

FIRST LUNAR MAPS

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During 400 years, since the invention of telescope, the Moon was studied and mapped by several observers using different techniques.

The first observers used the newly invented telescope from 1610 to 1650. The Moon was recognized as a new world to explore. This period marked the birth of Selenography. Galileo, Kepler, Langrenus, Hevelius, Grimaldi and several others were the first to map our satellite. After a long period of inactivity a second phase began in the early 19th century. Observers like W.G. Lohrmann, J.H. Mädler and J.F. Schmidt used achromatic refractors and filar micrometers to study and map the Moon with outstanding precision. Scientific cartography of the Moon was born. The third period started in 1890 when the large telescopes at Lick and Paris observatories began a systematic photographic survey of the Moon. The fourth and last period was, of course, close-up detailed observations performed by spacecraft and manned exploration of the Moon.

Galileo was not the first to observe the Moon through a telescope. Thomas Harriot (1560-1621) was one of the first observers of the Moon. These observations are considered today the first moon sketches made with a telescope (Figure 1). The first observations of sunspots are also attributed to Harriot (Figure 1).

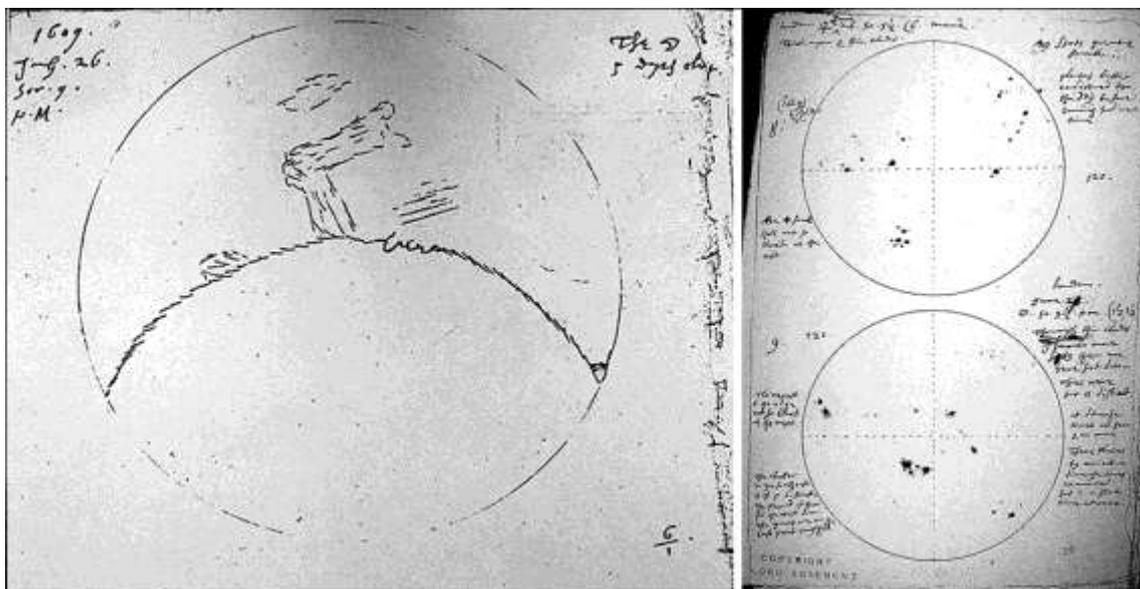


Figure 1- Thomas Harriot's drawings of the Moon (26 July 1609) (left) and Sun (December 1610) (right). Galileo Project (<http://galileo.rice.edu/index.html>).

Few if any of Galileo's Moon observations are dated. Perhaps the best known Moon drawings are those in *Siderius Nuncius* (Figure 2).



Figure 2- Title page of *Siderius Nuncius* published in 1610 (left) and Galileo's initial sketches of the Moon showing several craters and the lunar terminator (right).

