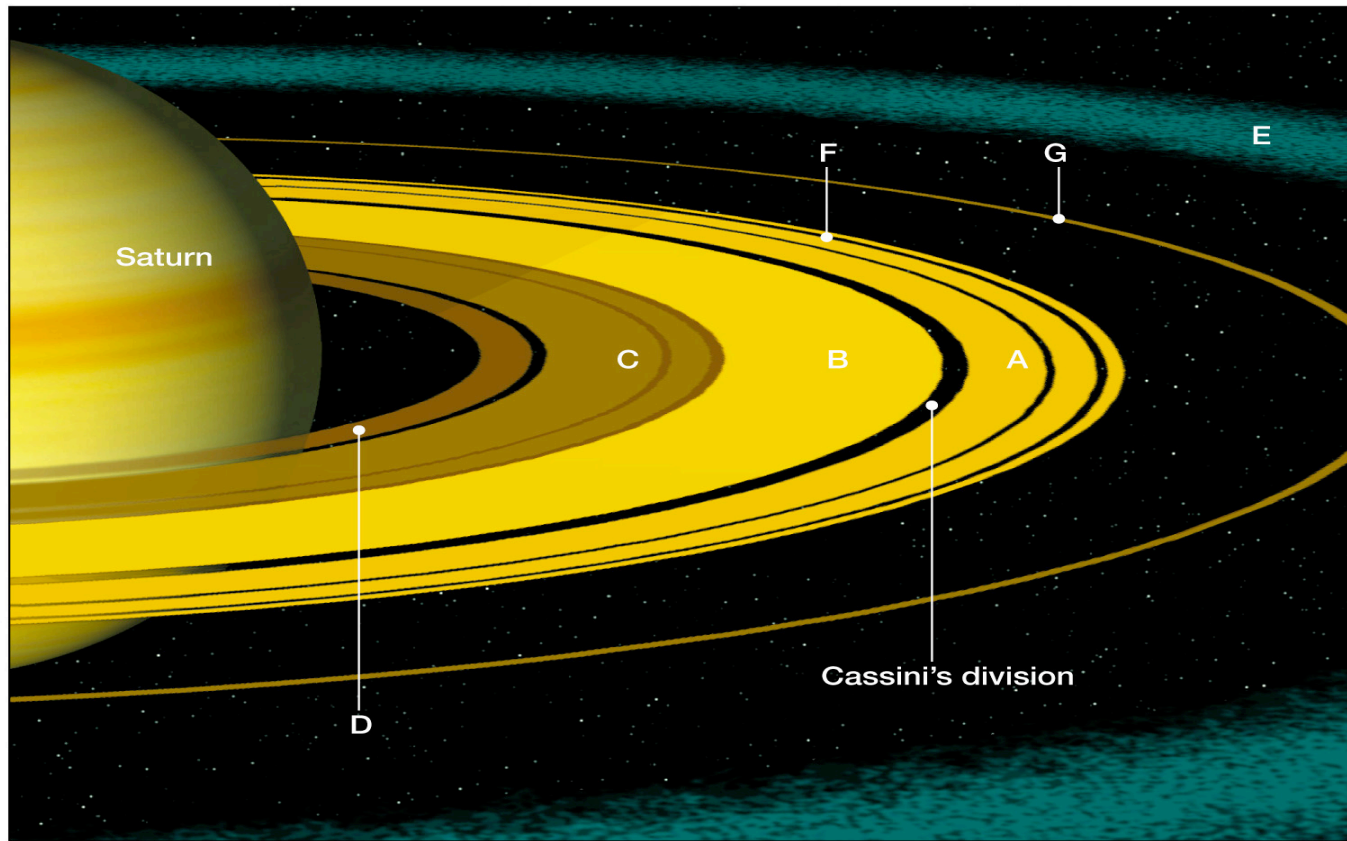


Mt Olympus



■ Jupiter

- **Largest planet**
- **Rapid rotation**
- **Banded Appearance**
- **Giant Red Spot**
- **Atm Storms**
- **Gaseous-Liquid Hydrogen**



