



On the leading edge of the westward-moving North American continental plate, Oregon has for millions of years been variously stretched, compressed and elevated. These processes continue today, with North America moving at a velocity of approximately 1.5 inches per year. In the northeast and southwest corners of the state, the Blue and Klamath Mountains suffered extreme compression as they were being annexed to North America.

The ancient rocks were elevated to high altitudes and extensively shaped by glaciers. Streams following fractures and fault patterns give the topography a distinctive rectangular grain (for detail, see page 127). Between Coquille and Newport in the central Coast area a series of lakes is trapped behind vast high dunes of clean white quartz sand delivered by streams and piled up by strong ocean winds (for detail, see page 126). The distinctive cones of the Cascades and High Lava Plains to the southeast tell a recent — geologically speaking — and tumultuous chapter in Oregon's volcanic history. Appearing on this map as smooth bumps, the volcanic peaks dotting the High Cascades are generally less than five million years old. These newly formed peaks have not yet been subject to the extensive erosion that has carved and "wrinkled" the much older Western Cascades. Remnants of what were once vast Ice Age pluvial lakes are today shallow bodies of water in the south-central portion of the state. Extensive erosion due to high rainfall has given both the Coast Range and the Western Cascades a thoroughly dissected "mature" physiography with steep valleys and deep canyons. East of the Cascades many of the streams are incised deeply into the flat volcanic plateaus.

The earth's crust beneath Oregon is anything but uniform. In the south-central part of the state intense stretching has pulled the area to more than twice its original width and left the crust only a few miles thick. In the northeast and southwest corners of the state great blocks of exotic rock project several tens of miles into the subsurface. Seventy miles beneath the eastern edge of the Cascade Range, the eastbound Juan de Fuca oceanic crustal plate is melting as it slips under the North American Plate. Along the axis of the Cascades volcanic conduits make their way to the surface from a depth in excess of 60 miles, intermittently pouring out lava and ash. A tangible reminder of ancient volcanic activity is seen clearly in the flat plateaus across the northern and central sections of the state. These regions are floored by near-continuous sheets of what was once an extremely hot fluid lava.

