STONE
USED IN THE CONSTRUCTION OF THE
ARKANSAS STATE CAPITOL BUILDING

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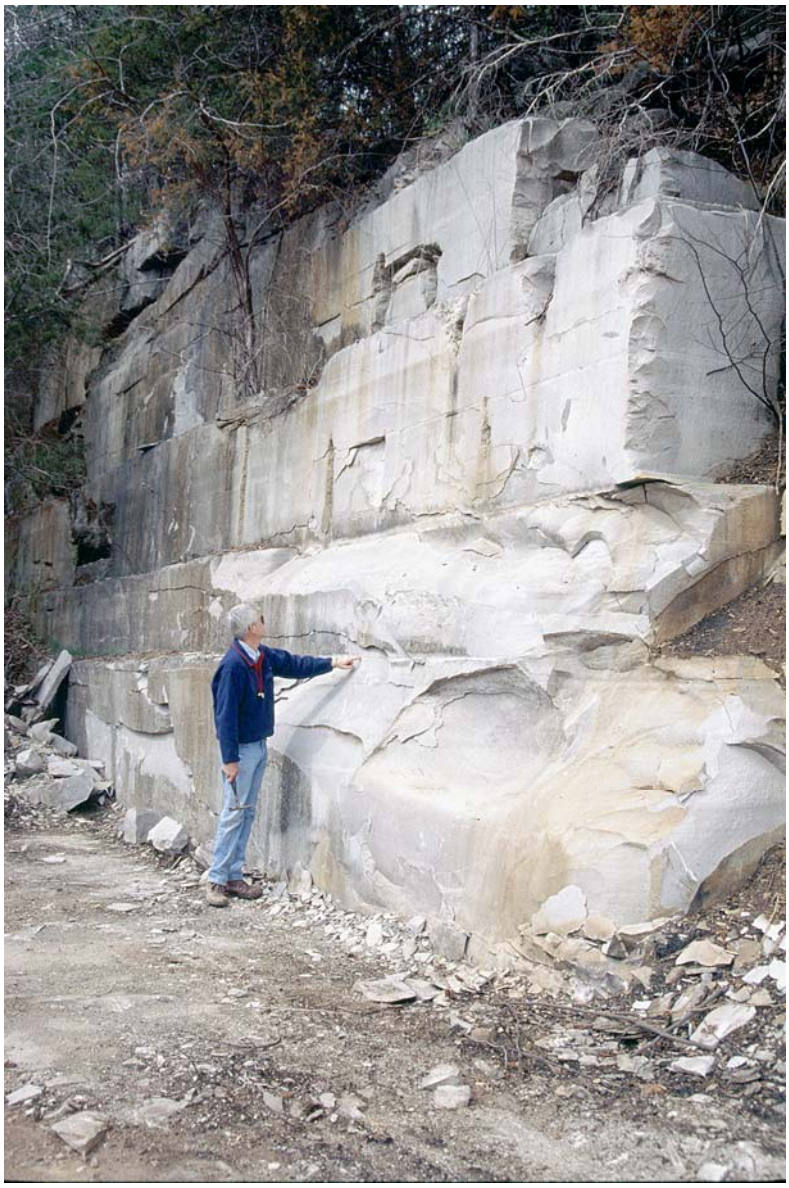
"The wealth, stability, and culture of a nation are generally reflected in its buildings, both public and private. As a nation advances in material prosperity we find the cheap and temporary wooden buildings replaced by more costly, durable and elegant structures of stone, with their interiors decorated with marble."

T.C. Hopkins in "Marbles and other Limestones" (Arkansas Geological Survey Annual Report, 1890)

