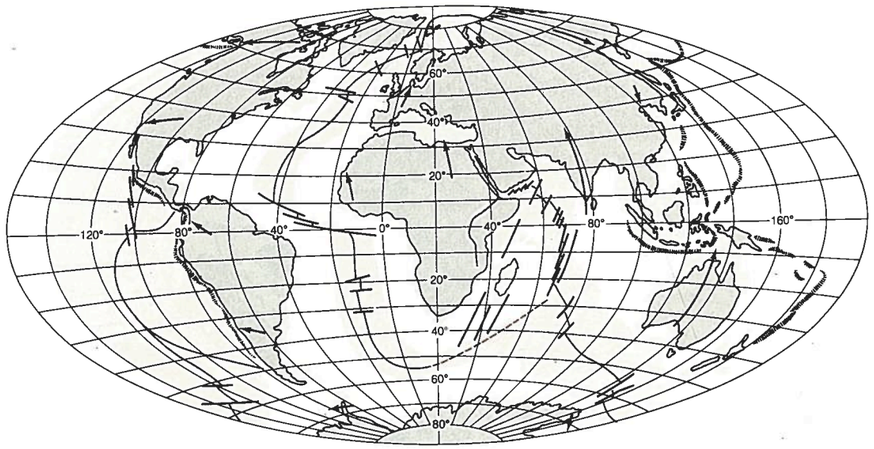

Figure 19-23
World geography today. Color shows sea floor produced during the past 65 million years, in the Cenozoic Period. [After "The Breakup of Pangaea" by R. S. Dietz and J. C. Holden. Copyright © 1970 by Scientific American, Inc. All rights reserved.]

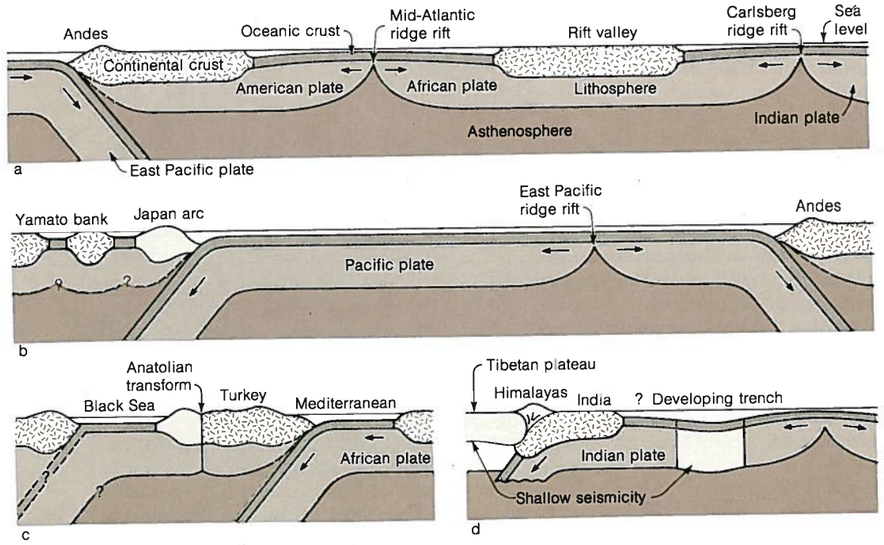

Figure 19-24
Schematic sections showing modern plate, ocean, continent, and island-arc relationships. [After J. F. Dewey and J. M. Bird, "Mountain Belts and New Global Tectonics" *J. Geophysical Research*, v. 75, pp. 2625–2647, 1970.]

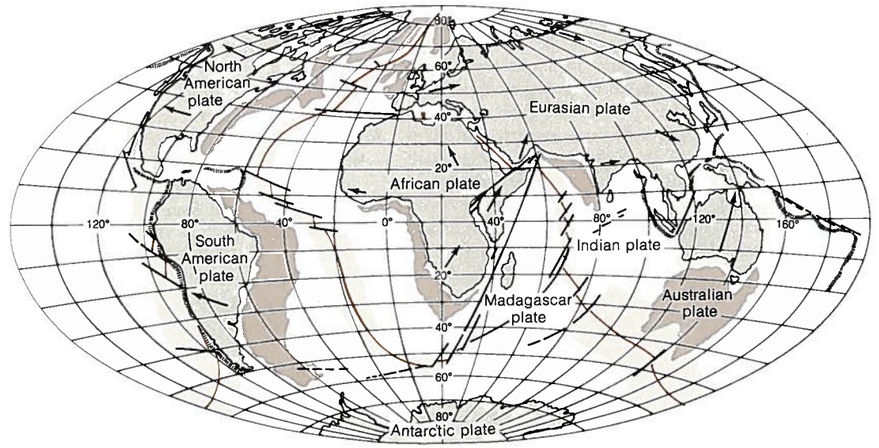

Figure 19-25
World geography as it may look some 50 million years from now if present-day plate movements continue. [After "The Breakup of Pangaea" by R. S. Dietz and J. C. Holden. Copyright © 1970, by Scientific American, Inc. All rights reserved.]

If the pattern of modern plate motions continues for another 50 million years, the continents of the world may have the configuration shown in Figure 19-25, but this is sheer speculation. The Atlantic and Indian oceans have expanded at the expense of the contracting Pacific. Australia is beginning to collide with Asia. A new ocean appears in its beginning stages in east Africa. Los Angeles has by-passed San Francisco's position on its northward journey to destruction in the Aleutian trench.

There is not a branch of geology that is untouched by this grand reconstruction of the continents, except perhaps crystallography. Economic geologists are using the fit of the continents to find mineral and oil deposits by correlating the formations in which they occur on one continent with their pre-drift continuations on another continent. Paleontologists are rethinking some aspects of evolution in the light of continental drift. For example, during most of the age of reptiles, the continents we know today were grouped together in two supercontinents, Laurasia and Gondwanaland. These continents were fragmented during most of the age of mammals, with faunas developing on the daughter continents under conditions of isolation from one another. Is this the reason why mammals diversified into so many more orders than the reptiles, and in a much shorter period of time? Structural geologists and petrologists are extending their sights from regional mapping to the world picture, for the concept of plate tectonics provides the means of interpreting such geological processes as sedimentation and orogeny in global terms. For example, the Caledonian mountain belt that runs along the northwest margin of Europe is the predrift continuation of the Appalachian belt, and the trend of the Andes may be followed into Antarctica and Australia, as Figure 19-26 shows.

Oceanographers are reconstructing currents as they might have existed in the ancestral oceans, to understand better the modern circulation and to account for the variations in deep-sea sediments. Paleoclimatologists are "forecasting backwards" in time to describe temperature, winds, the extent of continental glaciers, and the level of the sea as they were in predrift times. What better testimony to the triumph of this once-outrageous hypothesis than its ability to revitalize and shed light on so many diverse topics!

THE DRIVING MECHANISM OF PLATE TECTONICS

Up to this point everything we have discussed might be categorized as descriptive plate tecton-