you. That notion of direction comes from the lens at the front of your eye: it maps different incoming ray directions onto different locations on the light sensitive retina, located at the back of your eye (see also Chapter 15.6.2).

Thus, at a given moment in time, a particular ray has to be at the correct location and traveling in the appropriate direction to be identified with the flower. But not every ray of light that satisfies these conditions travelled the same path. For example, some rays traveled from the sun and were scattered off clouds before hitting the daffodil. If they arrive at your eye at the same time and with the same direction, their light will contribute to your perception of the colour and brightness of the flower.

Enough with the daffodils. We are gem fanatics, not flower people, after all (see page 213 of Volume 1). Back to gemstones…

11.9.2 Light Rays and Gemstones

Back from the garden? Good.

This section applies what you have learned in earlier sections of this chapter, including your walk in the garden, to the question of what happens when light rays interact with gemstones. As an added bonus, it will do so using cool three-dimensional figures. Wheee! For math mavens, Chapters 10.3 and 10.4 put this action on a firm trigonometric footing.

Figure 11-21 shows a light ray striking the table of a standard round brilliant gemstone cut in sapphire. There are two versions of the image, one for the left eye and one for the right. Hold the page about a foot away from your face and cross your eyes to make the images merge. You should now see three images total, and the central one should appear three-dimensional. How cool is that?

If you have difficulty seeing the effect, look at "Depth of Perception and Perception of Depth…" on page 73, as well as "Seeing in 3D" on page 74. Don't worry if it doesn't work – you will not miss any important information – and above all, do not persist if you feel discomfort in crossing your eyes. We all have enough headaches as it is.

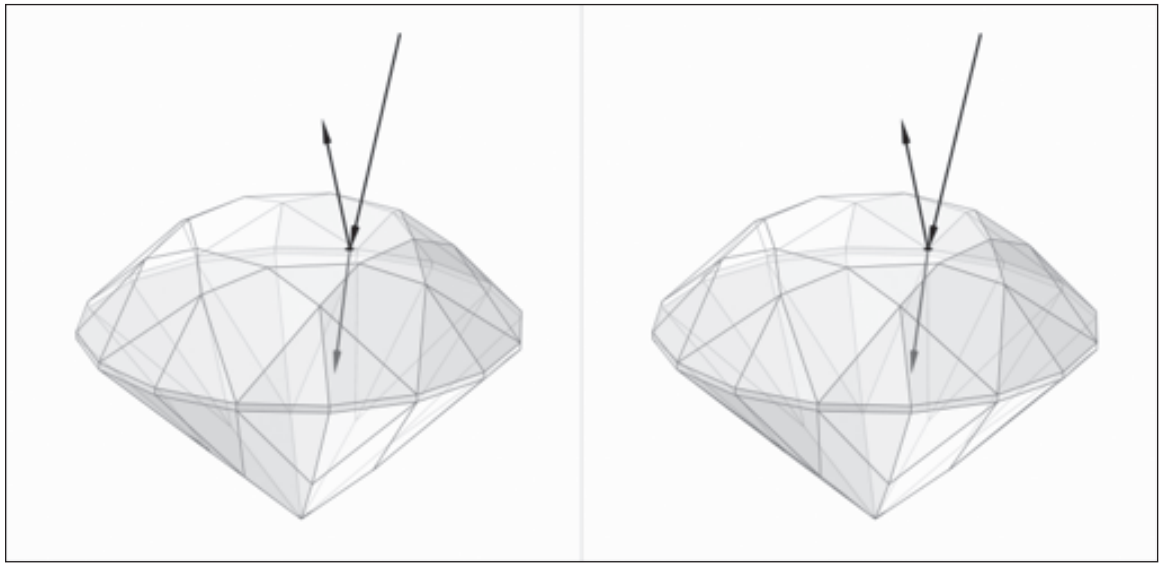

Figure 11-21 Light strikes the table of an SRB. Fresnel loss causes a fraction of the rays to reflect off the surface, while the remainder enters the gem. Some reflected rays will have the appropriate direction to be seen.