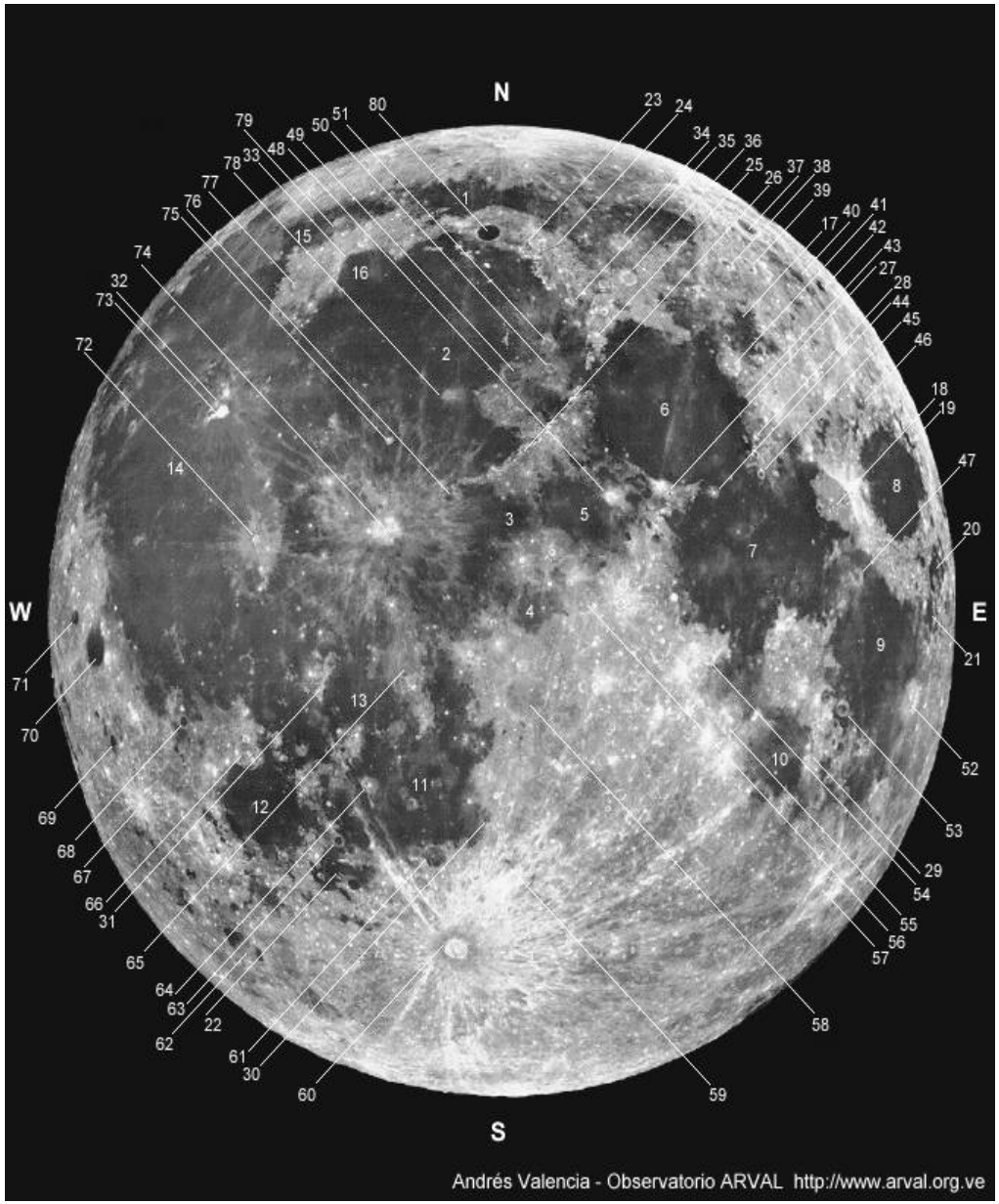
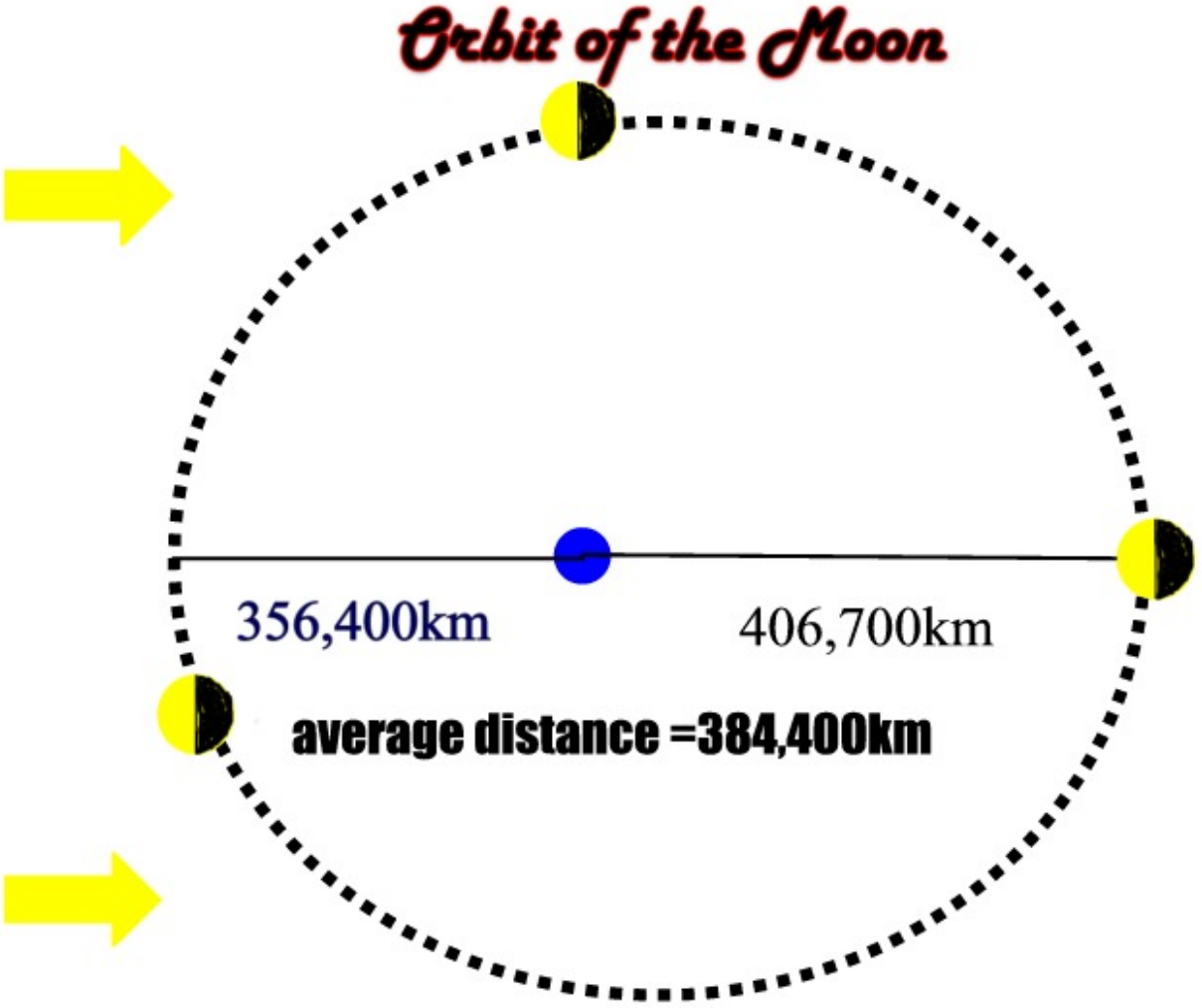
The Moon

