KİMYASAL BOZUNMA VE TOPRAK

CHEMICAL WEATHERING AND SOIL

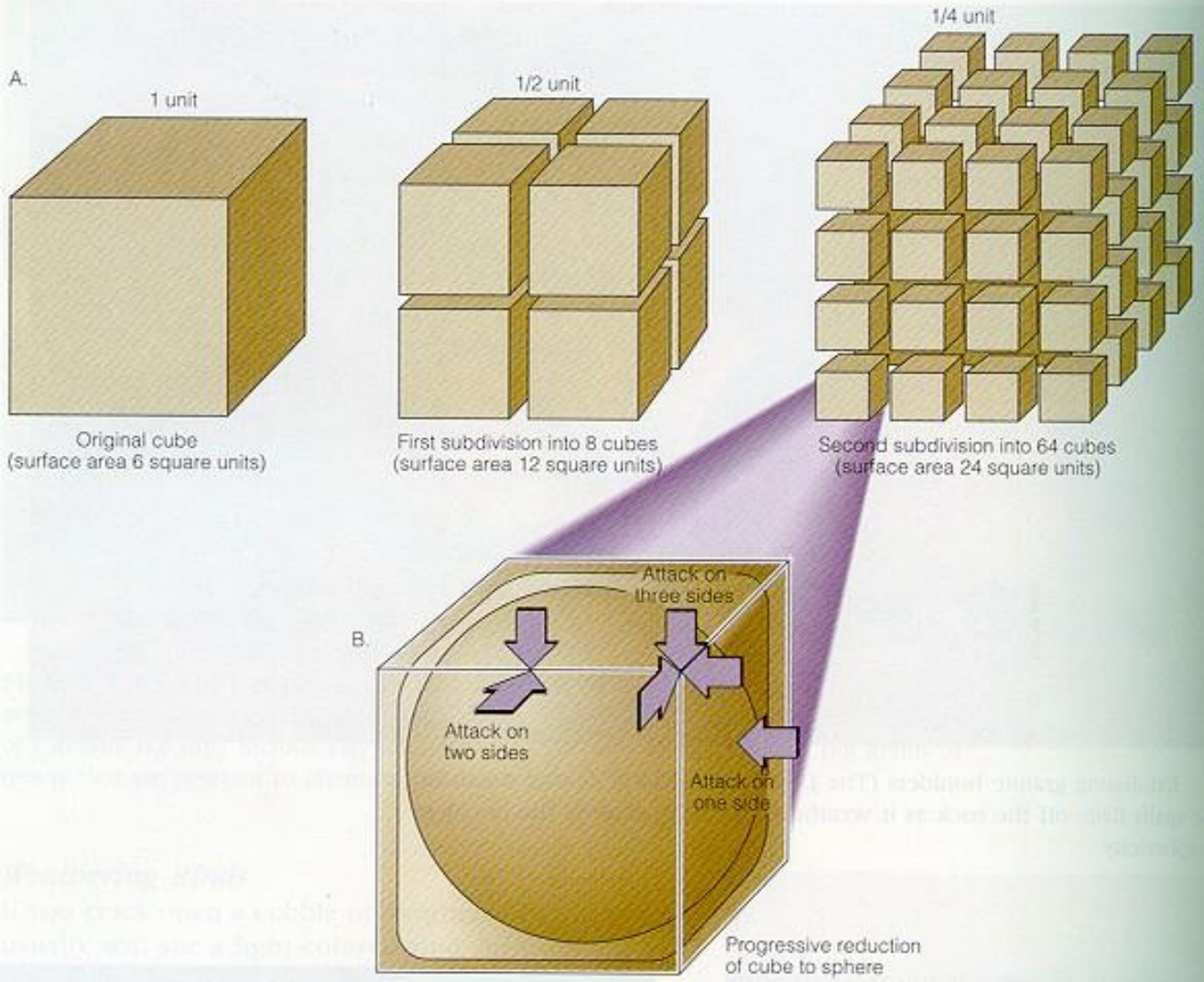


FIGURE 7.13 Subdivision and weathering of rock cubes. A. Each time a cube is subdivided by slicing it through the center of each of its edges, the aggregate surface area doubles. This greatly increases the speed of chemical reaction. B. Solutions moving along joints separating nearly cubic blocks of rock attack corners, edges, and sides at rates that decline in that order, because the numbers of corresponding surfaces under attack are 3, 2, and 1. Corners become rounded, and eventually the blocks are reduced to spheres. Once a spherical form is achieved, the energy of attack becomes uniformly distributed over the whole surface, so that no further change in form occurs.

