GUIDEBOOK NO. 6

GUIDE TO THE BUILDING STONES OF DOWNTOWN COLUMBUS:

A WALKING TOUR

by

Ruth W. Melvin and Garry D. McKenzie

prepared for the 1992 Annual Meeting
of the Geological Society of America

DIVISION OF GEOLOGICAL SURVEY
4383 FOUNTAIN SQUARE DRIVE
COLUMBUS, OHIO 43224-1362
(614) 265-6576 (Voice)
(614) 265-6994 (TDD)
(614) 447-1918 (FAX)

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by

Ruth W. Melvin
Delaware, Ohio

Garry D. McKenzie
The Ohio State University

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Cover illustration: The One Nationwide Plaza building rises behind the terra-cotta and brick arch in Arch Park, juxtaposing classical and modern architecture. The arch is all that remains of the High Street Arcade of Columbus's former Union Railroad Station.

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GUIDE TO THE BUILDING STONES OF DOWNTOWN COLUMBUS: A WALKING TOUR

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and
Garry D. McKenzie

INTRODUCTION

Columbus, the capital of Ohio and the county seat of Franklin County, has a unique heritage in its buildings, many of which are made with a fascinating array of beautiful rock materials. This heritage reveals, through a diverse and commonly highly aesthetic architecture, the history of a people and the development of a city. The buildings also provide an opportunity for study of a variety of geologic materials and for discussion of the formation, geologic history, and weathering of rocks.

For each building on the tour, this guide gives the location, year of construction or dedication, and the type and source of the **building stones,** which came from areas within the county, from nearby sites in other counties, and from other states and countries (fig. 1). The rock materials encompass the major rock types commonly classified as **igneous, sedimentary,** and **metamorphic.** In addition, other geologic materials such as concrete, brick, and various metals have been used in many buildings. These materials give considerable diversity to the appearance of the city. The historical changes in architecture combine classical types with utilitarian modern types to provide startling contrasts. Although brief reference is made to architecture and to construction techniques, the reader should seek other sources (such as Samuelson and others, 1976) for more information on these topics.

This guide is the outgrowth of an earlier guide (Melvin, 1986) that was developed for students and teachers visiting the Center of Science and Industry on Broad Street. The purpose of the present guide is to assist the public, students, teachers, and professionals in understanding the variety and importance of geologic materials in downtown Columbus. We expect the guide to be of most benefit to nongeologists and have included a glossary and references for further study of the geologic materials observed. Words that are defined in the glossary are in **boldface** where first mentioned in this text.

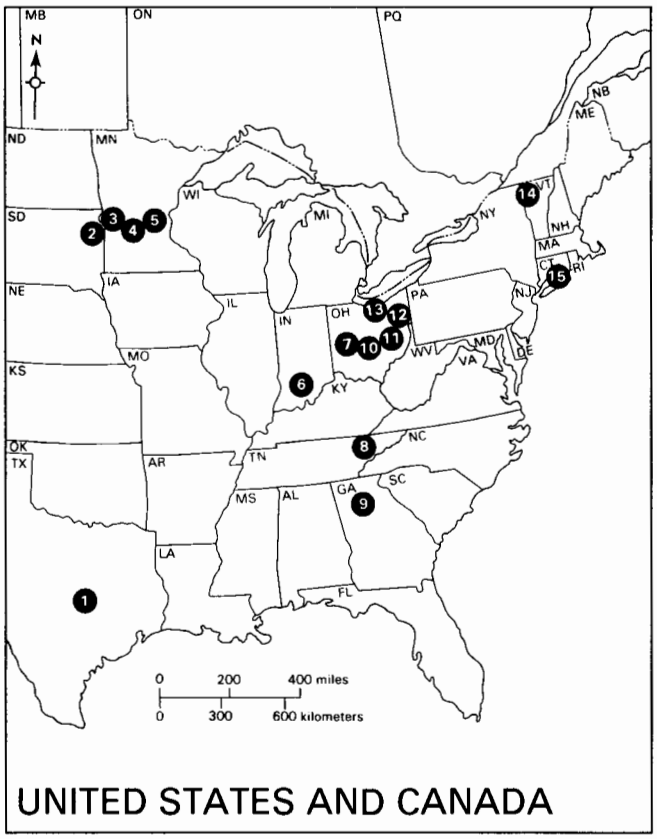
Stops in this guide are numbered, beginning with the State Capitol in the center of Columbus and ending with Orton Hall on The Ohio State University campus. All but two of the stops (7 and 20) are shown on the map of downtown Columbus (fig. 2 and back cover). The photographs were taken in 1986 and 1992.