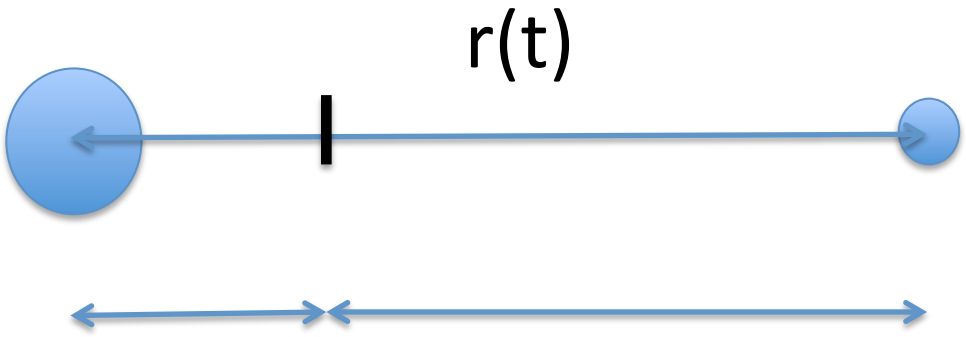
- Radius=1737 km (0.27 that of Earth)
- Mass = 7.34E+22 kg (0.012 that of Earth)
- “Man-in-the-Moon” features to be discussed
- No sign of atmosphere