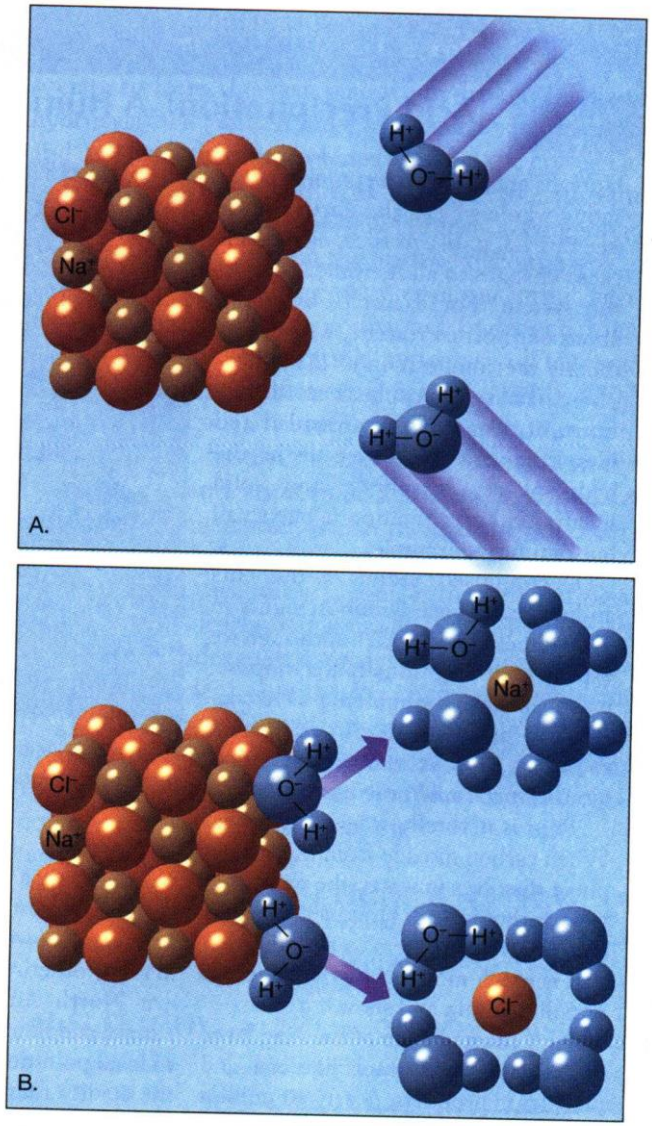


Figure 5.10 Illustration of halite dissolving in water. **A.** Sodium and chloride ions are attacked by the polar water molecules. **B.** Once removed, these ions are surrounded and held by a number of water molecules as shown.

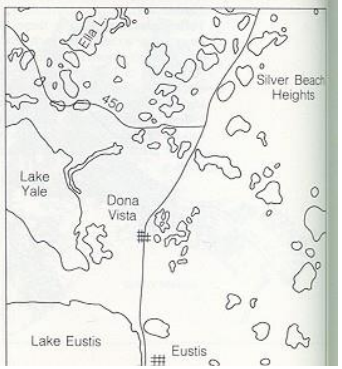


Figure 2.8
Groundwater is a largely invisible part of the hydrologic system, since it occupies pore spaces in the soil and rocks beneath the surface. It can, however, dissolve soluble rocks, such as limestone, to form complex networks of caves and subterranean passageways. As the caverns enlarge, their roofs may collapse, so that circular depressions called sinkholes are formed. Sinkholes create a pockmarked surface called karst topography. The hundreds of lakes shown in this photograph of the area west of Cape Canaveral, Florida, occupy sinkholes and testify to the effectiveness of ground water as a geologic agent.