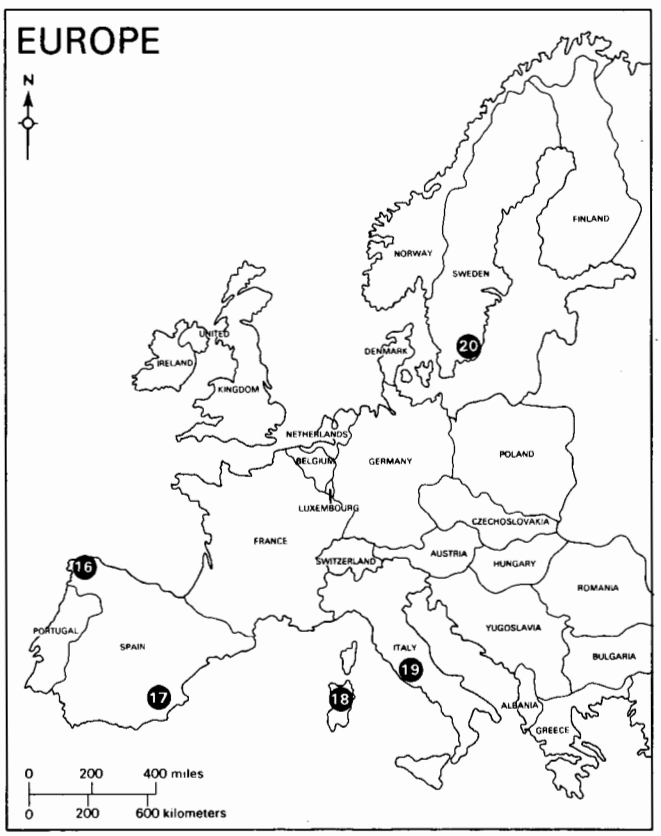
BUILDING STONES

Geology is the basic science that gives humans an understanding of the scope and importance of the physical environment. The ecological niche that we occupy, our food and clothing, and the materials we use in our complex civilization are all related directly to geology. When a city grows, be it a long time in developing or relatively short, the building materials used are from and of the Earth. As Columbus evolved from small log houses to a city with buildings taller than the Washington Monument, building materials became more complex and were brought from progressively greater distances to satisfy the desire for beauty, diversity, and permanence.

The rocks, metals, and other materials used in the construction of the buildings in downtown Columbus contribute greatly to the attractiveness of the skyline as well as to the artistic detail encountered upon close inspection. Igneous, metamorphic, and sedimentary rocks are found in some buildings; other buildings, particularly the older structures, are limited to sedimentary and metamorphic rocks. Early contractors utilized local stone, **limestone** from quarries on the west side of the growing city and **sandstone** from nearby Fairfield and Licking Counties. Limestone is a sedimentary rock consisting mainly of calcium carbonate. Depending on its purity, it also contains varying amounts of other carbonate minerals, clay minerals, and **quartz.** Sandstone is a sedimentary rock made up of sand-sized mineral grains (generally quartz, but in some cases **feldspar,** dominates) and rock fragments. These sedimentary rocks were combined with imported **marble,** from the eastern United States and Europe, to enhance the interiors of even the oldest buildings. Brick, a molded mass of clay and other materials fired in furnaces to form cohesive and durable blocks, was introduced in the latter part of the 1800's and early 1900's. **Terra-cotta,** another baked clay product, is seen on the exterior of two buildings (Stops 2 and 14) described in this guide. It is now used infrequently as a building material.

