



FIGURE 5.14.

The California earthquake of 1906, due to slippage along the San Andreas fault, left an offset of more than 8 feet in this fence near Bolinas, California.

The crust of the Earth is divided into plates which move about the surface of the globe while floating on a semi-molten underlayer. The ocean floor itself is changing. New basaltic ocean floor material wells up from the mantle at the Mid-Atlantic Rift. Where it meets a continent-bearing plate at its other end, the heavy oceanic crust dives beneath the lighter continental plate to be remelted by the hot asthenosphere below. Some of the oceanic crust's lighter materials may be welded onto the continent, or rise from the depths to create volcanoes, or simply add material to the bottom of the continent to elevate it higher above the oceans.

Continents themselves grow by the contributions from these oceanic plates and by adding sediments of their own as erosion wears down the mountain ranges. The Mississippi delta is constantly growing. The ancient city of Ur in southern Iraq, hometown of Abraham, was once almost a coastal town. Now that the delta of the Tigris and Euphrates rivers has extended into the Persian Gulf, Ur is many miles inland. Similarly, the great trade center of Ephesus was dependent upon its Mediterranean seaport. As the harbor filled with silt, the city lost its vital harbor and declined in importance.

We know that mountains and valleys and rivers and seas change their positions over time. We also know that the continents themselves slowly move about the globe. But can the moving continents themselves be considered essentially transitory features? Do they too disappear to be recycled?

The answer is basically no. In contrast to the crustal floor of the ocean whose oldest known age is 160 million years, the continents contain at their centers great granitic bases that date between 2.5 and 3.5 billion years ago. Where these granitic bases or cratons are exposed to the surface they are called shields. The extensive Canadian Shield of eastern Canada is the best-known geologic example. These basement rocks extend under a major portion of the United States.