Figure 5.A Acid rain accelerates the chemical weathering of stone monuments and structures, including this building facade in Leipzig, Germany. (Photo by Doug Plummer)

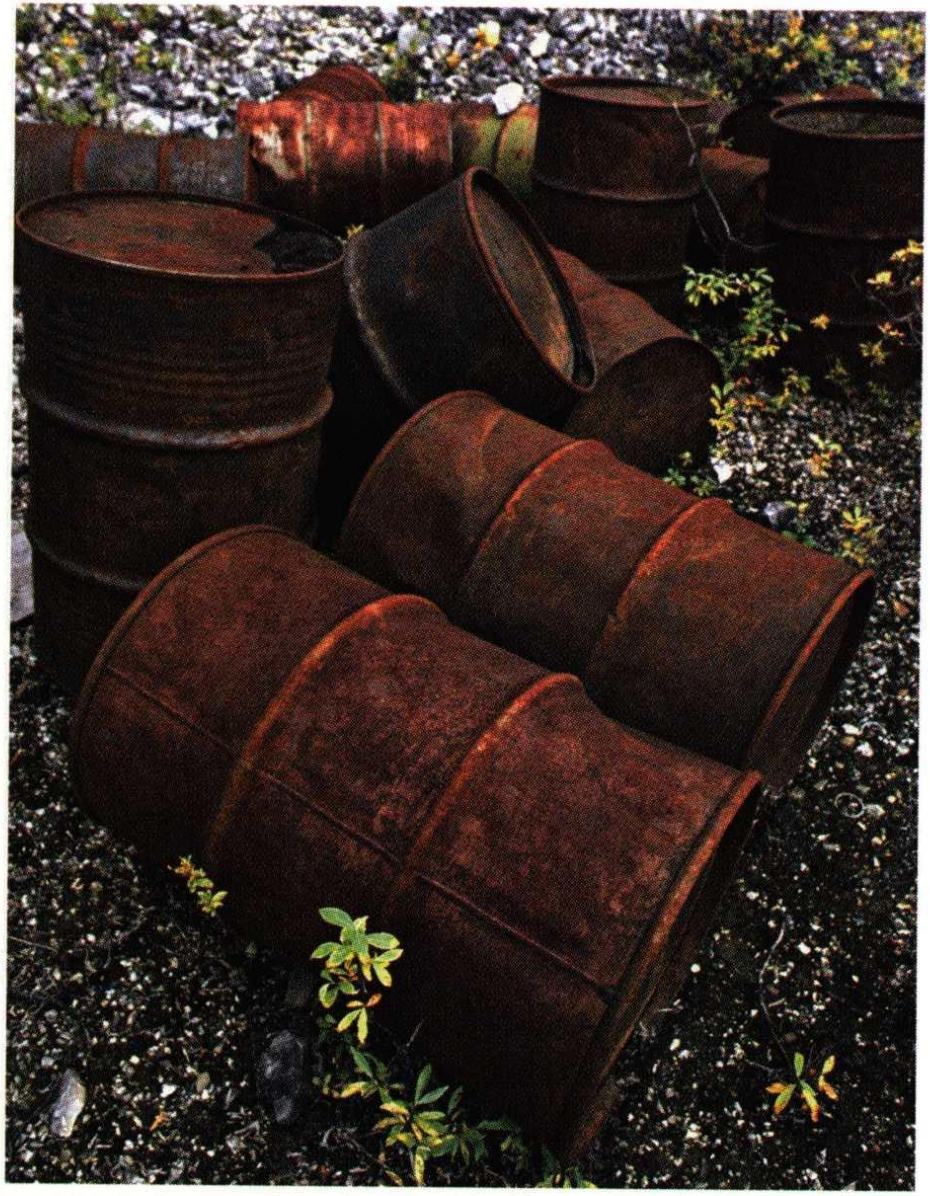
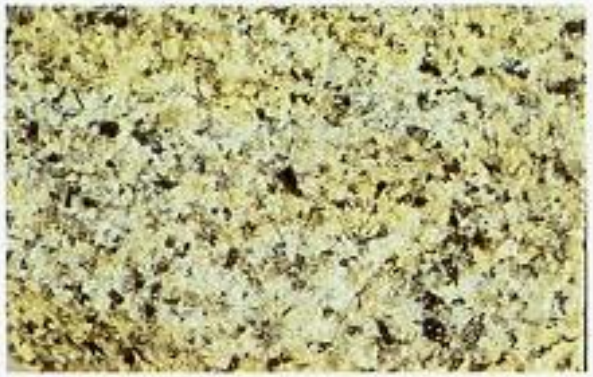