Travertine, a sedimentary rock composed of calcium carbonate deposited from solution when ground water or surface water rich in dissolved limestone evaporates, is commonly obtained from Tivoli, Italy. It is seen inside





1) Town Mountain Granite *(Sunset Red granite),* Burnet Co., Texas

2) Milbank Granite *(Carnelian granite),* Milbank, South Dakota

3) *Agate granite,* Ortonville, Minnesota

4) Morton Gneiss, Morton, Minnesota

5) *Pearl Pink granite,* St. Cloud, Minnesota, *Rockville White granite,* Rockville, Minnesota

6) Salem Limestone *(Indiana limestone),* Bloomington-Bedford area, Indiana

7) Dayton Formation and Brassfield Formation, Dayton area, Ohio

8) Holston Formation *(Tennessee marble),* Knoxville area, Tennessee

9) Murphy Marble *(Etowah marble, Georgia marble),* Tate area, Georgia

10) Columbus Limestone, Columbus, Ohio

11) Black Hand Sandstone Member, Licking and Fairfield Cos., Ohio

12) Massillon sandstone, eastern Ohio

13) Berea Sandstone, northeastern Ohio

14) Crown Point Limestone *(Champlain Black marble),* Vermont

15) *Stony Creek Red granite,* New Haven Co., Connecticut

16) Mondariz Granite, Porriño-Salceda, Spain

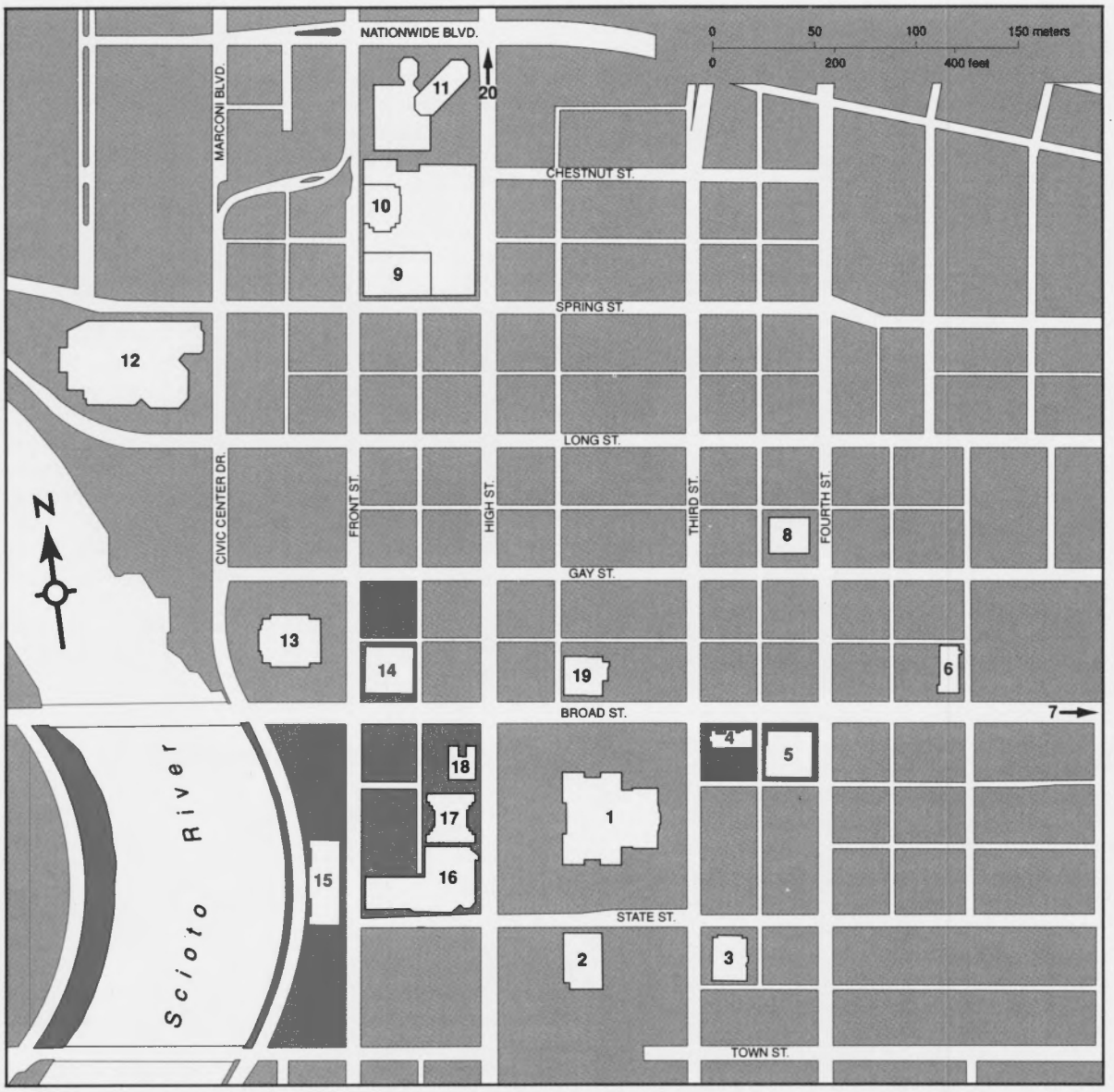
17) *Rojo Alicante marble,* Alicante, Spain