The Moon


N
S
W
E
Andrés Valencia - Observatorio ARVAL http://www.arval.org.ve

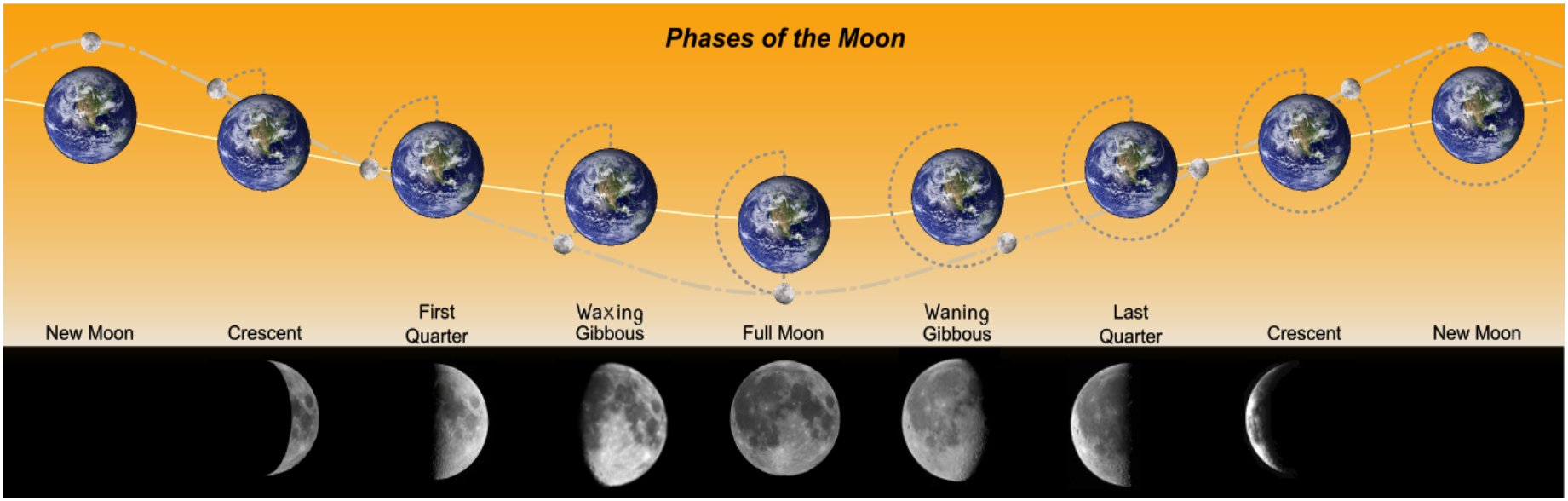

Orbit of the Moon
356,400km
406,700km
average distance =384,400km