Figure 5.11 Iron reacts with oxygen to form iron oxide as seen on these rusted barrels. (Photo by Stephen J. Krasemann/DRK Photo)

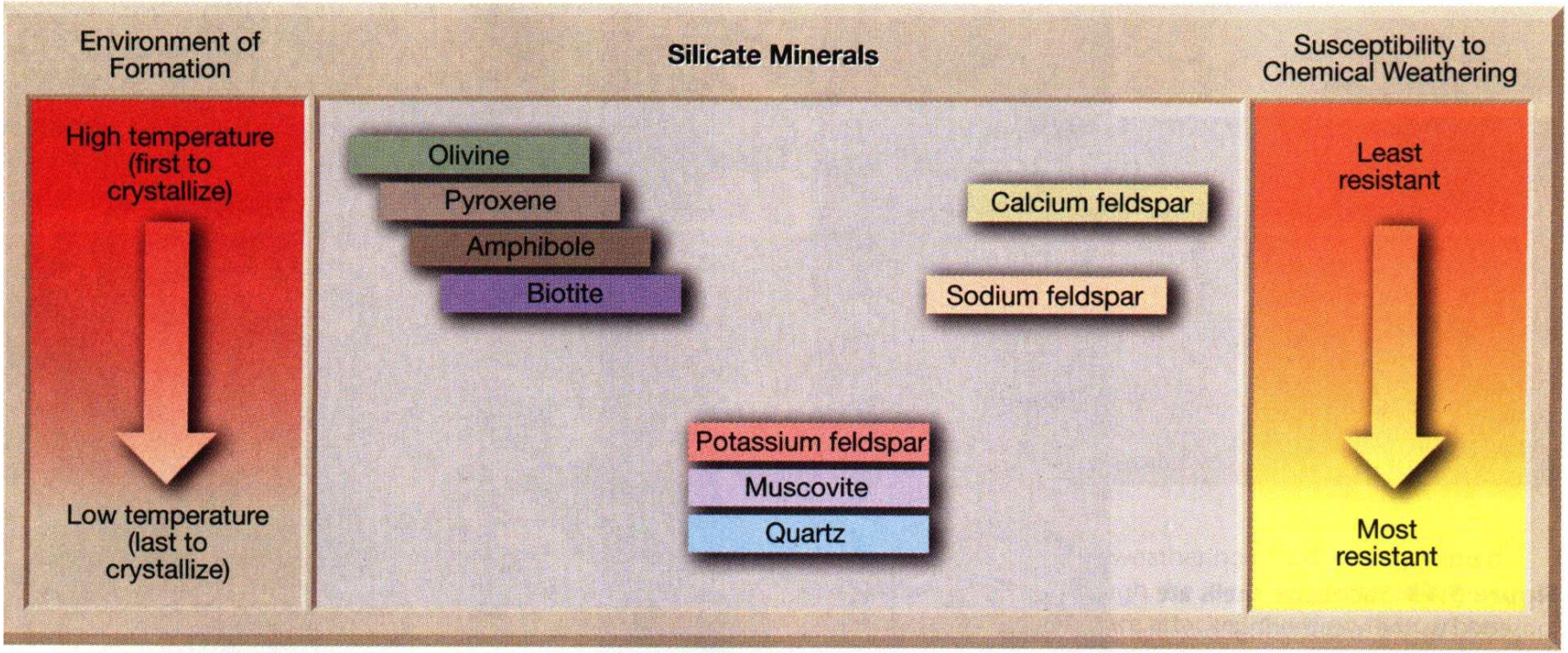


Basalt

Granite

Minerals		Solid weathering products		Soluble ions in solution
Feldspar	→	Clay minerals	+	Na^{1+} and Ca^{2+}
Fe–Mg mineral	→	Clay minerals	+	Mg^{2+}
Magnetite	→	Goethite		
Feldspar	→	Clay minerals	+	Na^{1+} and K^{1+}
Mica	→	Clay minerals	+	K^{1+}
Fe–Mg mineral	→	Clay minerals and goethite	+	Mg^{2+}
Quartz	→	Quartz		

FIGURE 7.9 When a basalt weathers chemically, its silicate minerals and magnetite are converted to clay minerals, goethite, and soluble cations. The weathering products of a granite not only include clay minerals, goethite, and soluble cations, but grains of quartz that are resistant to chemical breakdown.



igure 5.15 The weathering of common silicate minerals. The order in which the silicate minerals chemically weather is essentially he same as their order of crystallization.