18) *Sardinian Grey granite,* Sardinia, Italy

19) *Italian travertine* and *St. Peter travertine,* Tivoli, Italy

20) Vånga Granite *(Napoleon Red granite),* Vånga, Sweden

FIGURE 1.— Sources of some of the building stones used in downtown Columbus.



1) Ohio State House and Senate Building
2) Ohio Theatre
3) Old U.S. Post Office and Courthouse
4) Trinity Episcopal Church
5) BancOhio National Plaza
6) Saint Joseph Cathedral
7) Broad Street United Methodist Church
8) Ohio Bell Building
9) William Green Building
10) Three Nationwide Plaza and the Atrium
11) One Nationwide Plaza
12) American Electric Power Building
13) Columbus City Hall
14) LeVeque Tower
15) Departments of State Buildings
16) The Vern Riffe Center for Government and the Arts
17) Huntington Center
18) Huntington National Bank
19) James A. Rhodes State Office Tower
20) Orton Hall

FIGURE 2.— Map of downtown Columbus showing stops. Stops 7 and 20 are outside the area of this map.

many buildings and on the exterior of the BancOhio National Bank Building (Stop 5).

Marble was used to decorate early buildings and continues to be a favored selection for exteriors and interiors. Its main sources were, and still are, Georgia, Vermont, and Italy. Some building stone described as marble is actually limestone, a sedimentary rock. Generally these stones will hold a polish and therefore have marble in their **trade names,** for example, *Vermont marble* (Crown Point Limestone) and *Tennessee marble* (limestone belonging to the Holston Formation). The Ohio State House (Stop 1) interior is strikingly beautiful because of its black "marble" and white marble tiles. The three state office buildings (Stop 15) on Front Street were constructed with a brilliant white *Georgia marble* veneer. The interior of the central building (65 S. Front St.) is unique in its use of many different colors of marble.

Granite, an igneous rock composed primarily of grains of quartz, **potassium feldspar,** and generally a dark mineral such as **hornblende** and/or **biotite,** has long been used for memorials and buildings. Its enduring quality is due in part to the hardness of the minerals (quartz = 7 and feldspar = 6 on Mohs scale of hardness), and to their bonding. It is called "the rock of ages" because it resists weathering and discoloration. Granite was used for the steps, plaza, and exterior walls of Columbus City Hall (Stop 13) and many other buildings. The Rhodes State Office Tower (Stop 19) is faced entirely with a coarse-grained red granite quarried in South Dakota.

"Black granite," so called by the builders, is a dark igneous rock used on several buildings in the downtown area. It is in reality not granite but an igneous rock typically of the **syenite** group, classified between the very light granites and the very dark **gabbros.** It appears black when polished, as at the north and south Departments of State Buildings (Stop 15) and on the Huntington National Bank Building (Stop 18). The large feldspar (light) crystals are known as **anorthoclase;** the dark mineral, **augite,** gives it the black appearance. Technically the rock is called **larvikite,** a name derived from Larvik, in southern Norway. Some "black granite" may actually be gabbro, as in the lobby of the Ohio Bell Building (Stop 8), or **diorite** as in the fountain on Capitol Square (Stop 1).

