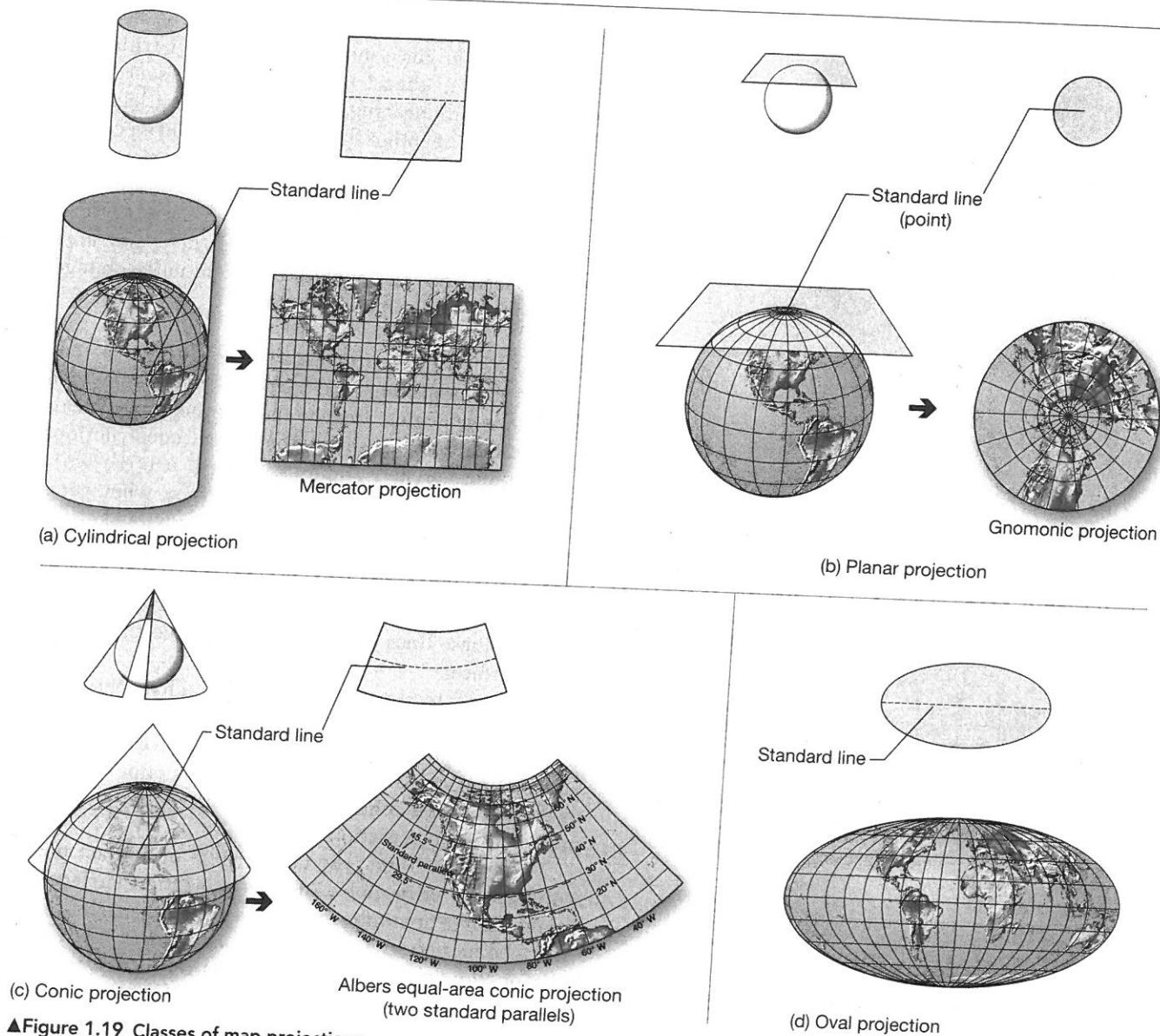




▲Figure 1.19 Classes of map projections.

The advantage of the Mercator projection is that a line of constant direction, known as a **rhumb line**, is straight and therefore facilitates plotting directions between two points (Figure 1.20). Thus, the Mercator projection is useful in navigation and is standard for nautical charts prepared by the National Ocean Service.

The *gnomonic projection* in Figure 1.19b is a type of planar (azimuthal) projection generated by projecting a light source at the center of a globe onto a plane that is tangent to (touching) the globe's surface. The resulting severe distortion prevents showing a full hemisphere on one projection. However, a valuable feature is derived: All great circle routes, which are the shortest distance between two points on Earth's surface, are projected as straight lines (Figure 1.20a). The great circle routes plotted on a gnomonic projection then can be transferred to a true-direction projection, such as the Mercator, for determination of precise compass headings (Figure 1.20b).

For more information on maps used in this text and standard map symbols, turn to Appendix A, "Maps in This Text and Topographic Maps." Scientists use topographic maps for landscape analysis, since such maps add a vertical component to the landscape. Travelers and others using the outdoors use these maps for navigation. The U.S. Geological Survey (USGS) *National Map* (available at <http://nationalmap.gov/>) provides downloadable digital topographic data for the entire United States.

## Modern Tools and Techniques for Geoscience

Geographers and Earth scientists analyze and map Earth using a number of relatively recent and evolving technologies—the Global Positioning System (GPS), remote

Animati  
Map Proje



<http://goo.g>