



Figure 5.4: A close double star viewed with a 4-inch (10-cm) telescope (left) and an 8-inch (20-cm) telescope (right). Simulated image generated with *Aberrator*.

5.4 Resolving power

A fundamental law of optics is that *you can't magnify detail that isn't there*. No matter how perfect its optics, no telescope can show an infinite amount of fine detail. Resolution is limited by two things: diffraction and the turbulence of the air.

Diffraction is the spreading of light waves as they pass through an opening. You may have seen it demonstrated with tiny pinholes or narrow slits. In a high-powered telescope, even the telescope aperture — several inches in diameter — produces a visible amount of diffraction.

Diffraction makes stars look like disks surrounded by rings rather than perfect points. Figure 5.4 shows a pair of stars, close together, as seen in 4-inch (10-cm) and 8-inch (20-cm) telescopes. The larger telescope forms smaller star images. Diffraction also blurs fine detail on planets; larger telescopes show more detail.

The effect of diffraction on resolving power is expressed as the **Dawes**