Concrete, seen and unseen, contributes measurably to the appearance and stability of downtown Columbus. Most of the sidewalks and curbstones are concrete. The buildings rest on concrete-filled steel tubes called **caissons,** and concrete backs much of the rock veneer or facing on buildings. Attractive precast concrete exteriors are found on some buildings. The term "cement" is often confused with concrete. Cement, commonly called portland cement, refers to a fusion of raw materials by burning in a kiln. The product is then ground to a powder and mixed with sand, gravel, and water to form a ready-mix concrete.

Steel beams, columns, and tubes constitute the supporting framework for the downtown buildings. Decorative ironwork is also found in some buildings, including the Ohio State House, and other metals are used in roofs, windows, decoration on buildings, and works of art.

In this guide, we have used the geological or rock-unit names (some of which are formal) and the trade names for building stones. When possible, we have provided the source and geologic age; this information is summarized in tables 2-4 at the end of this guide.

A formal rock-unit name is assigned to a rock unit when it is first described in the literature. The formal name consists of the locality followed by the name of the material (capitalized) or the word **"Formation"** or **"Member"** (both capitalized). Examples are the Columbus Limestone, the Holston Formation, and the Black Hand Sandstone Member. A geologic unit that has an informal status uses a lower case letter for the material or unit, for example, the Massillon sandstone. A building-stone trade name may be the same as the geologic unit name, but generally is different. In some cases the same rock unit has several trade names, reflecting marketing of slightly different types of the same rock unit by the same or different companies. In this guide the trade names are in *italics.* Formal rock-unit names are given where known.

For more information on stone used in buildings and monuments, please see Bownocker (1915), Bates (1969), Winkler (1978), Hannibal (1990), Hannibal and Schmidt (1991), and Hannibal and Park (1992).

GEOLOGICAL SETTING

Columbus lies in the **Till** Plains Section on the eastern edge of the Central Lowland Physiographic Province (Fenneman, 1917). The Scioto River and one of its major tributaries, the Olentangy River, join near the center of Franklin County, in the center of the city. They flow within wide valleys, which, although now altered by dams for water-supply reservoirs, indicate that the streams were once much larger. These streams were **meltwater** rivers fed by a **glacier** wasting back about 15,000 years ago.

The **bedrock** immediately underlying the glacial materials is composed of the Columbus and Delaware Limestones and the Olentangy and Ohio **Shales,** all of Devonian age (Stauffer and others, 1911) (table 2). These rocks were deposited 380 to 360 million years ago when Ohio was almost completely under water. Abundant **fossils** in the limestone, which has a thickness of about 135 feet, indicate the sea was warm and remained relatively quiet over a long period of time. The environment of this inland sea changed slightly when the Olentangy Shale (now 30 feet thick) was deposited on the Delaware Limestone. The Columbus and Delaware Limestones and the Olentangy Shale represent successive stages from pure limestone to a soft, massive, bluish-gray shale. A greater change occurred when the Ohio Shale was deposited on the Olentangy Shale. The Ohio Shale is a thinly bedded, **carbonaceous,** dark-gray or dark-brown rock unit formed from mud and plant residue in what may have been an extensive, shallow stagnant sea, although some scientists now believe that these black shales were deposited in a deeper water environment. In this area, known as the "Ohio Bay" (Pepper and others, 1954), deposition

continued to a thickness of 450 feet. The Ohio Shale underlies much of the Columbus area and crops out along many stream valleys, ravines, and road cuts. The Columbus and Delaware Limestones crop out in the valley of the Scioto River. The Delware Limestone crops out in the valley of the Olentangy River north of Columbus.

The rocks underlying Columbus dip slightly to the southeast because of a positive (uplifted) geologic structure in the southwestern part of the state. This structure, known as the Cincinnati Arch, controls the lineal pattern of exposed rock in Ohio. The bedrock formations crop out in bands extending roughly north and south in central Ohio.