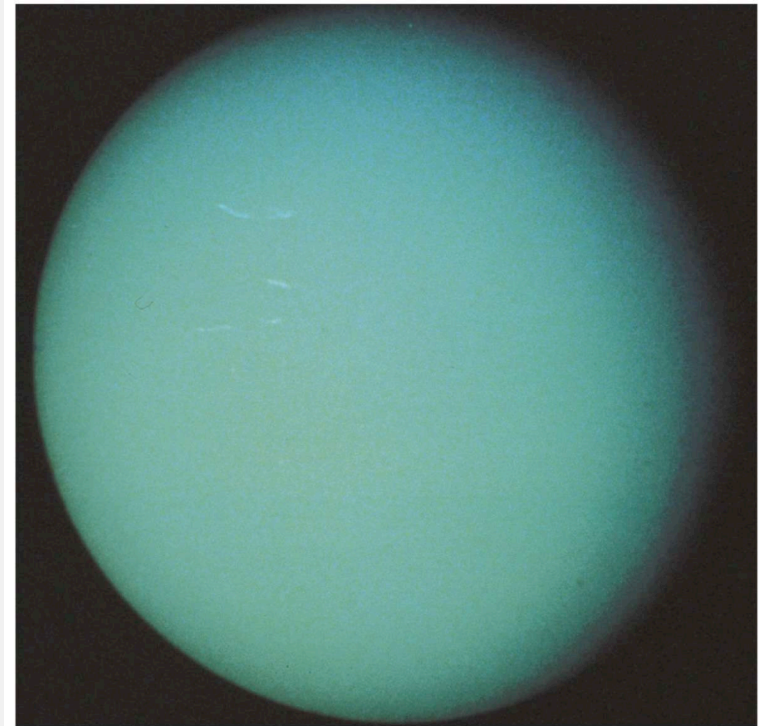
■ Saturn

- **Similar to Jupiter--Gaseous**
- **Rings of rock debris**
- **30 moons**
- **Would Float in Giant Lake**

Planets: A brief tour

■ **Uranus**

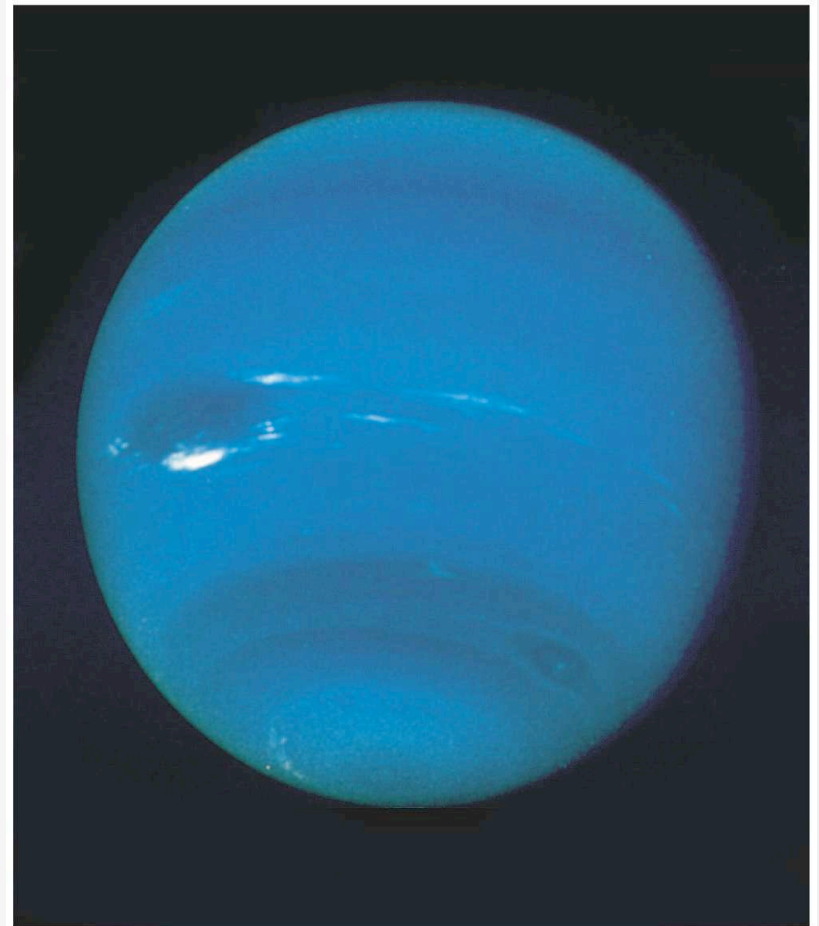
- **Icy Planet**
- **Rotates "on its side"**
- **Small Rings**
- **Several large moons**



