

# ***The WPA Guide to Indiana: The Hoosier State***

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With this brief outline in mind, the geological formations of Indiana are easily understood. In the southeastern corner of the State the surface rocks, immediately under the topsoil, are of Ordovician age. Then in order, toward the west, appear belts of Silurian, Devonian, Mississippian, and Pennsylvanian outcroppings; a second and smaller Devonian formation to the north indicates the presence in that period of a separate northern basin. Cambrian and pre-Cambrian rocks, though not exposed anywhere in Indiana, underlie these more recent formations; there are Permian rocks, because Indiana was above the sea level during and after this period.

Ordovician rocks are exposed only in the southeastern corner because of the uplift that began at this point to form the Cincinnati Arch. Elsewhere in the State Ordovician strata are found beneath more recent formations. Next to the Ordovician outcropping a belt of Silurian rocks is exposed. Farther west the Silurian rocks are overlapped by rocks of succeeding periods—a narrower Devonian formation, a still narrower Mississippian. Only in the southwestern part of the State are Pennsylvanian rocks found, overlying the uptilted layers of previous periods.

During the many millions of years intervening between the Permian period and the glacial epoch, Indiana experienced three major cycles of erosion. In the entire Mesozoic era, however, the region was above sea level and thus has no rocks of the Triassic, Jurassic, or Cretaceous age. For the same reason no rocks were formed in Indiana during the Tertiary period of the Cenozoic (recent life) era. At the beginning of the Pleistocene (Glacial or Ice Age) the Indiana region was elevated a fourth time. Then came the glaciers, creating by their action many of the salient physical features of present-day Indiana. In the Pleistocene about five-sixths of the whole region—all except what is now south central Indiana—was at one time or another under a massive layer of ice, sometimes 2,000 feet thick.

There were at least three ice invasions into Indiana. The earliest, or Illinoian, extended farther south than the Ohio River except in the south central part of the State. Later came the early Wisconsin, which reached a line dividing the northern two-thirds of Indiana from the southern third. The last of the glaciers, the late Wisconsin, covered only the northern half of the State. After each invasion came a warmer period lasting many thousand years, during which the glacier ebbed slowly away, and plants and animals flourished.

The glaciers modified the terrain in several important ways. Their most striking effect was the present bed of the Ohio River, channeled by the ice melting at the edges. They cut off many hills in the northern region, filling the valleys with the rocks thus removed, and smoothing and leveling the entire area. By mixing these materials and grinding them into rock flour an excellent subsoil was formed, particularly a fine clay. Over much of Indiana today the glacial subsoil, the surface of which is excellent farmland, is scores of feet deep, in marked contrast to the shallow and easily eroded surface of the unglaciated areas. Glaciers also greatly altered drainage conditions by destroying streams and valleys, melting and thus creating new ones, and leaving water in many depressions to form marshes and lakes. In melting, they left extensive deposits of sand and gravel they had picked up and created many hills in the north by piling up soil and rocks into moraines.

The glaciers were not the last agency to alter the surface of Indiana. Wind, water, chemical action and heat and cold are still at their ceaseless labor of lifting and breaking the soil, cutting into bedrock, and carrying away the debris thus formed. In the unglaciated section the soil is thin and easily worn away, and in the course of centuries innumerable swift streams have cut the bedrock to form deep gorges, canyons and hills. In the northern two-thirds of the State, however, the processes of erosion proceed much more slowly. Here the drainage is less rapid, for the land is level and the streams sluggish.