Underlying the Devonian rocks in the Columbus area are older Paleozoic sedimentary formations. These rocks are underlain by igneous and metamorphic basement rocks that make up the **Canadian Shield,** which extends northward and crops out in Canada. These basement rocks range in depth from less than a mile at Cincinnati to more than 2 miles below the surface on the eastern border of Ohio. At Columbus they are about 3,650 feet below land surface (Larry Wickstrom, personal communication, 1992; Owens, 1967).

When the Ice Age began about 2 million years ago, masses of ice moved southward as glaciers, modifying the preglacial landscape. The deposits from the most recent glacial stage, the Wisconsinan, lie directly on the limestone and shale bedrock underlying Columbus. The area was completely buried by till, which is generally 10 to 30 feet thick (Schmidt, 1958). Till consists of unsorted clay, silt, sand, pebbles, and boulders carried by the ice. Some of the buildings described in this guidebook lie directly on the till, which is adequate to hold their weight. However, because of the highly variable nature of glacial deposits, it is necessary to test for **bearing capacity** at each building site. Large **outwash** deposits of sand and gravel in the Scioto and Olentangy River valleys resulted from the great volumes of meltwater from the wasting ice sheet. Some of these deposits occur above the present drainage level as gravel terraces and serve as **water-recharge** areas south of Columbus along the Scioto River.

Thus, on this glacial landscape and its underlying bedrock, the legislators of Ohio plotted a capital, in 1812, on the forested high banks east of the Scioto River. The beginning of the city was unique in that Columbus did not become Ohio's capital, the capital became Columbus.

Stop 1. OHIO STATE HOUSE AND SENATE BUILDING

FIGURE 3.— The Ohio State House. View from the southwest.

The Ohio State House, or Capitol (fig. 3), occupies a whole city block (Capitol Square) in the center of downtown Columbus. The original capitol on the site was brick and was occupied in 1816; the current capitol was completed in 1861. The cornerstone was laid at the northeast corner on July 4, 1839, but it took 22 years and the installation of steam-operated machinery at both the yard and the quarry as well as a railroad for transportation to bring the building to completion. According to a brochure on Ohio's capitols (Anonymous, n.d.), it is considered "one of the purest examples of Greek Doric architecture in the United States."

The State House is constructed of large blocks of Columbus Limestone procured from the "state quarries near the Central Hospital" (Bownocker, 1915). The original building commission "decided on native stone as the material and contracted with William Sullivant, who had a quarry on the west bank of the Scioto, about three miles from the square" (Anonymous, n.d.). Bownocker describes it as a high-grade building stone; "the columns were supplied by the five and one-half foot-course, which at that time formed the base of the quarry." The steps came from the 6- to 9-inch-thick "sheepskin" course, which was regarded as superior to the more popular Salem Limestone of Indiana. The structure demonstrates how well the rock withstands the Ohio climate. Abundant fossils are evident in the columns, including **corals, brachiopods,** and **mollusks.** The outside steps also show many fossils, including a coiled **cephalopod, gastropods, colonial** corals, and **stromatoporoids** (Mayer, 1962; Hannibal, 1990).

The interior floors are black, white, and pink stone; the black is *Champlain Black marble* (Crown Point Limestone), the white is *Italian marble,* and the pink is a marble from Portugal. A star pattern in the floor of the rotunda also includes green marble ***(Verde Antique)*** from Vermont and a purple **breccia** marble. The walls are plaster with Columbus Limestone pilasters. The most prominent fossil in the Crown Point Limestone is the snail *Maclurites.* Ironwork in the stairways, bronze doors, and a copper and iron roof supplement the limestone and marble resources. The Great Seal of Ohio is painted in the dome 120 feet overhead; however, the painting covers a stained-glass seal in the dome (Christopher Moss, personal communication, 1992). Encircling plaques, murals, and display cases of documents depict Ohio's heritage.