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Planets: A brief tour

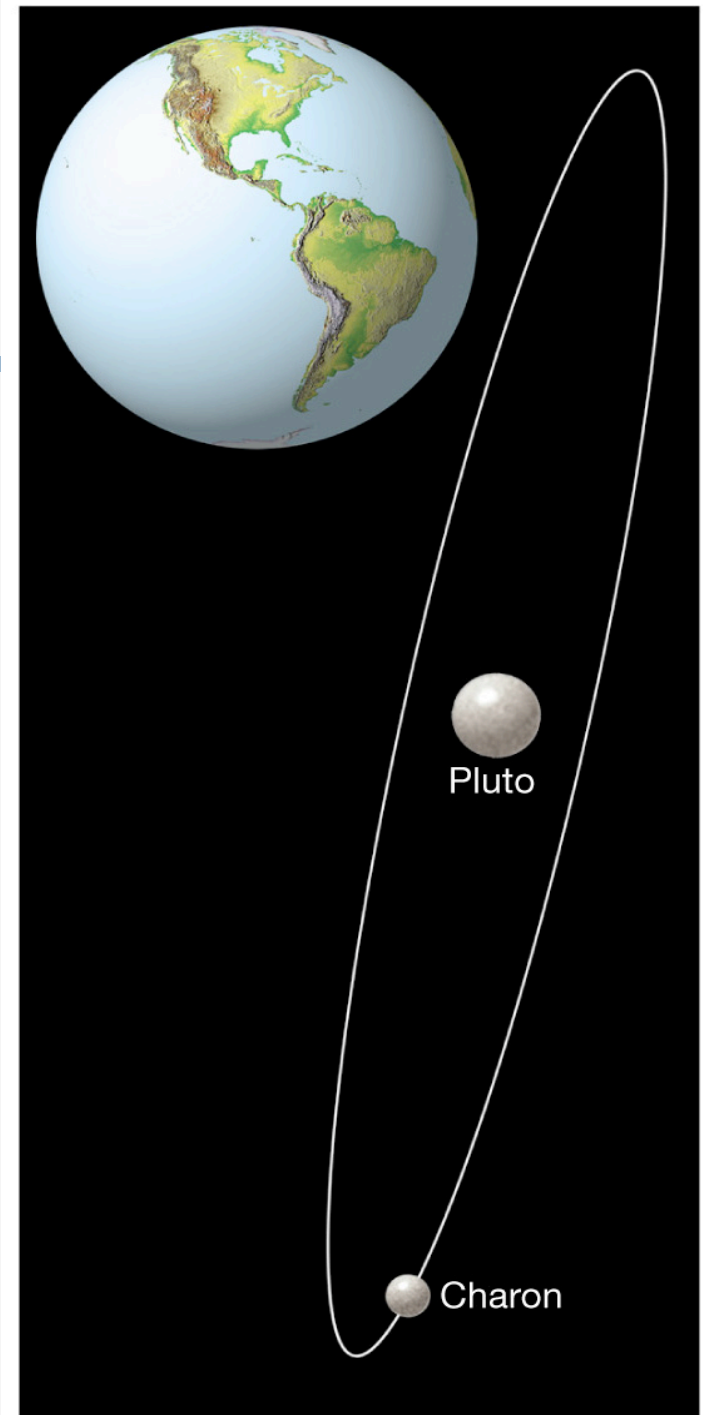
- **Neptune**
 - **Icy Gases**
 - **Dynamic atmosphere**
 - **One of the windiest places in the solar system**
 - **Great Dark Spot**
 - **Eight moons**



