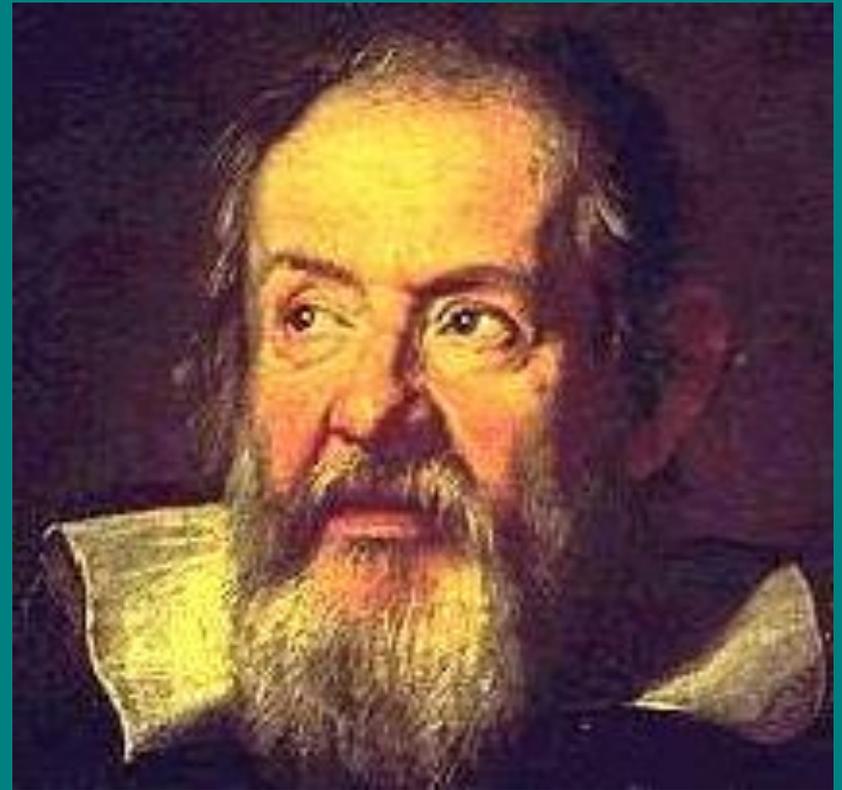




Telescope Notes



Galileo made the first telescope



Fom:

<http://www.comune.pisa.it/aziende-esternalizzazioni/images/galileo.jpg>

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Fom: http://www.amuseum.de/physik/brillen/exh98_99/galileo.jpg



In October 1608 a Dutch optician makes an accidental discovery when he puts

a concave lens in front of a convex one. This leads to the first spyglass – a small tube that gathers light from distant objects and magnifies it for the eye to see.

May, 1609 Galileo immediately grasps the potential of this new "toy" and makes improvements that will lead to the first true telescope.

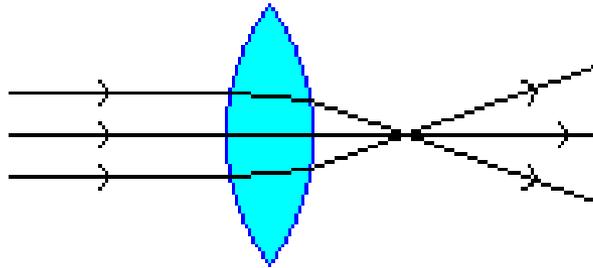
The first telescope



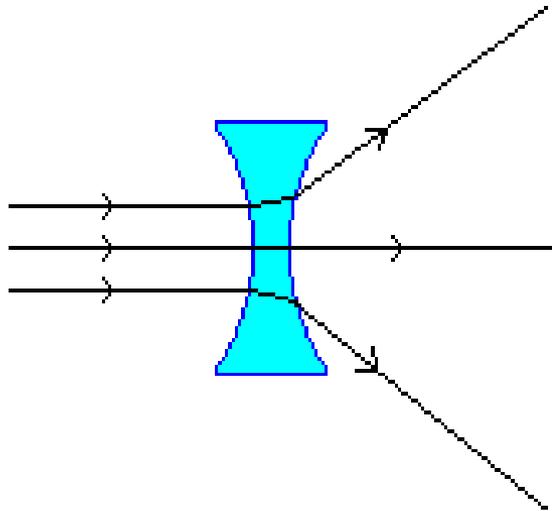
Galileo's 1609 telescope magnified objects about 14X. Galileo's telescope is a tube nearly four feet long, with a lens mounted at each end. Light enters the scope through a two-inch convex lens, which bends the light rays until they converge

at a focal point – the one-inch eyepiece lens. Galileo improves the magnification and clarity of the image by adjusting the focal length and by grinding and polishing his own lenses.

convex and concave lenses



Convex lens converges
(pushes together) light
rays



Concave lens diverges
(separates) light rays

Top: a convex lens converges light rays
Bottom: a concave lens diverges light rays