FIGURE 4.—Interior steps of Ohio State House showing stairs of Columbus Limestone, balustrades of *Tennessee marble* and white *Italian marble,* handrails of *Italian marble,* and floor of *Champlain Black marble* and white *Italian marble.*

Stairs in the north and south halls are Columbus Limestone. The turned balustrades are dark *Tennessee marble* (Holston Formation) alternating with white *Italian marble.* The handrails and newel posts are also white *Italian marble* (fig. 4). Some of the statues in the State House are probably *Carrara marble.*

In 1901 the Judiciary Annex (now known as the Senate Building) to the east was constructed from Columbus Limestone obtained from the "old Taylor & Bell quarry near Marble Cliff" (Bownocker, 1915). Quarrymen were impressed with the **crystalline** nature of this rock—thus the name Marble Cliff. The Senate Building's most notable feature is the large staircase of white marble with gray veining. Most of the walls are white marble (Italian?); some wall bases are *Tennessee marble.*

In 1992 an atrium was added between the Senate Building and the State House, the exteriors of the two buildings were renovated, and the Christopher Columbus Discovery Fountain was added on the southwest corner of the State House. Because no quarries were producing dimension stone from the Columbus Limestone, arrangements were made by Clifford Hammond of the Columbus Stone Center to obtain **dimension stone** from a quarry producing limestone aggregate (crushed stone). Special stone-cutting equipment was brought in to remove Columbus Limestone from the American Aggregates Corp. quarry (Bates, 1973) on the north side of the south outerbelt (I-270) west of the Scioto River. This stone was cut into slabs for veneer and turned for fluted columns in Indiana. Columbus Limestone was found to be much harder than *Indiana limestone* and required twice as long to cut. More than 2,500 pieces were used in the facade of the atrium and in renovation of damaged triglyphs and cornices (Kathleen Fox, personal communication, 1992).

The Christopher Columbus Discovery Fountain, near the southwest corner of the State House, is made of four types of rock. The base is a dark-red granite, *Carnelian (Sequoya) granite,* quarried by the Cold Spring Granite Company in Milbank, South Dakota. The formal geologic name for this Precambrian rock is Milbank Granite. Most of the exterior of the fountain is rose-colored **porphyritic** Town Mountain Granite *(Sunset Red* or *Texas Pearl granite),* which has large zoned feldspar **phenocrysts.** Town Mountain Granite is Precambrian in age. The inner portion, over which the water flows, is *Academy Black granite,* a medium-grained black diorite of early Cretaceous age from Raymond, California. About 65 percent of this rock is **plagioclase feldspar** and 20 percent is hornblende. Other **ferromagnesian minerals** make up most of the remainder (Chuck Muehlbauer, personal communication, 1992). Set into the black diorite are 20 small blocks of black slate from the Liguria region of Italy. Liguria, the home state of Christopher Columbus, is Ohio's sister state. Eighteen of the blocks contain a symbol representing the accomplishments of Ohioans of many cultures and backgrounds.

The walkways on Capitol Square were replaced in 1991 during the renovation of many parts of Capitol Square. The central portion of these walkways is also Town Mountain Granite, from Burnet County, Texas. The margins of the walkways are Milbank Granite. The curbs at the edge of the road are *Rockville White,* a medium-to coarse-grained porphyritic granite quarried in Rockville, Minnesota. This white to gray Precambrian granite consists mainly (80 percent) of nearly equal amounts of quartz, phenocrysts of **microcline** (including intergrowths of plagioclase feldspar), and plagioclase feldspar.

Stop 2. OHIO THEATRE

This ornate "movie palace" (fig. 5) on State Street, south of the State Capitol, was opened in March 1928. Designed by Thomas Lamb, a major theatre architect of the 1920's, as one of Marcus Loew's theatres for silent films, the Ohio Theatre was considered to have the richest interior in the country (Anonymous, 1978). By 1969, with its original decorations still intact, it was destined for destruction. The efforts of a community-based citizens' organization resulted in its restoration.

The exterior is primarily brick, in places covered by a terra-cotta or stone facade. *Indiana limestone* (Salem Limestone, see Thompson, 1990) is on either side of the north entrance below the terra-cotta and above a porphyritic granite. At the same level as the granite beneath the store windows on either side of the entrance area is a breccia marble, probably *Red Levanto marble.* New stone slabs were installed in 1978.