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■ Pluto

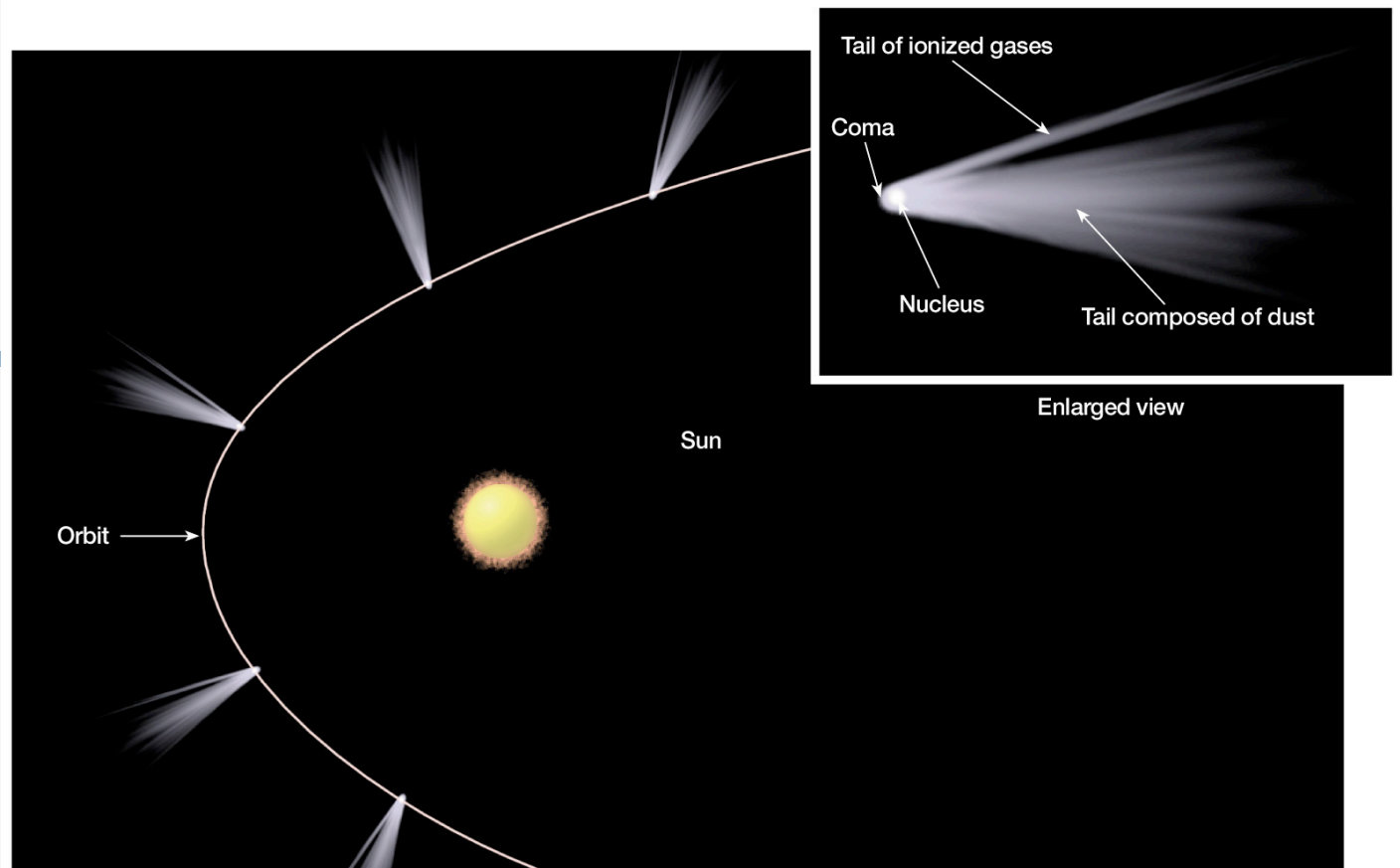
- **Not visible with the unaided eye**
- **Discovered in 1930**
- **Average temperature is -210°C**
- **Sun looks like bright star**