Two body problem and the center of mass

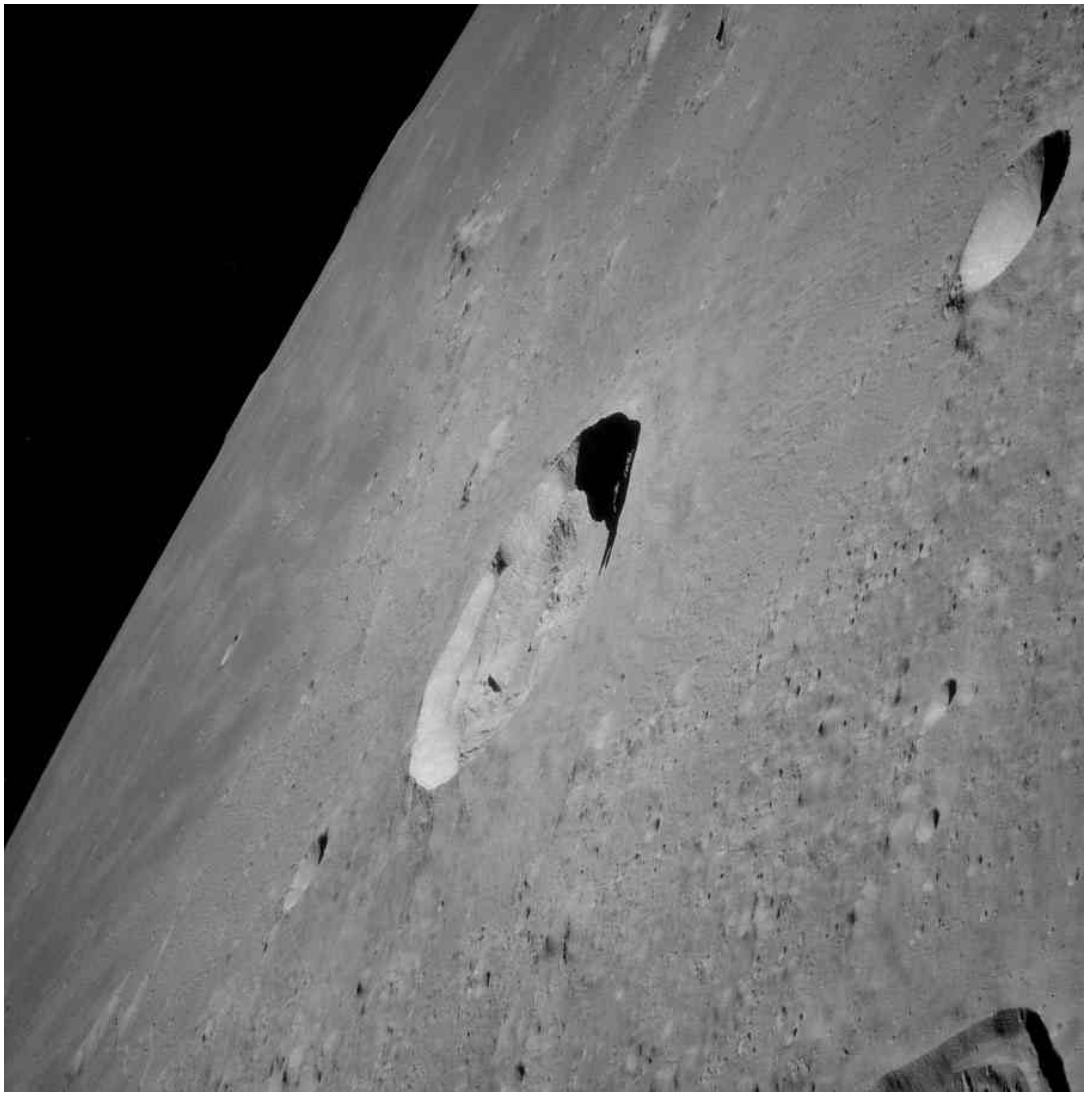


$$r_1 = \left(\frac{m}{M+m}\right) r \qquad r_2 = \left(\frac{M}{M+m}\right) r$$