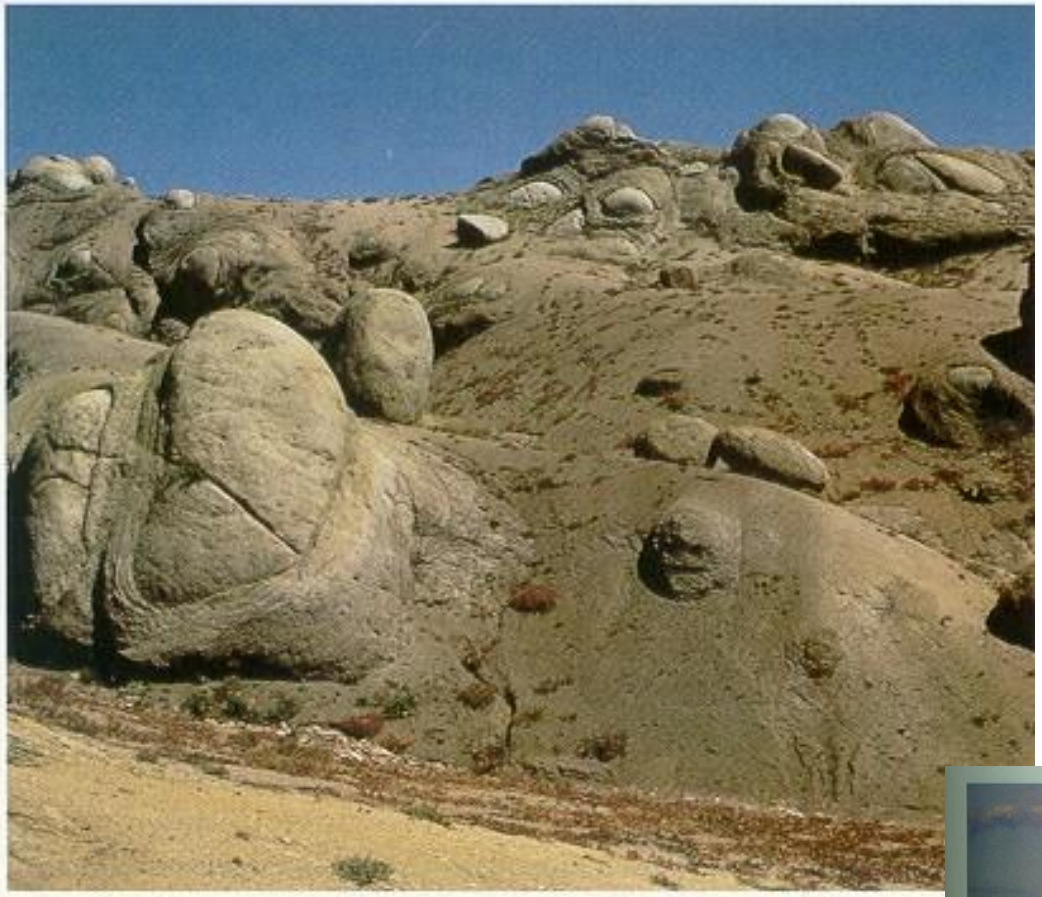


FIGURE 7.12 Spheroidal weathering of granitic bedrock in the northern Sierra Nevada of California produces boulders of solid granite that are surrounded by a core of disintegrated rock. Although the boulders resemble rounded stream gravel, their form is entirely the result of weathering.