■ Comets

- **Origin**

- **Not well known**
- **Form at great distance from the Sun**
- **Dirty Snowballs--rock debris and ice**
- **Most famous short-period comet is Halley's**
 - **76-year orbital period**



Comet Hale-Bopp

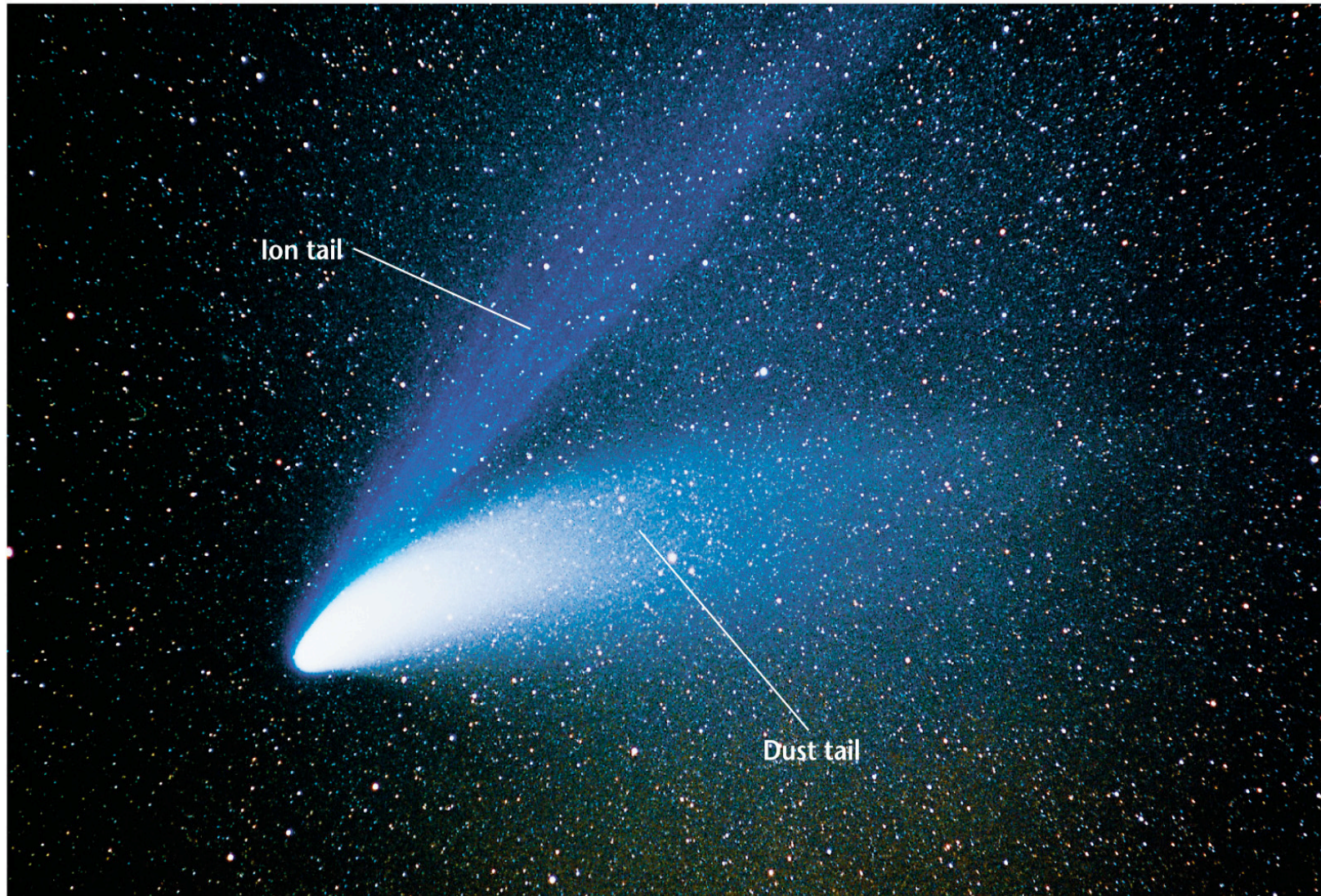
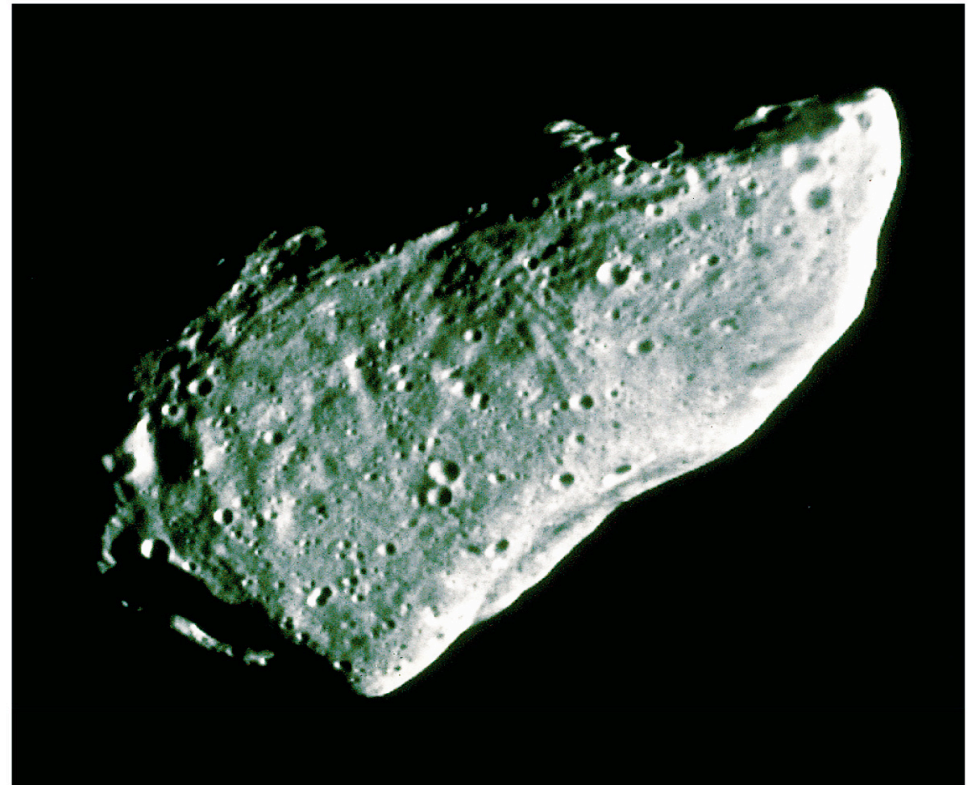