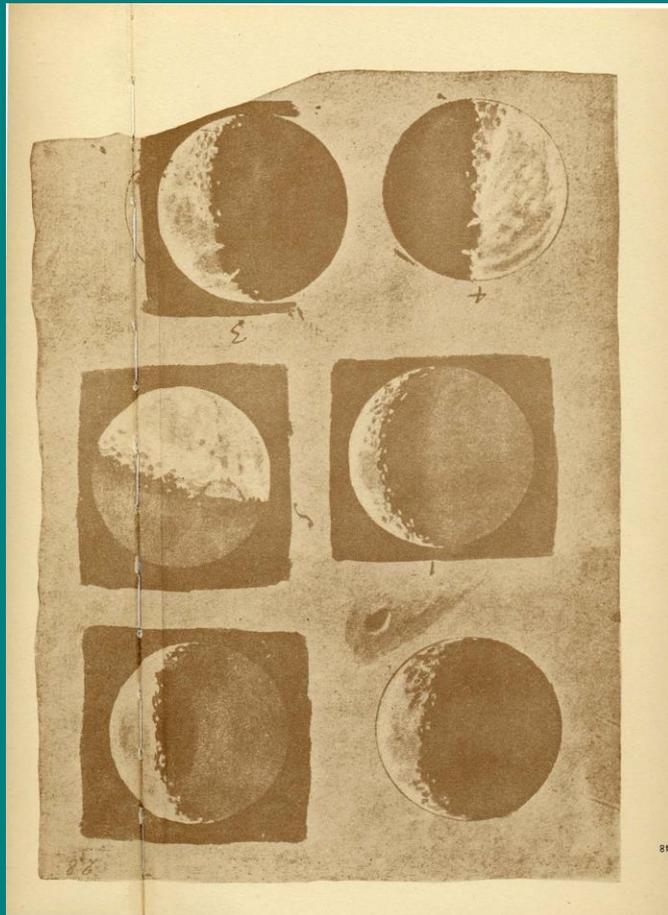
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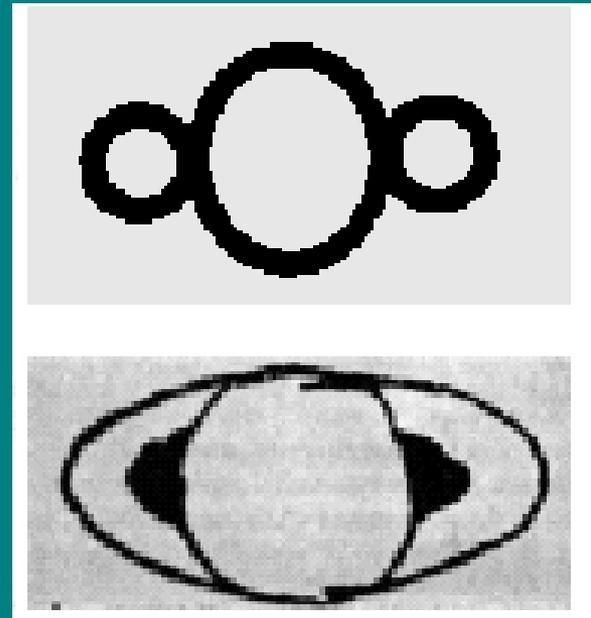
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More Observations

The Moon



Saturn



1610 & 1616

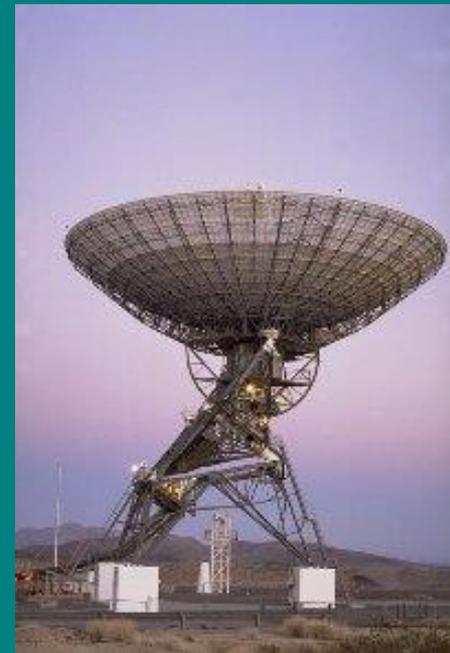
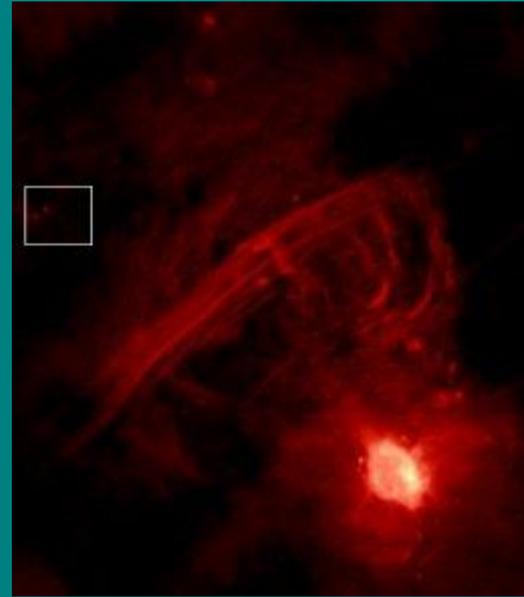
Galileo's Telescope

- Improved Dutch spyglass to achieve 8-9X magnification
- Observed mountains on the moon, the Milky Way composed of tiny stars, and sunspots
- Accurately measured the period for four of Jupiter's moons
- Saw that Venus showed phases like the moon did and must therefore orbit the Sun rather than the Earth



Other Telescopes

- Radio telescopes detect radio waves to observe the Universe.
- Gamma and X-ray telescopes are placed in space away, because Earth's atmosphere absorbs and deflects gamma and x-rays.



Other Telescopes

- Since 1609, many improvements have been made to the telescope.
- As technology improved, so did the telescope.
- In fact, there are different types of telescopes that use the electromagnetic spectrum to observe the Universe.

Other Telescope

- In 1781, William Herschel found fuzzy patches using a telescope, but could not explain them.
- In 1923, Edwin Hubble, with the use of photography and the telescope learned the fuzzy patches Herschel observed were other galaxies.
- This is when Astronomers learned the Milky Way Galaxy was one of millions of galaxies. Earth was not the center of the Universe as ancient observers originally thought.. It's not the center of anything.