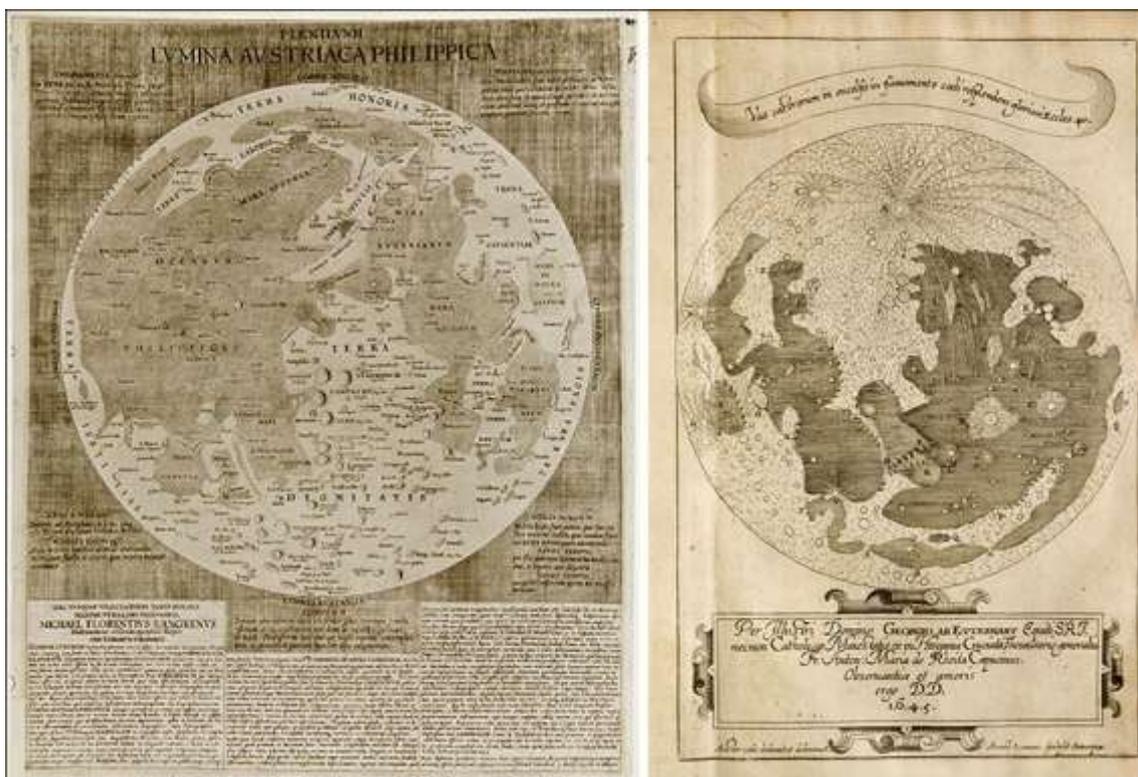


Figure 3- Moon Maps published in 1645: Michael Langreen (left); Antonius Rheita (right). Museo Galileo (<http://www.museogalileo.it/en/index.html>).

Several lunar maps were published soon after these first observations. Michael Langren (1600-1675) produced in 1645 a map including the oldest known nomenclature of lunar formations. This map started a long debate regarding the naming of Moon's features (Figure 3). On the same year Antonius Rheita (1597-1660) depicts the lunar seas and the main lunar craters (Figure 3).

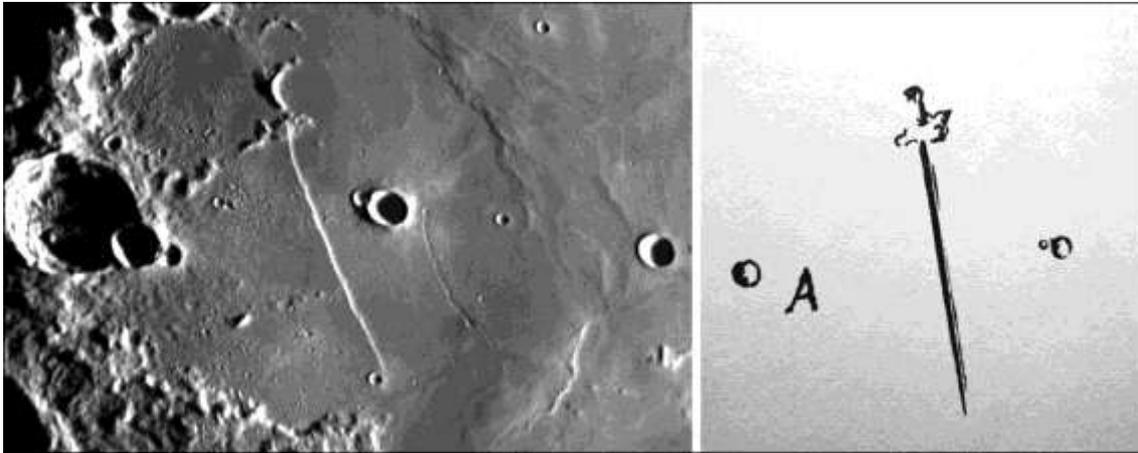


Figure 4- Christiaan Huygens image of the Straight Wall (right) and CCD image of the same region obtained by Thierry Legault (left). Huygens drawing, from *Complete Works of Christiaan Huygens* (1925).