Figure 22.27

Other members of the solar system

■ Asteroids--Asteroid Belt

- Most lie between Mars and Jupiter
- Irregular sizes
- Origins are uncertain

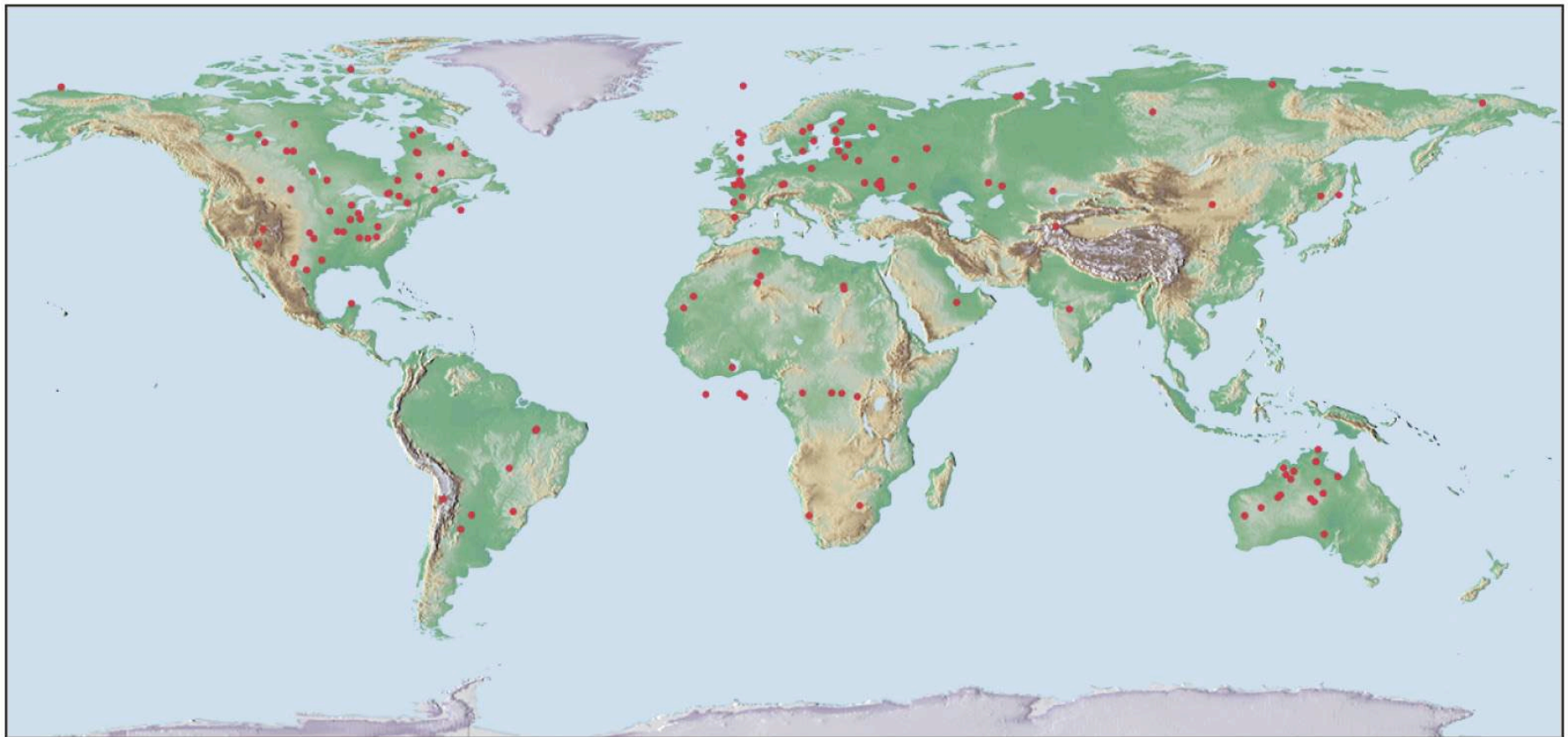


Other members of the solar system

✧ Meteorites

- Meteoroids are referred to as meteorites when they are found on Earth
- Types of meteorites classified by their composition
 - Irons--6%
 - Mostly iron
 - 5-20% nickel
 - Stony meteorites--93%
 - Silicate minerals with Inclusions of other minerals
 - Stony-irons -1%-- mix of irons and stony meteorites

Crater Locations



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Canada's Ancient Crater Ring