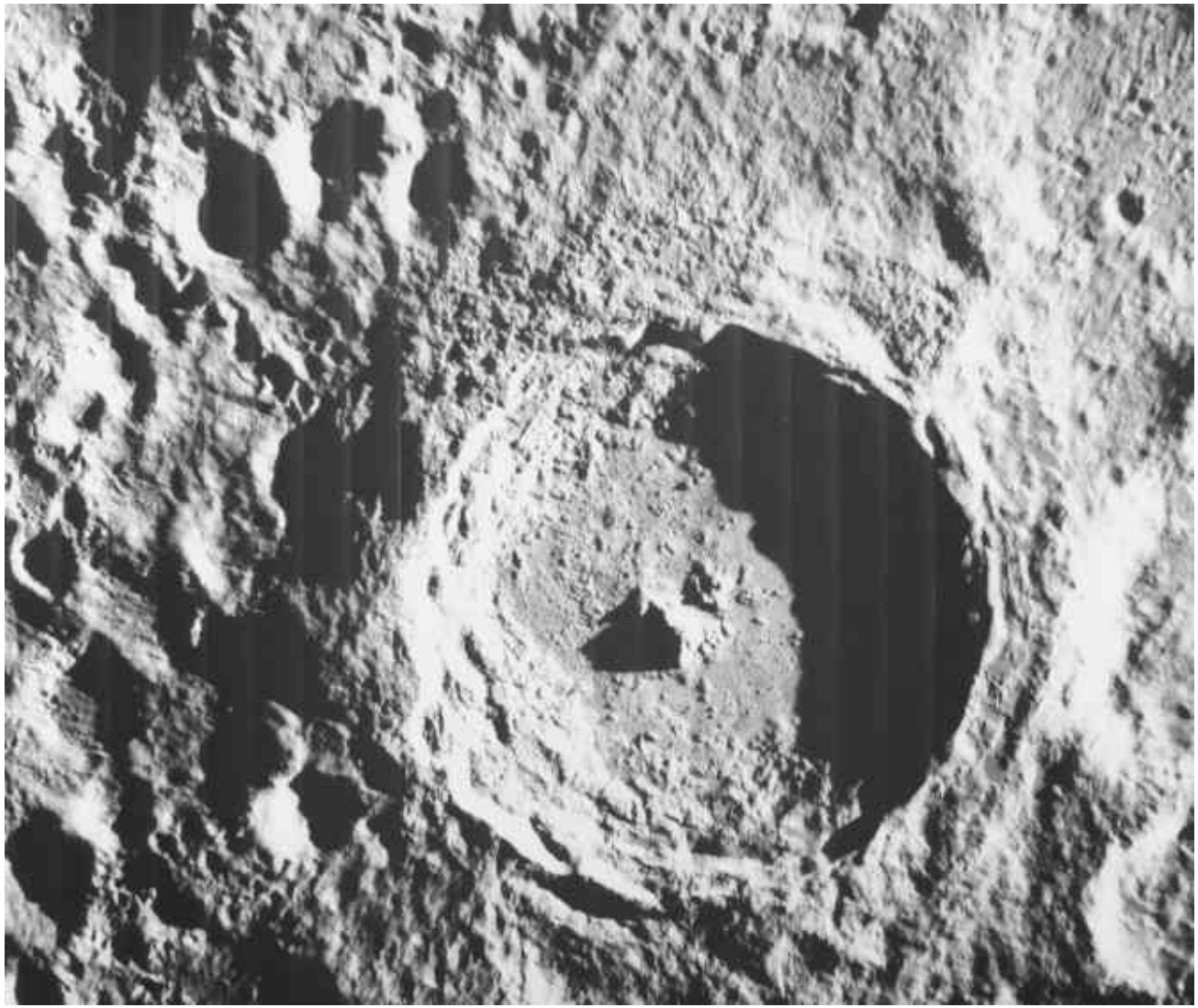
Phases of the Moon



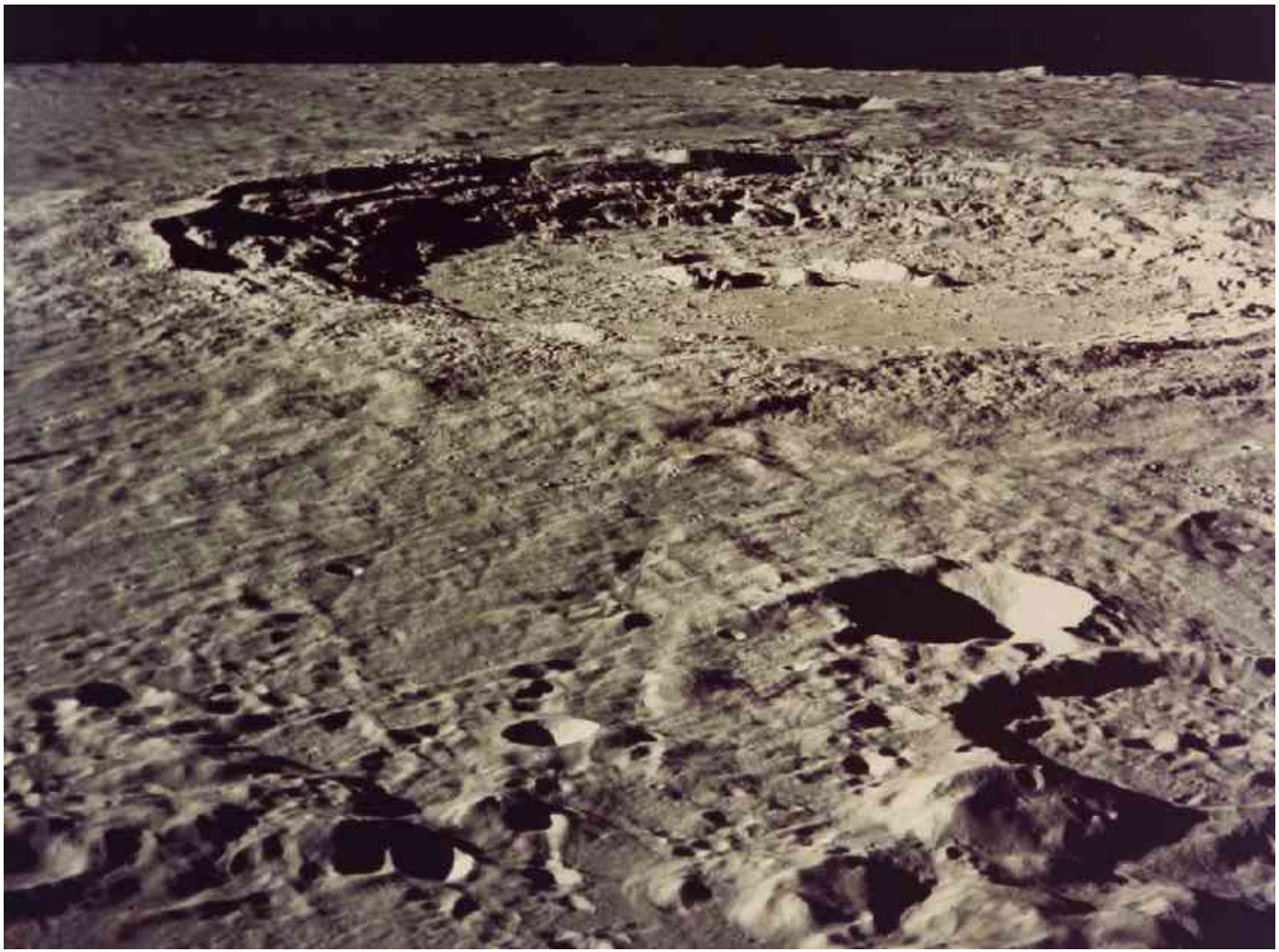
The most famous features of the lunar surface…
Craters of the Moon