Christiaan Huygens (1629-1595) was also an active observer of the Moon. He is mainly recognized for discovering the true nature of Saturn rings and its satellite Titan in 1655 and 1659 respectively. His Moon studies remained unknown until 1925. Huygens discovered several lunar features including the straight wall attributed for a long period of time to J.H. Schröter (1745-1816). In 1686 Huygens used a 123-foot non-achromatic refractor to view and draw this interesting lunar formation (Figure 4). He also recorded the Schröter valley and the great Hyginus rille using a 60-foot refractor.



Figure 5- Johannes Hevelius (left) and his *Selenographia* Moon map (right).

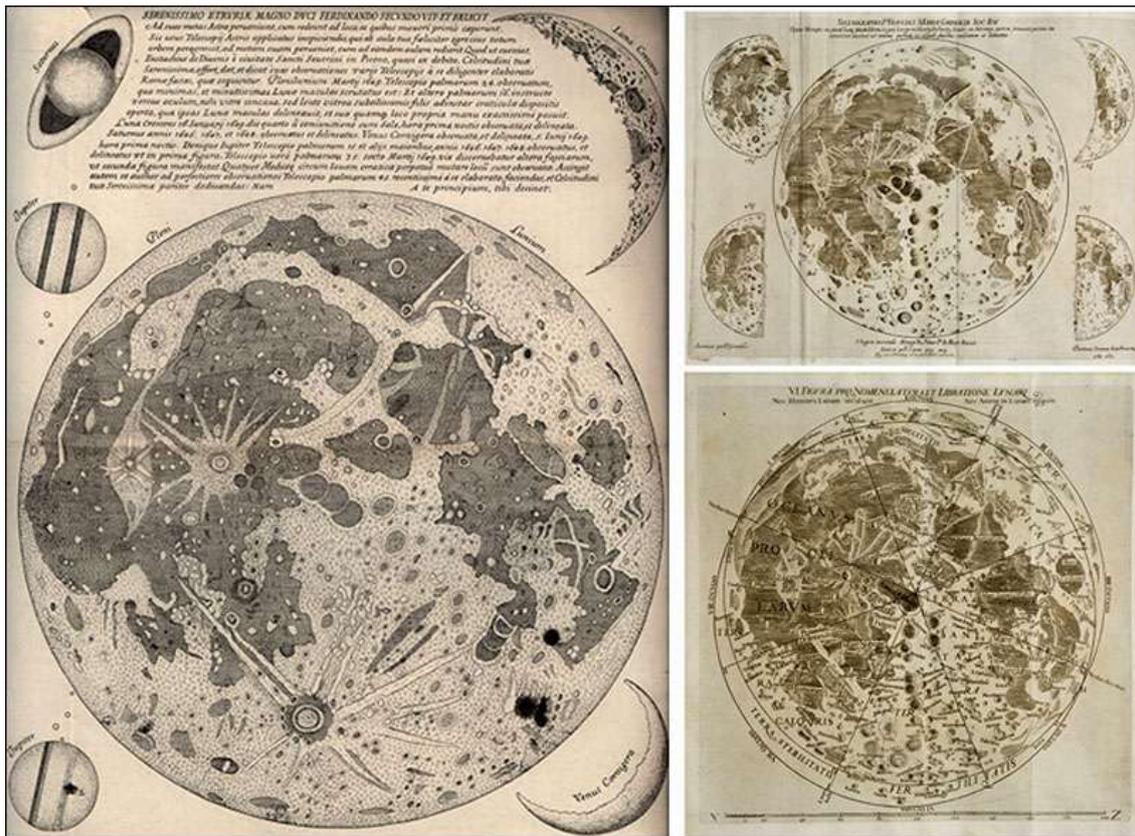


Figure 6- Eustachio Divini (left) and Giovanni Riccioli (right) Maps of the Moon. Museo Galileo (<http://www.museogalileo.it/en/index.html>).

