SHENANDOAH ASTRONOMICAL SOCIETY
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A Tribute to the Telescope

Bill Cheng's Telescope

I imagine that the first telescope ever made had no tube or mount. Someone simply picked up two lenses and looked through them and saw that something looked bigger. Perhaps he/she thought there was no purpose for that and never did it again.

A Dutchman by the name of Hans Lippershey in 1608 decided it might be useful. Another Dutchman named Jansen is said to have used two lenses to magnify objects but discarded the idea since the images were upside down. Some think the Englishman, Thomas Harriot, made a map of the Moon using a telescope before Galileo began making telescopes. Thus it may be that the first telescope was made in England, no one knows for sure. There is some evidence that Thomas Digges, also an Englishman, made a telescope years earlier but without confirmation. This information is according to a book by Patrick Moore, the Englishman.

There is no question that the first great user was the Italian scientist Galileo.

Galileo is hailed as the creator of telescope astronomy. He discovered the craters on the Moon, found the four large moons of Jupiter and resolved stars in the Milky Way. He announced there were a myriad of stars not seen by the naked eye. He began to support the Copernican system of a Sun centered Solar System.

A Galilean telescope uses a positive lens at the front of the scope and a negative lens at the eye. This arrangement gives an upright image but the field of view is very small. Johannes Kepler suggested using a positive lens for the eyepiece. This gives a larger field of view but an upside down image. Thus astronomical telescopes give an inverted image unless an erection system is used to make the image upright. For example, all binoculars use a prism system to make the image correct for terrestrial use.

Galilean and Keplerian telescopes are refractors and the lens separate the white light into colors that show around the images. Sir Isaac Newton thought they would never be useful and invented a reflecting telescope in which color would not be a problem. However, the one he presented to the Royal Society was too small to be useful but others were soon building Newtonian reflectors and are still doing so. Two other types of reflectors were designed, the Gregorian and the Cassegrain.

Achromatic lenses were invented in the 1700's so that partially solved the color problem in refractors by using two lenses together as one. They are made from different types of glass and one cancels the color aberration of the other. Then

astronomers had several types of telescopes to work with. Certainly telescopes became bigger as time went on. But refractors have a limitation since the lens must be supported at the edges so the largest refractor ever built is 40 inches in diameter. It is still in use at the Yerkes Observatory in Williams Bay, Wisconsin. But Newtonians have gotten ever larger. William Herschel, discoverer of Uranus, built many reflecting telescopes, some quite large. Lord Rosse of England built a 72 inch reflector.

Enter the 20th century, the 100 inch reflector was installed at Mount Wilson in California in 1917, the largest in the world. The 200 inch Hale telescope was installed at Mount Palomar in 1948, again the largest in the world. Russia built a bigger one of 6 meters (236 inches) in 1975. Now there is a 9.8 meter (386 inches) reflecting telescope on a mountain in Hawaii. Now many countries have large scopes all around the world and I have not even mentioned radio telescopes.

The Hubble Space Telescope has made headlines more than all the others. Although not the largest reflector at 2.4 meters (95 inches), it has the advantage of clear skies and no air to distort the image. The HST has orbited the Earth over 100,000 times traveling a distance equivalent to several round trips to the Sun. It has imaged many thousands of objects and discovered many distant galaxies.

Hale to the Telescope! Even our small ones are great in themselves. We enjoy them very much and experience the awe of looking up at the mind boggling universe.

(Jim Adkins)

Program at LFCC March 8

7:00 PM Room 336 in modular building

Alan will be bringing a presentation on his laptop computer downloaded from a professional talk by one of the experts in the field. The last one we watched was very good, actually excellent. So there is much to learn about the planets, stars, and galaxies. Everyone invited.

Celestron NextStar Telescope

The End