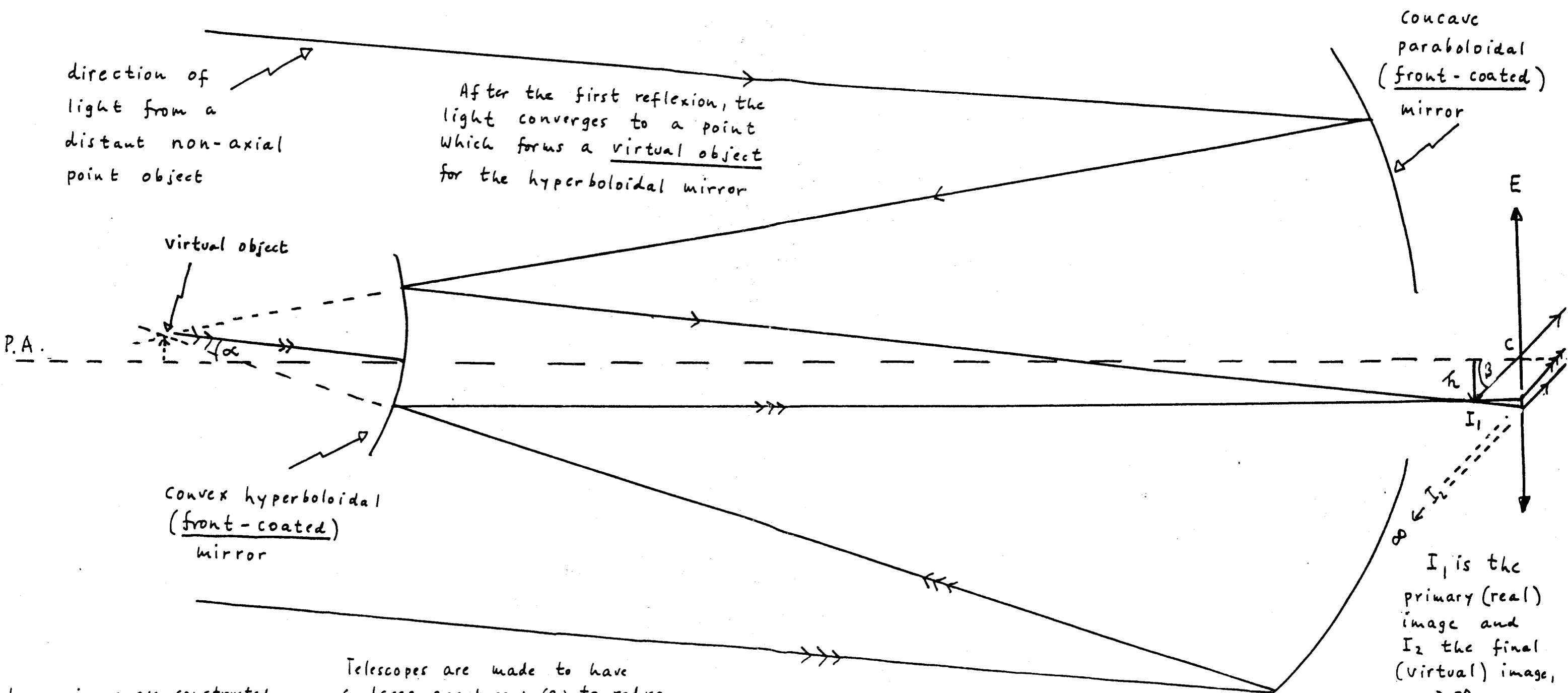


Cartesian (Cassegrainian) reflecting telescope (Guillaume - a contemporary of Newton)

Cassegrain's design (1672) of a reflecting telescope consisted of a large concave mirror which converged the light towards a smaller convex mirror, and this in turn brought the focus into an aperture at the pole of the main mirror. The image was then examined with an eyepiece. The two mirrors are coaxial, the small convex mirror of necessity lying in the centre of the main beam entering the telescope. The main mirror is paraboloidal; the small convex mirror is hyperboloidal, so that its focus coincides with the focus of the main mirror (the other focus of the hyperboloid is at the aperture). This is the design of the 5 m (200") telescope at Mount Palomar.



Large mirrors are constructed by silvering or aluminizing paraboloidal glass surfaces. If the reflecting surface is damaged or tarnished it can be repaired more easily than if the whole mirror were metal.

Telescopes are made to have a large aperture: (a) to reduce diffraction effects, and (b) to make the image of faint sources bright enough. They are reflecting because:
 (i) there is no chromatic aberration,
 (ii) it is relatively easy to make

a (single) paraboloidal reflecting surface,
 (iii) it is difficult to maintain uniform refractive index throughout a large volume of glass, and

(iv) the suspension of a large lens is more difficult to achieve than that of a large mirror.