Chapter 20.3 contains a more complete explanation of dichroscopes, including instructions on how to build your own for under two dollars.

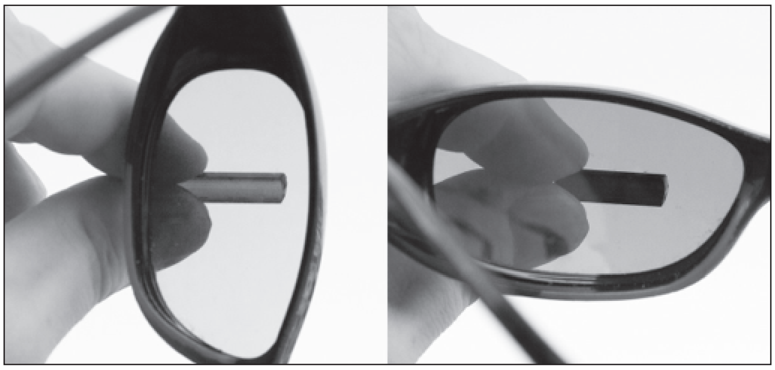

Figure 12-13 Pleochroism is a polarization phenomenon, here seen with fisherman's sunglasses and a tourmaline crystal with a closed c-axis. To see the effect, you need to hold the stone in front of an intrinsically polarized light source, such as a flat screen display or the blue sky 90° from the sun.

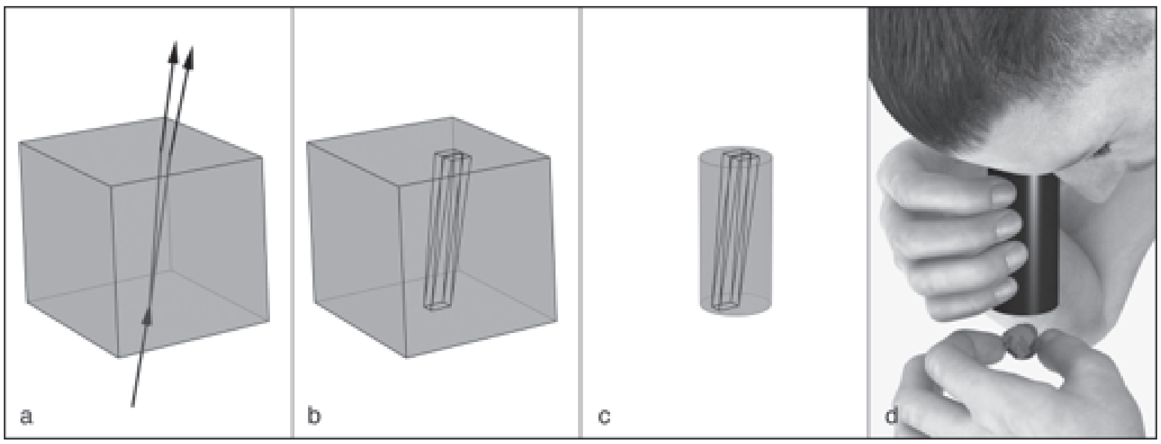

Figure 12-14 Operating principle of a simple calcite birefringent polariscope, or dichroscope. Light rays from below enter the crystal and split according to polarization, taking different paths (a). If oriented properly, an input window on one side of the crystal will produce two output windows, one for each polarization (b). Trimmed to a convenient size (c) and mounted in a sturdy holder (d), the calcite crystal becomes a dichroscope, which can be held against a sample of gem rough to identify the optical axis and dominant body colours.

12.4.1 Gem Design and Orientation for Pleochroism

In addition to providing a fun little example of seemingly magical physics, dichroism and trichroism have a direct impact on the appearance of a gemstone. For example, some tourmalines display complete absorption along one axis of the crystal – a phenomenon often referred to as a "closed c-axis." Viewed along their length, such stones are opaque black, hardly an appealing colour for a gem. Other samples may show a pleasing green or turquoise colour in one direction, and a considerably less aesthetic brownish-green along another (see Figure 6-26).

There are design and orientation choices which can help you get the most out of pleochroic gemstones. Turn to Chapter 6.7.1 for practical advice.

Figure 12-15 A pleochroic tourmaline showing yellow-green colours along the up-down direction and pale blue-green left and right..