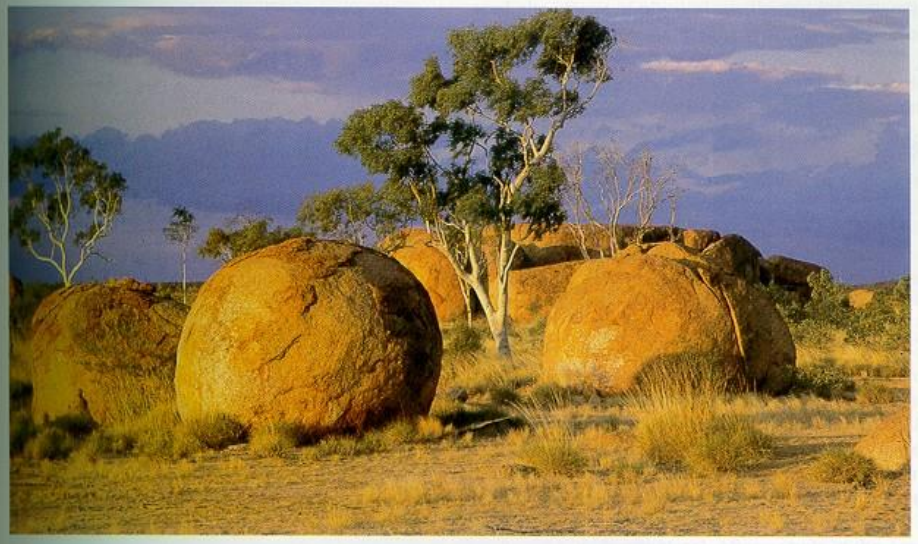


FIGURE 7.11 Exfoliating granite boulders (The Devil's Marbles) in central Australia. Thin, sheetlike spalls flake off the rock as it weathers, gradually causing the boulders to increase in sphericity.

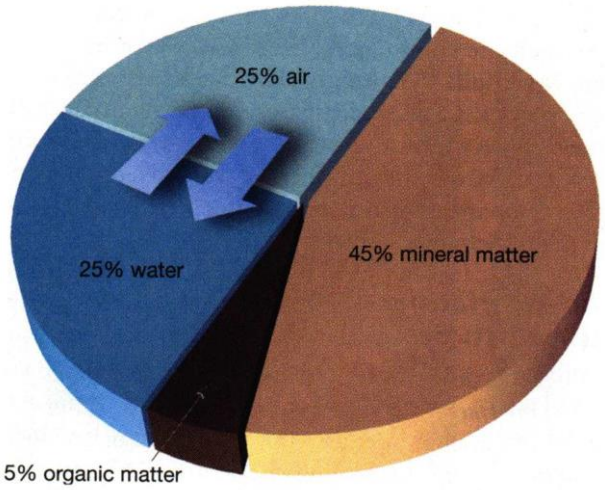


Figure 5 17 Composition (by volume) of a soil in good condition for plant growth. Although the percentages vary, each soil is composed of mineral and organic matter, water, and air.

