IN THE SKY | ASTRONOMICAL INFORMATION SERIES

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TELESCOPES

Telescopes:

FAQ About Telescopes

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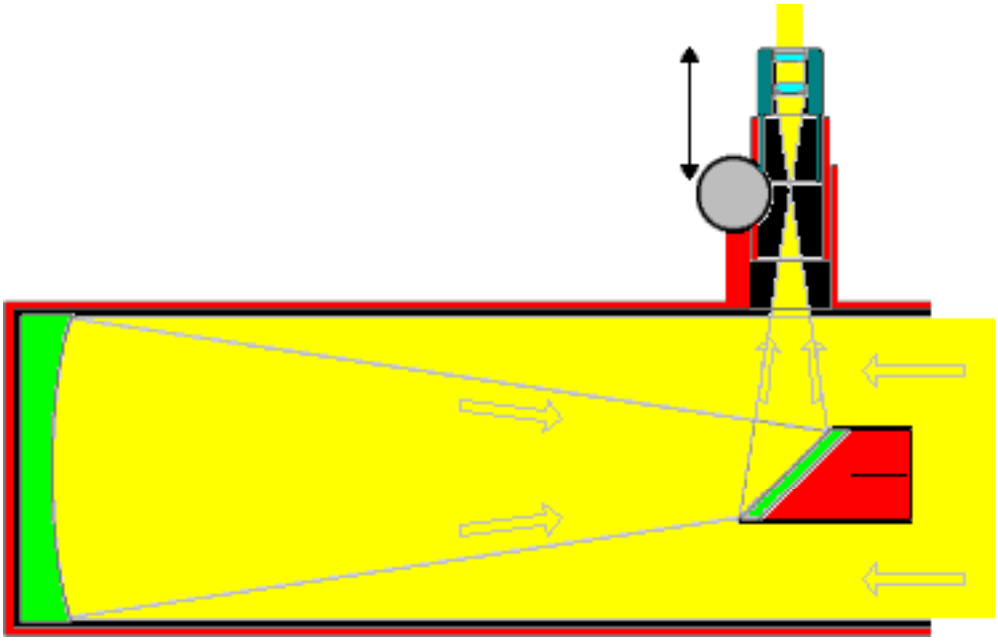
Who invented the telescope?

Hans Lippershey (whose last name is sometimes spelled without the letter "s"), a Dutch eyeglass manufacturer, is most often associated with the invention of the telescope. Lippershey was awarded a patent for his device in October 1608 by the parliament in the Netherlands.

Credit for the invention of the telescope is also extended to Jacob Metius, a Dutch optician, though he was reluctant to allow the Dutch parliament to review his patent claim and even prohibited anyone from seeing his device. Despite his reluctance, Metius was eventually awarded a small sum from parliament, also in 1608, when he applied for a patent on his device a few weeks after Lippershey.

However, the Dutch parliament only allowed Lippershey to construct a binocular version of his telescope. So, Lippershey is also the inventor of the binocular! (Please note: Galileo Galilei did not invent the telescope!)



A typical reflecting telescope

This simple cutaway diagram shows that as light is gathered by the large mirror, the curve of the objective mirror concentrates the light which is then reflected by a flat, diagonal mirror to one side, where it is then magnified by the eyepiece. *Image by Larry McNish, Royal Astronomical Society of Canada*

A typical refracting telescope

This simple cutaway diagram shows that as light is gathered by the large lens, the curve of the objective lens concentrates the light which is then magnified by the eyepiece.

Image by Larry McNish, Royal Astronomical Society of Canada

When was the telescope invented?

The telescope's invention is often pegged in 1608 with the award of a patent to Lippershey by the States-General, the name for parliament in the Netherlands. However, an Englishman, Thomas Harriott constructed an early, low-power version of the telescope and used it in August 1609 to observe the Moon, at the same time when Galileo presented a similar small instrument to the Venetian Senate. Galileo undertook his own serious observations in October or November of that same year with a larger telescope. Since he published his observations in 1610 before Harriott, Galileo Galilei is often credited historically as the first scientist to use a telescope for astronomical observing.

Who came up with the word "telescope"?

On constructing his own optical device, Galileo originally used the terms organum and instrumentum to describe his telescope. And, on publishing observations made with his telescope, he also used the term perspicillum, which was also favored by his contemporaries.

It was at a Roman banquet held in Galileo's honor on April 14, 1611, that an unidentified theologian, an expert in Greek poetry, suggested the name "telescope", on seeing the instrument at that dinner event. The banquet's host, Federico Cesi, founder and president of the Academy of the Lynxes, an association for the advancement of science, whose most illustrious member was Galileo, promptly adopted the term coined by the dinner guest.

Are there different types of telescopes?

There are two basic types of telescopes. The first type, invented by Lippershey, is known as a refractor, a telescope constructed of lenses. This is the type used by Galileo. A later telescope, invented by Isaac Newton and made with mirrors, is known as the reflector.

How does each type of telescope work?

The refractor, the type that Galileo constructed for himself, uses a convex lens to gather light from distant objects and then magnify that light. The refractor's main lens, which points skyward, is called the objective. That lens gathers light from stars and planets, and then bends, or refracts, that light to a pinpoint focus. Typically, in a simple refractor, a second lens (which may be convex, concave, or some combination or surfaces), known as an eyepiece, then magnifies the light gathered. The observer's eye then can view a magnified image of the night sky at the telescope's eyepiece. By the way, the original telescopic refractors of both Metius and Lippershey apparently only magnified about three or four times. Galileo's first telescope rated about the same, but he later built, or had built for him, successive telescopes that magnified approximately 30 times.

The reflector, the type that Isaac Newton constructed for himself, uses a curved mirror to gather light from distant objects. The reflector's main mirror, which points skyward, is also called the objective. That mirror gathers light at its concave, polished surface and then bounces, or reflects, that light to a focus. Typically, though, in a simple reflector, a smaller, flat second mirror, known as a flat or a diagonal, reflects the gathered light conveniently to one side, where the eyepiece can then magnify the image for the observer. Newton's own first telescope was about six inches (15 centimeters) in length and magnified approximately 40 times; a second, larger telescope with a two-inch (5-centimeter) wide mirror was presented to the Royal Society of London.