FIGURE 7.7
Chimney Rock at Capitol Reef National Monument in central Utah is a striking specimen of the red beds formed during the Triassic age 200 million years ago. (Courtesy Utah State Historical Society.)

and the formations are often composed of sandstone deposited by wind or in shallow-water, dry-land environments. Once oxygen was present in the atmosphere, it could combine with the iron present in the grains of rocks to form the stable compound ferric oxide, which is resistant to solution. Iron would no longer be easily soluble to be carried to the world's oceans and lakes.

Thus the sedimentary rocks testify to the ancient supply of the world's oxygen. Prior to 2 billion years ago, oxygen as a gas was present only in the world's oceans where it combined with the soluble iron to produce the banded iron formations. After 2 billion years ago, oxygen was free to accumulate in the atmosphere, create the ozone screen, and combine with the iron still present on the land to form the Red Beds of the deserts. Once in the stable state of ferric oxide in the Red Beds, the iron was no longer free to wash into the oceans. Banded iron formations are virtually absent after 2 billion years ago. The land formations known as Red Beds first began to appear about 2 billion years ago, and iron continues to rust in our present oxygenated environment when exposed to water and air.

A critical effect of the increasing accumulation of oxygen in the atmosphere was the creation of the ozone screen. The ozone screen began to filter out the Sun's ultraviolet rays, and advanced forms of photosynthesizing plant life, red, green, and brown algae appeared. As the oxygen supply continued to increase, animal life in the water appeared, then plant life on the land, and finally animal life on the land. The time scale of the changing atmosphere of the Earth is illustrated in Figure 7.8.