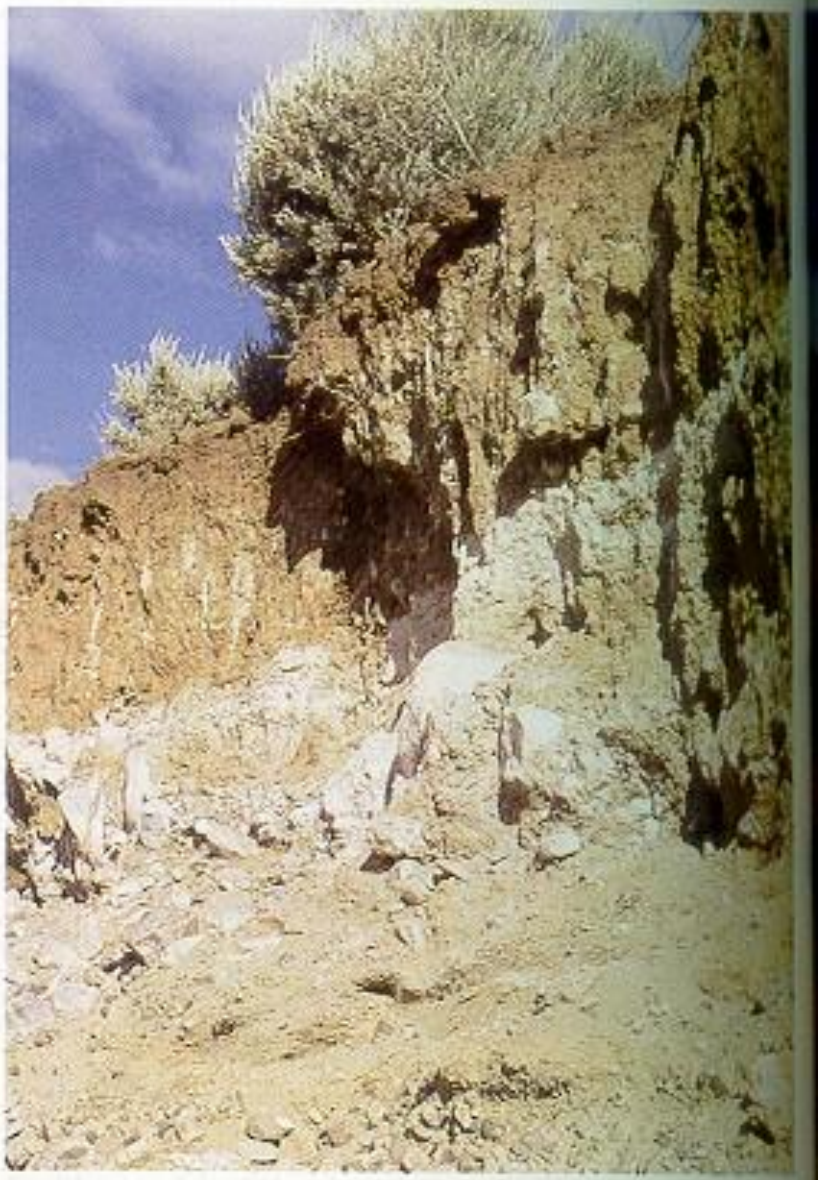


FIGURE 7.19 A soil profile in semiarid central New Mexico includes whitish caliche forming a prominent K horizon between a yellowish-brown C horizon beneath and a reddish-brown B horizon above.