Crater Tycho…lunar orbiter

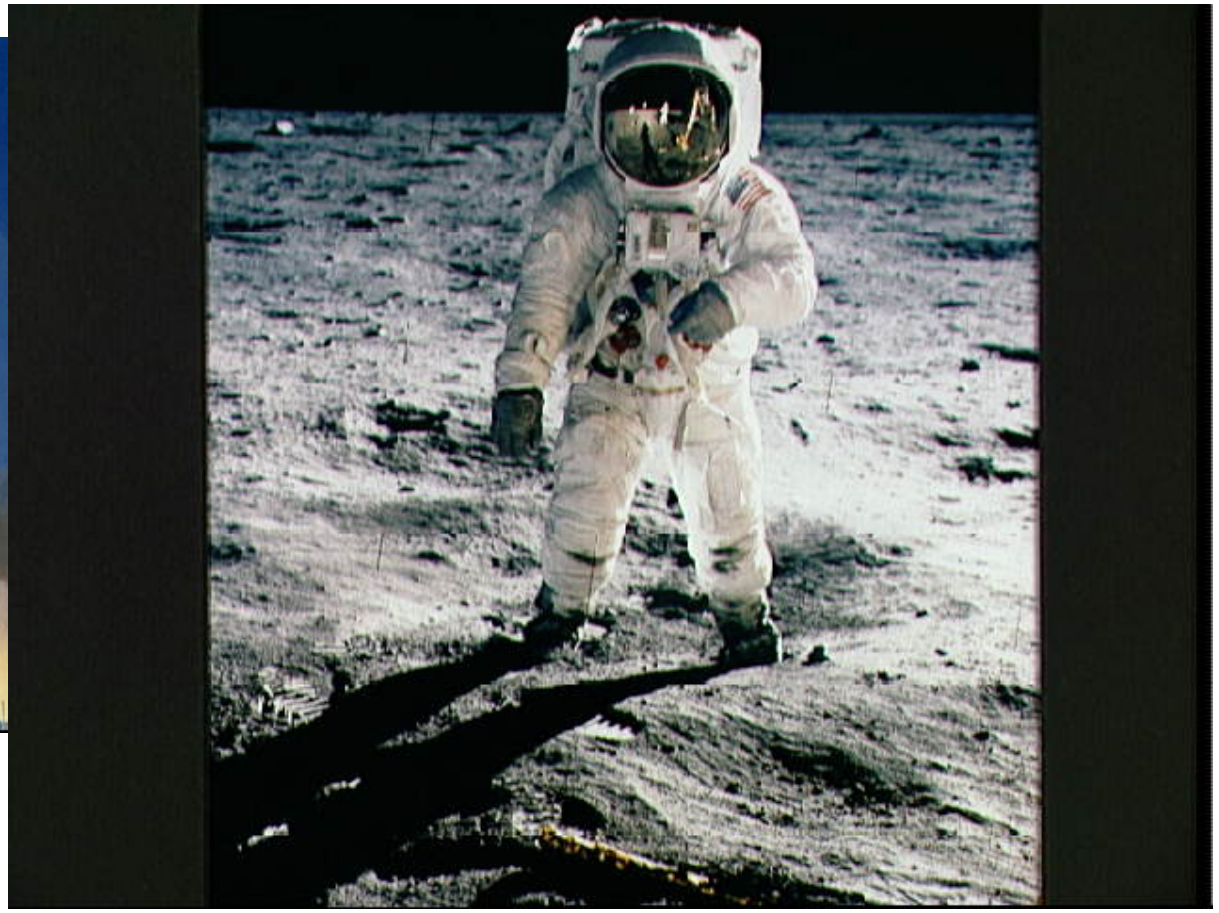


Crater Copernicus from the Apollo spaceship



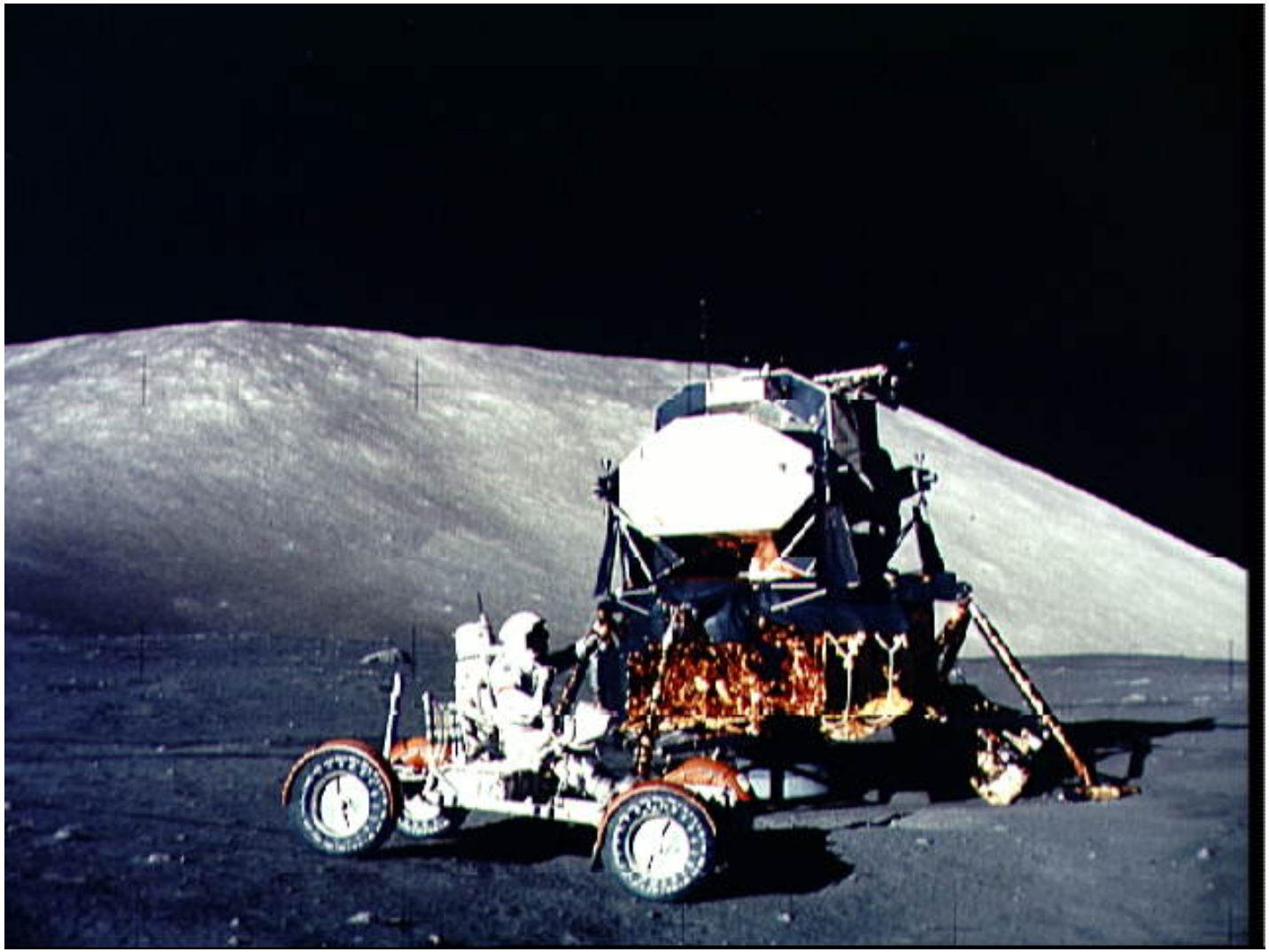
The Barringer crater: a lunar crater on the Earth