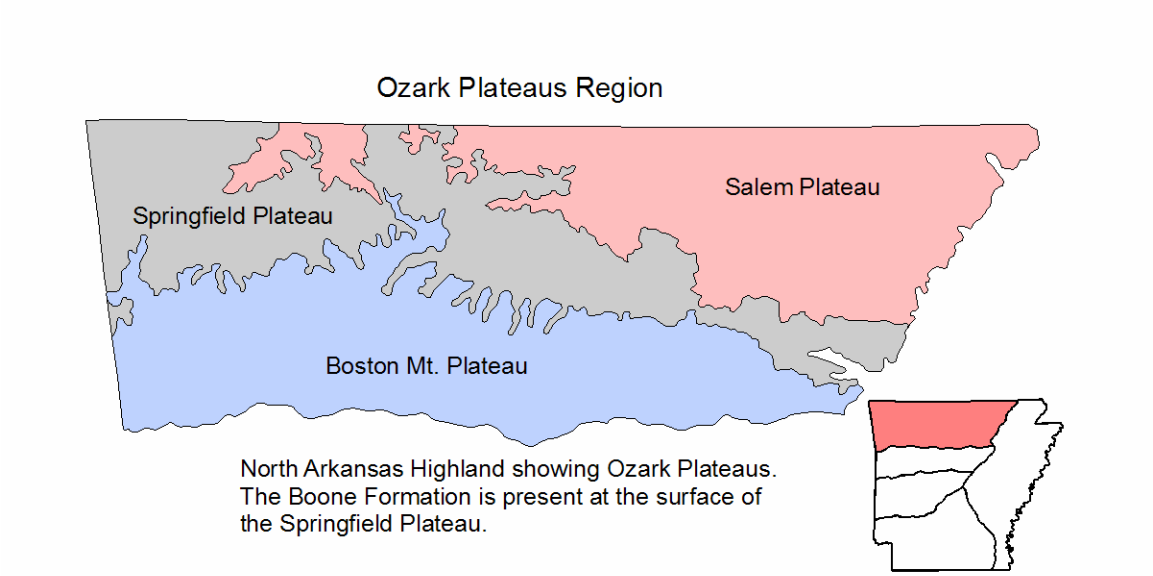
The rocks used in the construction of the Arkansas State Capitol can be grouped into three general categories (as all rocks can); **igneous** – rock formed from molten material; **sedimentary** – rocks formed from the bits and pieces weathered from other rocks or from the shells and skeletons of plants and animals that lived in the past; and, **metamorphic** – rocks formed from preexisting rocks by heat, pressure or chemical action.



Limestone quarry for State Capitol in the Boone Formation at Pfieffer, Arkansas.

The exterior of the Capitol is faced with a **sedimentary** rock called **limestone**. This limestone was quarried near Batesville, Arkansas from a rock unit called the Boone Formation. The Boone Formation limestone can

be traced across the north Arkansas highland from Independence County to Benton County. The limestone is predominantly composed of the mineral calcite, much of which is of biologic origin.



Close-up of the Boone limestone facing the exterior of the Capitol.

Between 340 and 350 million years ago most of Arkansas was covered by a tropical sea. Near the shoreline on a broad shallow shelf an abundance of marine life flourished. Invertebrate animals and calcareous algae dominated the biologic community. Crinoids, snails, bryozoa and corals lived in fields, patches and reefs across the sea floor. As these plants and animals died their skeletons settled to the bottom, there to be disarticulated, broken and ground up into sand size particles by the action of waves, currents and storms. Eventually this sediment found rest in deeper waters carried there by processes similar to those that created the sedimentary debris. As millennia passed more and more sediment accumulated. Millions of years later this portion of Arkansas was uplifted, carrying this compacted but as yet mostly unconsolidated skeletal debris above the sea. The sea water that filled the pore spaces between the grains of sediment was gradually replaced by fresher water. This change in pore water also changed the sediment chemistry slightly. Cement – mostly calcite – formed due to this chemical change, glued the particles together and formed the rock we call limestone.

If you stop a moment and give close attention to the limestone facing the Capitol you can find many recognizable fossil fragments. Disc-shaped crinoids, lacy bryozoan and cone-shaped corals are all present.

The igneous rock syenite at the base of a limestone column.

Around the base of the walls and columns of the Capitol are blocks of an igneous rock called **syenite** cut from quarries southeast of Little Rock on Granite Mountain. This rock was formed by the emplacement of a mass of molten rock within the earth's crust about 90 million years ago. With time the molten rock cooled and the various minerals crystallized. During the last 90 million years the overlying sedimentary rock eroded away exposing this now solid rock. As the weathering environment affected the syenite it too began to erode and weather. Some of the minerals broke down into soluble material and were washed away, leaving behind an enriched residuum called bauxite. Bauxite is the ore of aluminum and has been designated the state rock of Arkansas by Act 128 of the General Assembly of 1967.

Typical of many public buildings the interior of our Capitol is faced with marble. Marble is used for its beauty, durability, uniformity of texture and adaptability to construction.

Marble stairs in the state capitol building.

To some any suitable limestone that will take a polish is considered a marble. The term marble used in this way is a commercial term rather than a scientific one. Limestones from north Arkansas are often marketed under

the commercial name marble. However, true marble is a metamorphic limestone.

The **marble** used inside the Capitol is a **metamorphic limestone** and was imported from Alabama, Colorado and Vermont. The original limestones, before metamorphism transformed them into marbles, may have looked similar to limestone from the Boone Formation and were probably formed in much the same manner and by similar processes. Metamorphism slowly destroyed the original texture, bedding and fossils of the limestone and led to recrystallization and reestablishment of environmental equilibrium. The indistinct dark zones observed in this marble may be the last traces of folded bedding planed or possible zones of impurities concentrated by pressure solution.

Indistinct dark zones in marble in the interior of the capitol.

History is often reported to begin and end with man's own influence. It is hoped that this brief geologic summary of the rock used in the construction of the State Capitol will introduce new dimensions and expand your understanding of what our Capitol represents – not only our seat of government, but also our natural resource heritage.