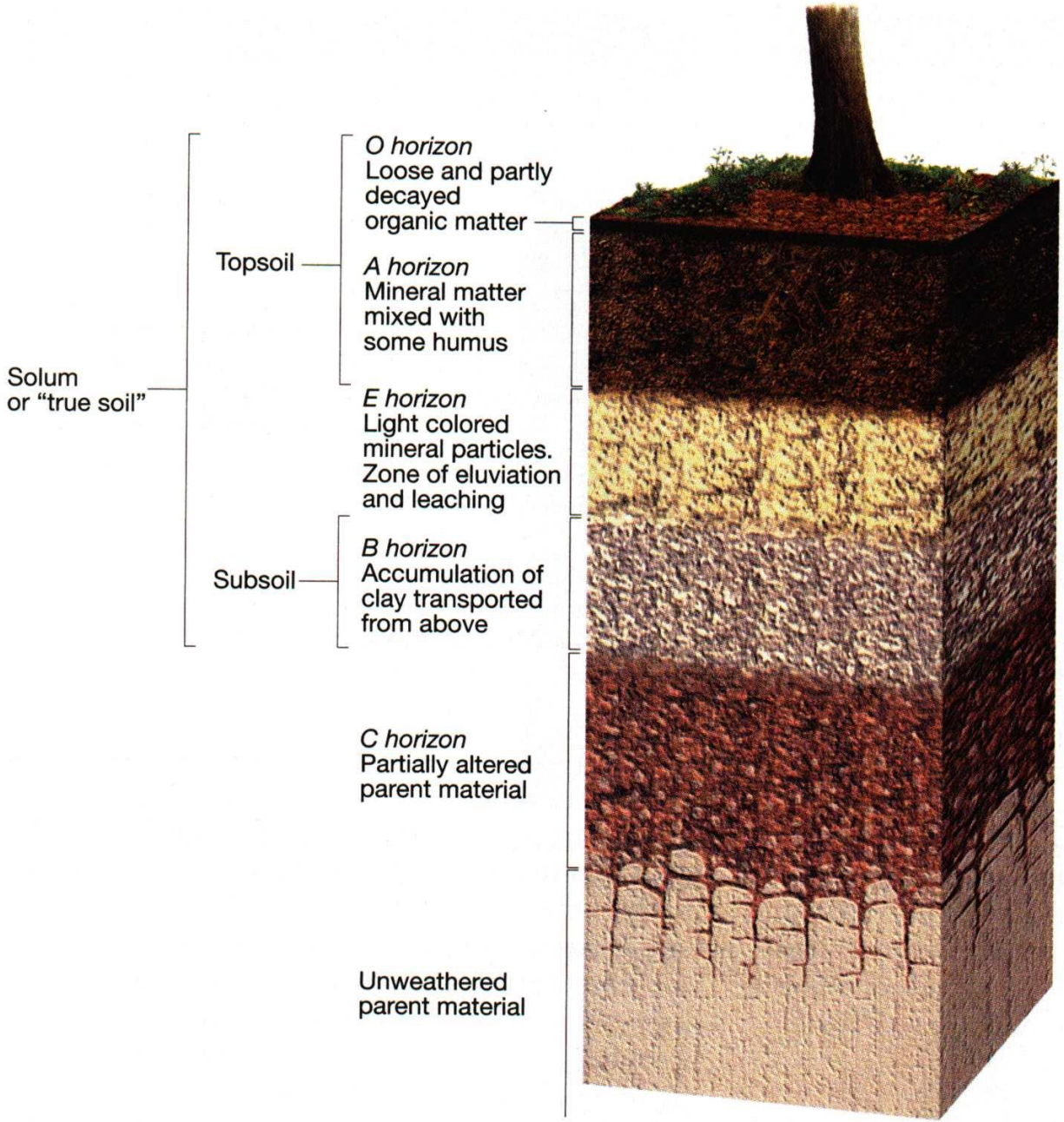


Figure 5.20 Idealized soil profile from a humid climate in the middle latitudes.

FIGURE B7.1 Red, iron-rich laterite near Khao Yai, Thailand. Originally a conglomerate, the rock is now a mixture of limonite and clay as a result of extreme tropical leaching.

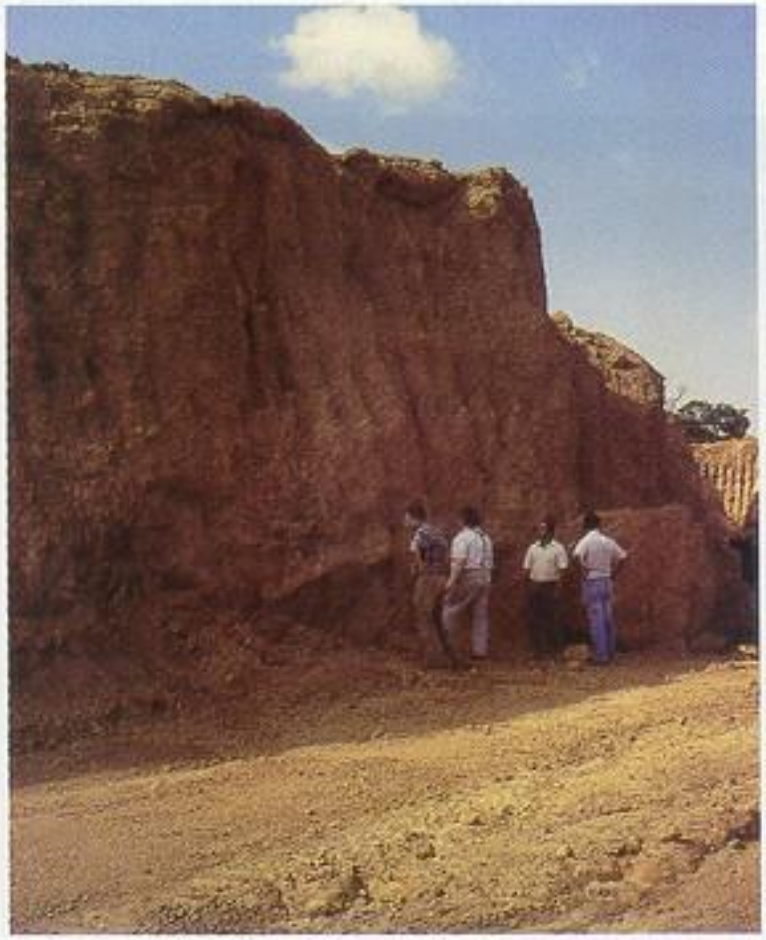


FIGURE B7.2 Bauxite mining in Venezuela. The bauxite is a 6-m-thick capping of aluminous laterite developed on granite.