The Apollo program and the exploration of the Moon



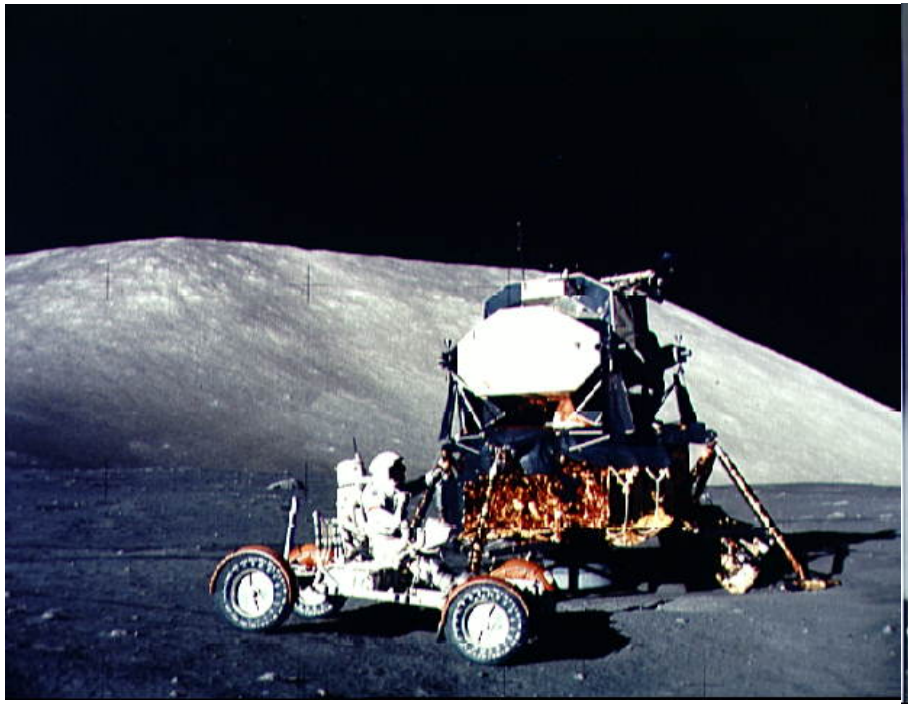
The Earth from a cosmic perspective

Human beings on an another astronomical object

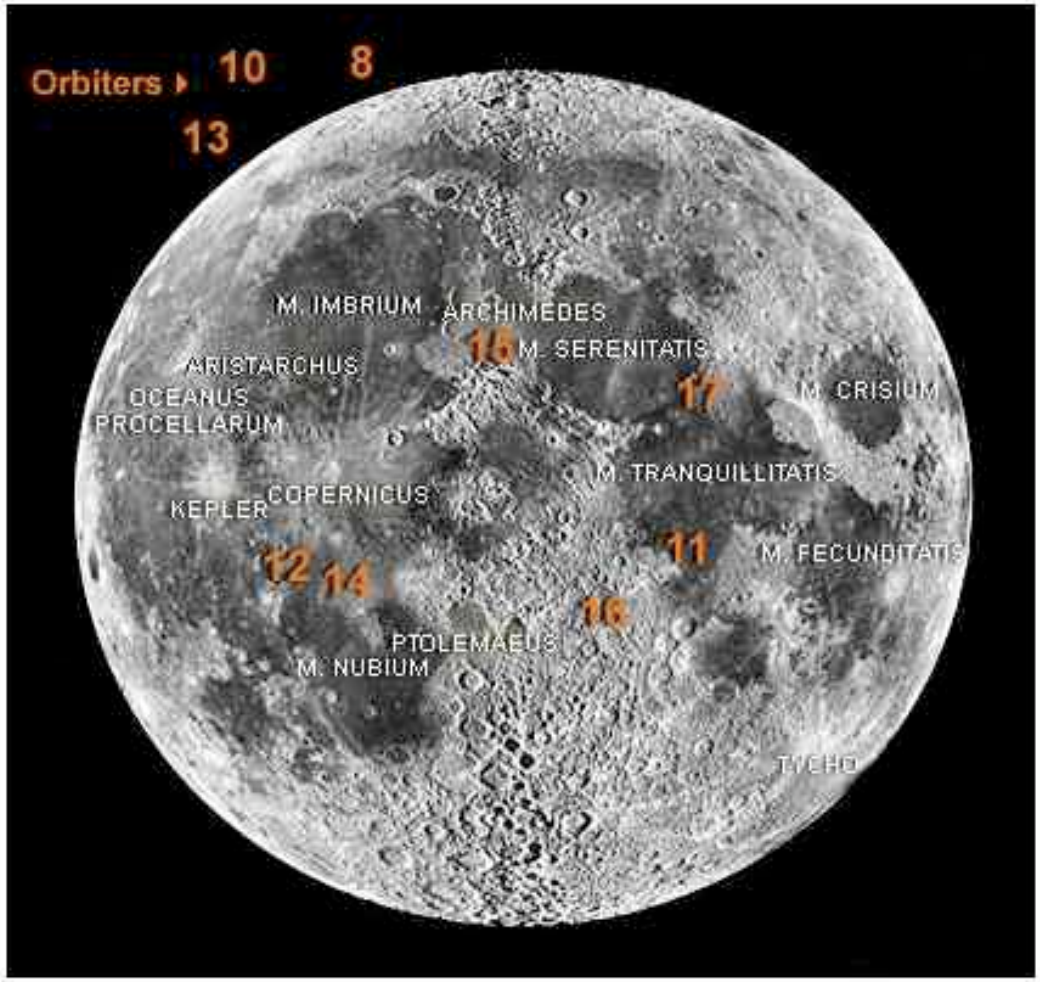


Lunar rock samples

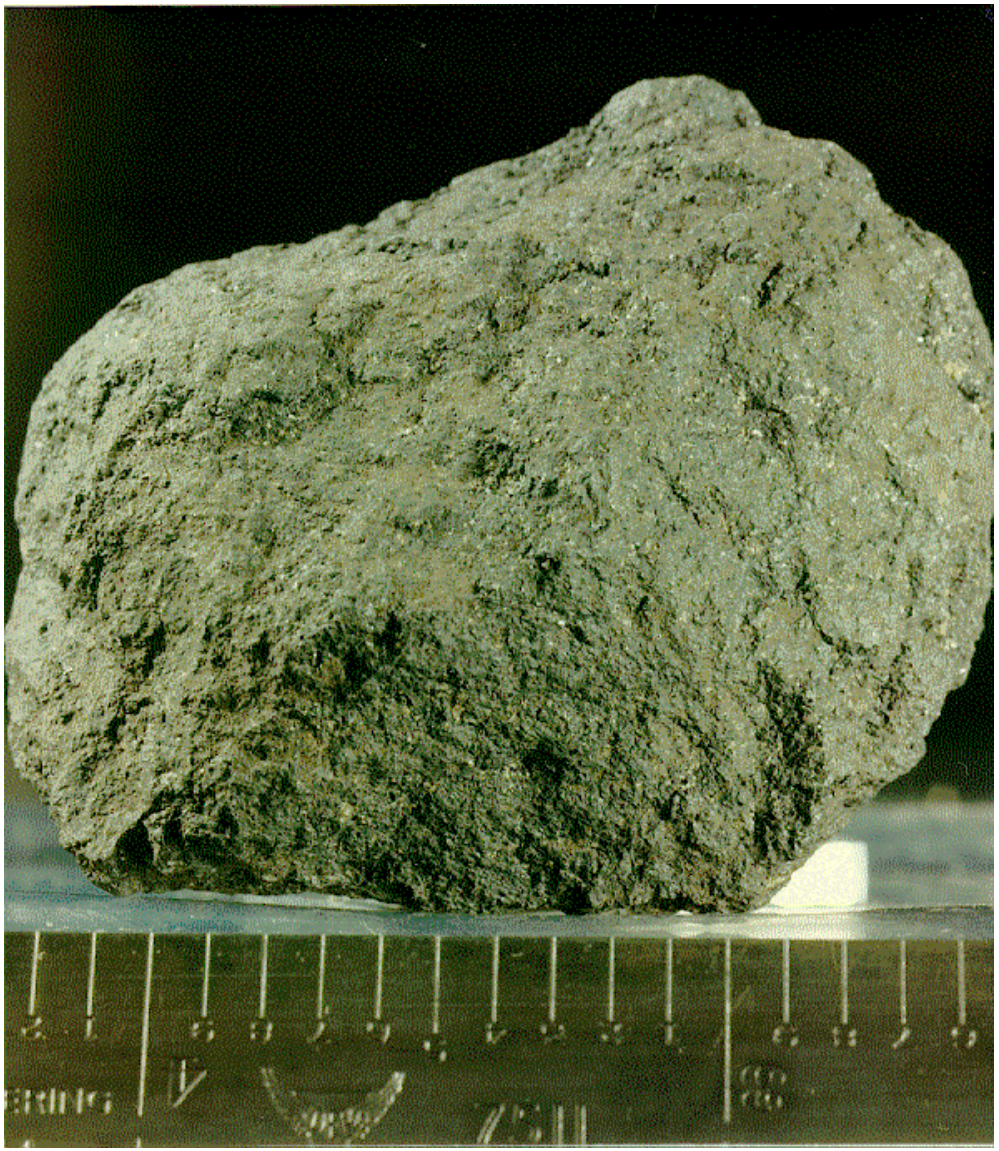
Lunar rocks: witnesses to the ancient history of the solar system



Apollo landing sites



Lunar sample: basalt



Lunar sample from Apollo 17: troctolite from the terrae

Ages of Formation of Lunar Rocks

The age of formation of lunar rocks can be determined by radioisotope dating. See p144 of the textbook for a description of this technique. A radioisotope that proves useful in dating rock samples is Rubidium 87, which decays to Strontium 87.

The following conclusions result from the dating of Moon rocks.

1. Moon rocks are extremely old relative to Earth rocks. All of the samples returned had formation ages from 3.2 to 4.5 billion years. Check previous notes for the comparison of this to Earth rocks.
2. The rocks found on the Maria ranged from 3.2 to 3.8 billion years.
3. The rocks found in the terrae, or thought to come from terrae regions, ranged from 3.8 to 4.5 billion years.

Moon Rocks and the Age of the Solar System

No lunar rocks have been found which are older than 4.5 billion years. Furthermore, no rock has been found anywhere in the solar system that is older than 4.5 billion years old. This is because the whole solar system is only slightly older than 4.5 Gyr (Gyr= billion years).