

OHIO'S BEGINNINGS

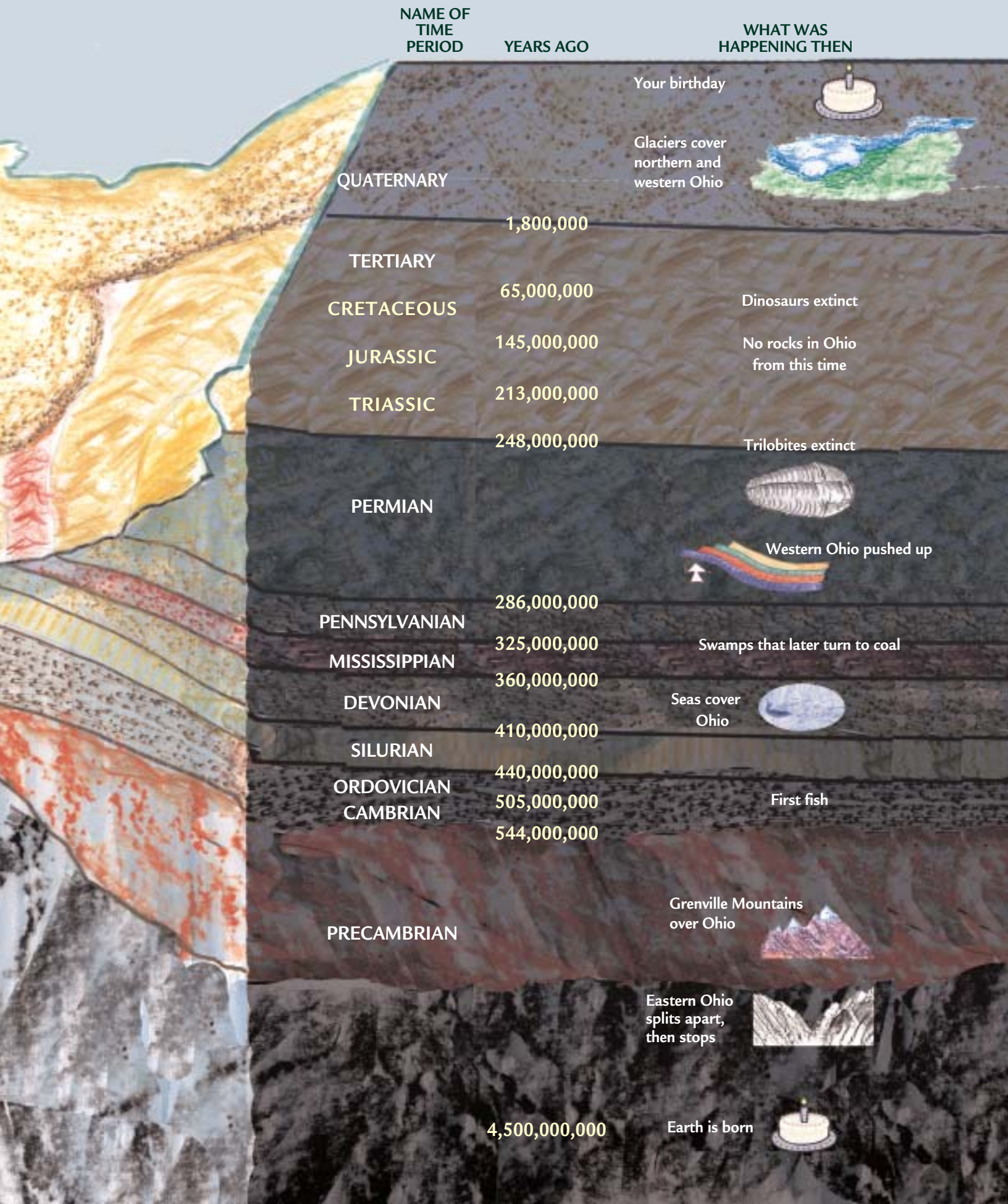
The story of the rocks and fossils under Ohio goes back almost four and a half billion years to when the Earth was born: Back before there were any human beings or even any plants or animals—back when there were only rocks and seas and air. The oldest rocks in Ohio are under the western part of the state and are more than a billion years old. But they are buried thousands of feet deep under thick layers of younger rocks.

To tell the story of the rocks and fossils in Ohio and around the world, geologists divide time from the beginning of the Earth right up to now into different periods—just as we have names for months of the year and days of the week.

Geologic time is so long that the periods are divided by major events in Earth history, like when certain plants or animals showed up or when others became extinct.

The rocks and fossils under Ohio are from many different time periods. Some formed billions of years ago, and some are just starting to form now under lakes and streams—and maybe in your own backyard. But rocks from some time periods, like those from the age of the dinosaurs, are simply missing. That may be because water and wind swept the rocks and fossils away, or because the land was slowly rising during that time and no thick layers of rocks and fossils were deposited. Without rocks or fossils as clues to the past, we can only guess what happened!



