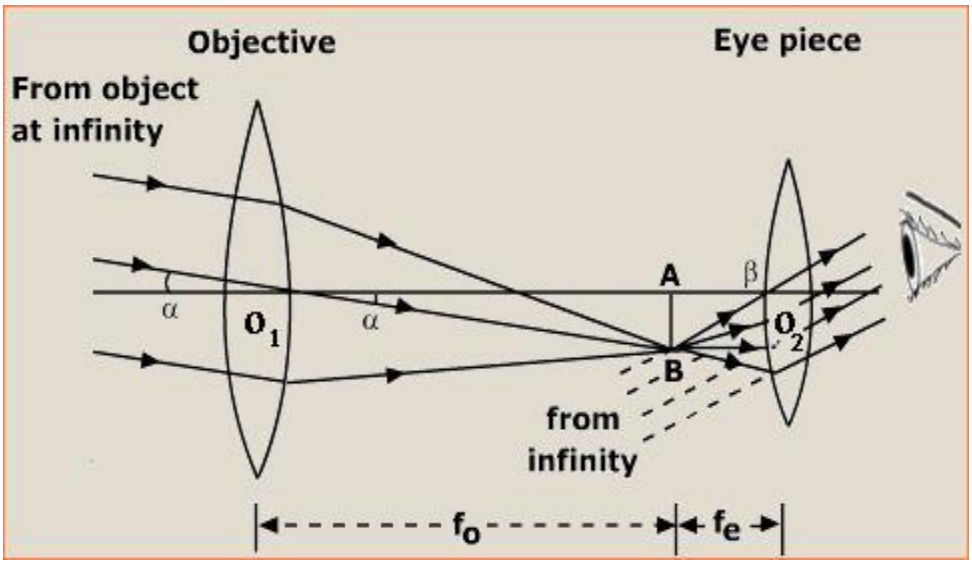
Telescope

The telescope is used to provide angular magnification of distant objects. It has an objective and an eyepiece. The first known practical telescopes were invented in the Netherlands at the beginning of the 17th century, by using glass lenses. They use for both terrestrial applications and astronomical.

Optical telescopes are mainly divided into two types: refracting and reflecting telescopes. Telescopes with lenses to focus light are called refracting telescopes. Telescopes with mirror objectives are called reflecting telescopes.

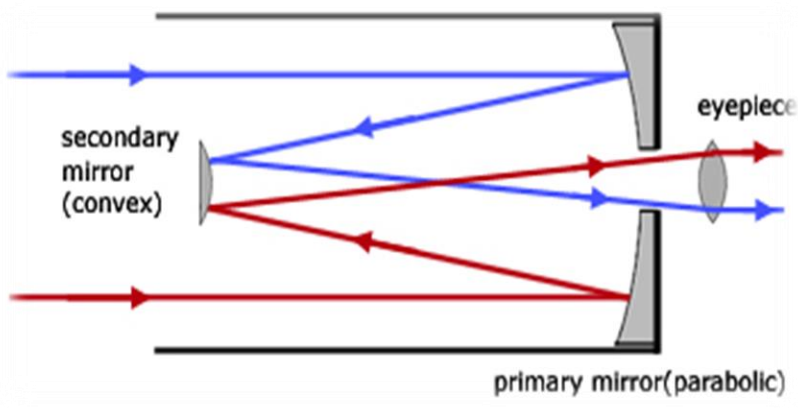
Light from a distant object enters the objective and a real image is formed in the tube at its second focal point. The eyepiece magnifies this image producing a final inverted image.



(Schematic diagram of a refracting telescope)

Terrestrial telescopes have, in addition, a pair of inverting lenses to make the final image erect. Refracting telescopes can be used both for terrestrial and astronomical observations.

Modern telescopes use a concave mirror rather than a lens for the objective. Telescopes with mirror objectives are called *reflecting* telescopes.



(Schematic diagram of a reflecting telescope)

They have several advantages. First, there is no chromatic aberration in a mirror. Second, if a parabolic reflecting surface is chosen, spherical aberration is also removed. Mechanical support is much less of a problem since a mirror weighs much less than a lens of equivalent optical quality, and can be supported over its entire back surface, not just over its rim.

One obvious problem with a reflecting telescope is that the objective mirror focusses light inside the telescope tube. One must have an eyepiece and the observer right there, obstructing some light (depending on the size of the observer cage). One solution to the problem is to deflect the light being focussed by another mirror. One such arrangement using a convex secondary mirror to focus the incident light shown in above figure.

The largest telescope in India is in Kavalur, Tamil Nadu. It is a 2.34 m diameter reflecting telescope (Cassegrain). It was ground, polished, set up, and is being used by the Indian Institute of Astrophysics, Bengaluru. The largest reflecting telescopes in the world are the pair of Keck telescopes in Hawaii, USA, with a reflector of 10 metre in diameter.

Teachers may suggest students to make a brief idea about scientific instruments in physics depicting the advancements in the subject.