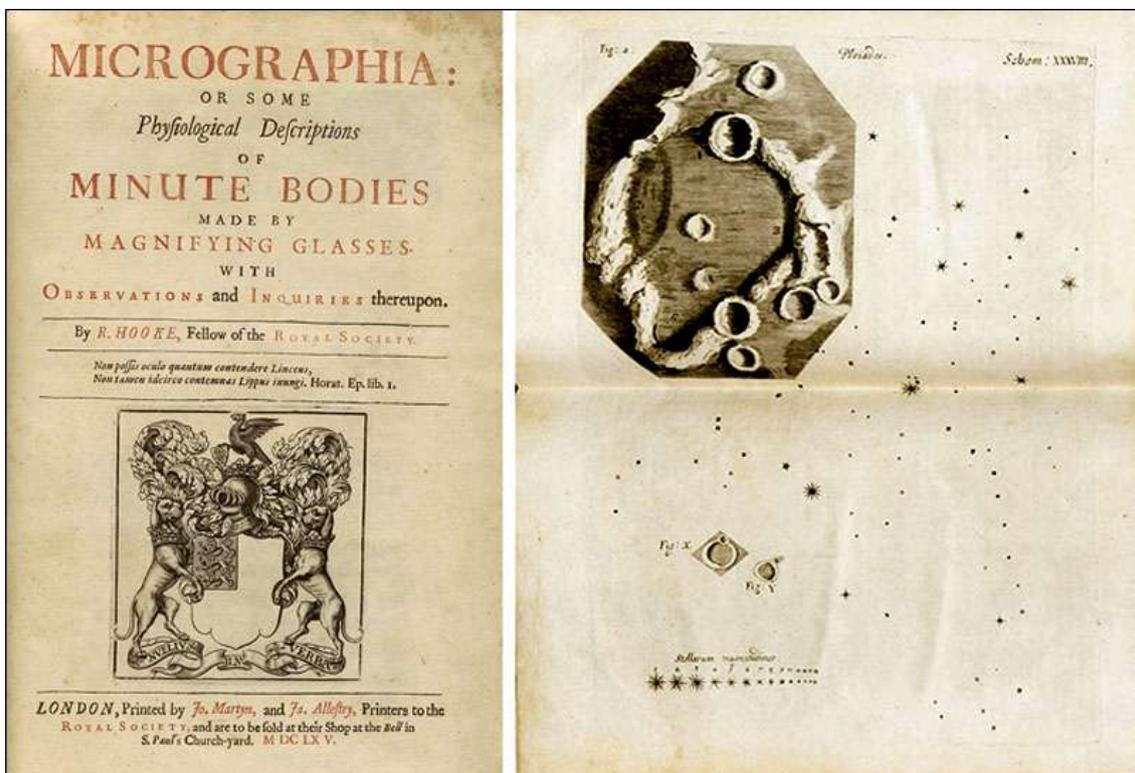


Figure 7- Robert Hooke *Micrographia* title page (left) and depiction of crater Hipparchus (right). Museo Galileo (<http://www.museogalileo.it/en/index.html>).

Johannes Hevelius (1611-1687) drew several maps of the Moon from observations performed with non-achromatic refractors. In his book *Selenographia* published in 1647, forty engravings of the Moon in its various phases are presented together with three large lunar maps. The effect of libration is shown together with names of surface features that are not in use today (Figure 5).

Eustachio Divini (1610-1685) and Francesco Grimaldi (1613-1663) Moon maps were published in 1649 and 1651 respectively. Divini's map is clearly inspired by the work of Hevelius. Grimaldi map shows the moon in different phases and the effect of libration (Figure 6).

Robert Hooke (1635-1703) described his lunar observations in a book published in 1665 (*Micrographia*). Hooke produced a first representation of a limited area on the Moon (crater Hipparchus) using a 30-foot refractor in 1664 (Figure 7). Several laboratory experiments were performed by Hooke using bullets that were dropped into soft clay. These experiments produced craters similar to the ones observed on the Moon.

The work of Giovanni Domenico Cassini (1625-1714) at the Paris observatory established a new standard in Moon mapping. Cassini made many drawings of the Moon in different phases. He used back and white chalk on a blue background. All these drawings combined produced a full Moon chart with 12 feet in diameter. Only a small engraving of this work is known today (Figure 8).



Figure 8- Giovanni Cassini (left) and original drawings of the Moon produced in 1671-1679 at the Paris Observatory (right). Museo Galileo (<http://www.museogalileo.it/en/index.html>).

Cassini's Moon Maps were a considerable advance over its predecessors. Even by today standards this extraordinary large Moon map has a very modern appearance (Figure 9).



Figure 9- Large Map of the Moon Giovanni Cassini (1679). Museo Galileo (<http://www.museogalileo.it/en/index.html>).