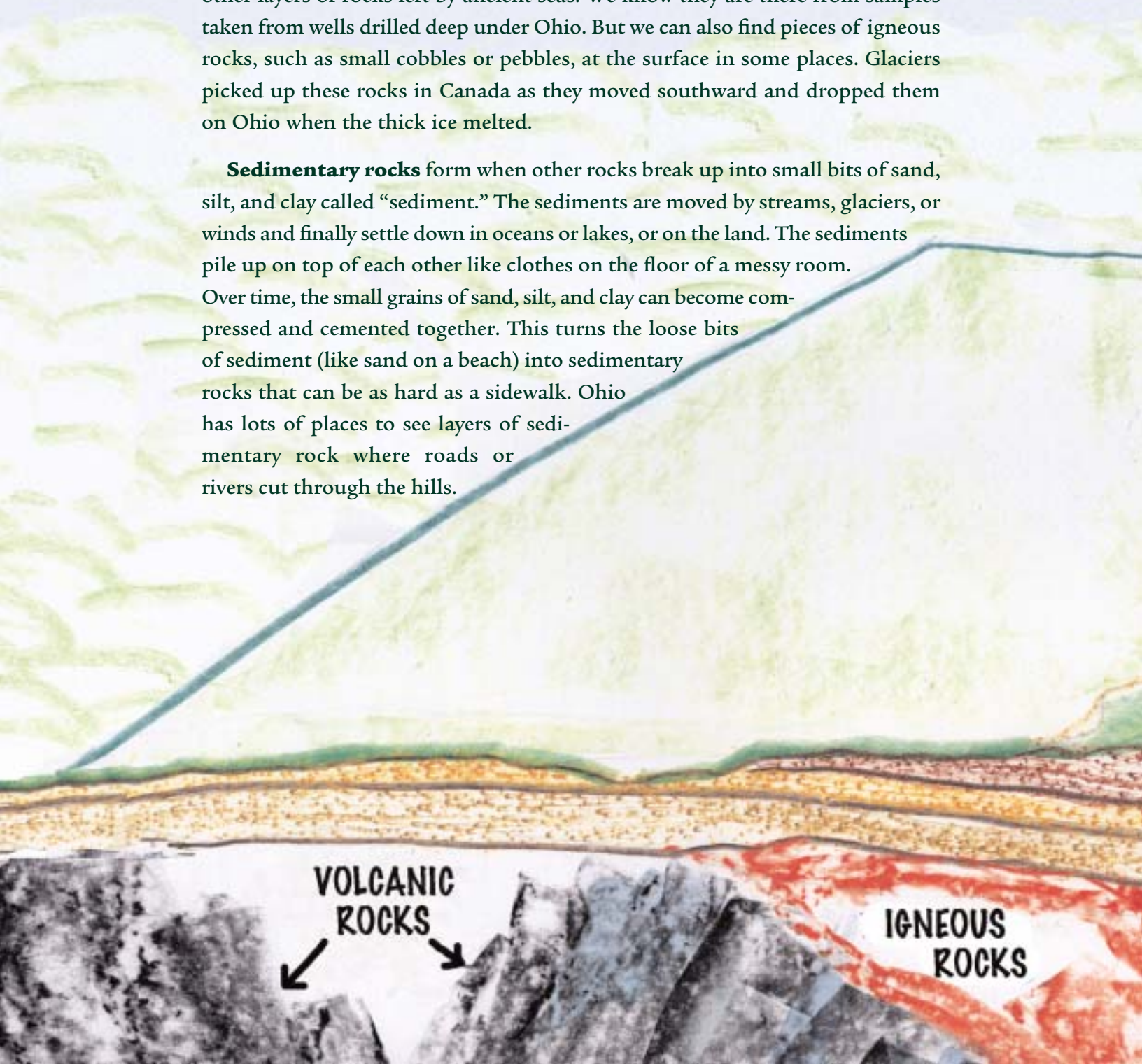


Under Ohio, you can find all three of the main types of rock in the world: igneous, sedimentary, and metamorphic.

Igneous rocks are found deep under Ohio (the deepest rocks are actually called “basement rocks”). Igneous rocks are formed when magma or lava cools and crystallizes. They can cool slowly under the surface as plutonic rock, or they can shoot up onto the land and cool quickly as volcanic rock.

We can't see the deep igneous rocks of Ohio because they are covered by other layers of rocks left by ancient seas. We know they are there from samples taken from wells drilled deep under Ohio. But we can also find pieces of igneous rocks, such as small cobbles or pebbles, at the surface in some places. Glaciers picked up these rocks in Canada as they moved southward and dropped them on Ohio when the thick ice melted.

Sedimentary rocks form when other rocks break up into small bits of sand, silt, and clay called “sediment.” The sediments are moved by streams, glaciers, or winds and finally settle down in oceans or lakes, or on the land. The sediments pile up on top of each other like clothes on the floor of a messy room. Over time, the small grains of sand, silt, and clay can become compressed and cemented together. This turns the loose bits of sediment (like sand on a beach) into sedimentary rocks that can be as hard as a sidewalk. Ohio has lots of places to see layers of sedimentary rock where roads or rivers cut through the hills.



Sedimentary rocks can also form when a sea dries up and leaves layers of salt and other types of rock (a mine under Cleveland goes down more than a thousand feet to a buried layer of salt). Ohio's sedimentary rocks include coal, limestone, sandstone, and shale. It also includes flint—Ohio's official gemstone—which was used to make arrowheads and jewelry for thousands of years!

Sometimes pieces of plants or the shells, bones, or teeth of animals settle down with the sediment and eventually become part of the rock, where they can turn into fossils. Or sometimes an animal might leave only tracks when it walked across muddy land or crawled on the sea bottom.

Ohio also has **metamorphic rocks** that are found mostly deep underground. Metamorphic rocks are made from other existing rocks that have been changed by heat and pressure when buried deep or when hot molten rock moves in next to them (metamorphic simply means “changed”—like a caterpillar that metamorphoses into a butterfly).

We can't see lots of metamorphic rocks at the surface of Ohio because they are buried deep, but we can find small pieces of metamorphic rocks that were brought down from Canada by the glaciers, just like the pieces of igneous rocks.