The walls of the entry, both inside and outside the main doors, are covered in white *Vermont marble.* Just above the floor is a green marble. The ticket booth is *Verde Antique.* The floor of the entrance was white marble; it was replaced after one year because it was too slippery when wet. Most of the interior floors that are not covered by carpet are **terrazzo.**

The interior is mainly plaster, stucco, and other materials characteristic of the "rococo" style. A salmon-colored marble, *Etowah marble* (Murphy Marble), was used beside the sinks and in the partitions of the washrooms in the addition on the east side. This Cambrian-age stone was quarried in the Tate area of Georgia and supplied by the Georgia Marble Company (Joseph Hannibal, personal communication, 1992). Original glass tiles and glass partitions may be seen in the washrooms in the old section. A countertop in the south end of the ground floor of the new east wing is artificial marble, and the west wall of this wing is pink terra-cotta from California. This terra-cotta wall looks like a wide curtain. This look was achieved by using molds for horizontal parapet parts.

The exterior of the east entrance has large columns that look like limestone from a distance; however, they are concrete, poured as one unit on site by injection from the base into a mold that contains reinforcing iron.

FIGURE 5.—Ohio Theatre.

Stop 3. OLD U.S. POST OFFICE AND COURTHOUSE

FIGURE 6.—Old U.S. Post Office and Courthouse. View southeast from Capitol Square.

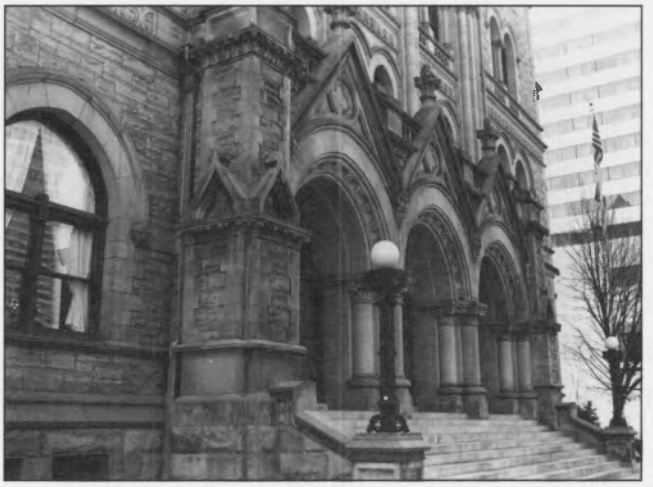


FIGURE 7.—Old U.S. Post Office showing detail of State Street entrance.

This building (fig. 6), at 121 East State Street (now fronting on 100 South Third Street), is sometimes described as the Old, Old Post Office, and was the first federal building in Columbus. This Romanesque Revival style building, completed in 1887, was enlarged in 1912 when it was converted to High Victorian Gothic. The pointed arches (fig. 7) and red clay tile roof are evidence of the change. The exterior is golden-tan **rock-faced** Berea Sandstone. This stone is Devonian-Mississippian in age (about 360 million years old). It is composed mostly of pure quartz grains which are interpreted as river or beach deposits and sand dunes. It was early termed "Berea Grit" because it was quarried in great quantities in the 1800's at Berea, Ohio, and used for grindstones because of its coarse quartz grains. The stone in this building may have been quarried at South Amherst, Ohio, a location which has some of the deepest sandstone quarries in the world. (See Bownocker, 1915; Hannibal, 1985; and Hannibal, Lanier, and Stover, 1991.)

Restoration of the building was completed in 1988 in a joint venture of the City of Columbus and the law firm of Bricker and Eckler. The exterior of the building was chemically washed by hand, rather than sandblasted, to protect the delicate structure. The matching four-story addition was erected to house modern wiring and plumbing systems.

White, green, and red marble and carved oak wainscoting, marble fireplaces, a marble staircase, and a carved oak "postal wall" are highlights of the interior. During the renovation, marble masons and master carpenters skillfully plugged old doorways. The project revealed and preserved high ceilings with ornate designs, and preserved the federal court holding cell (with bars) and the massive iron doors of the post office's vaults.

Stop 4. TRINITY EPISCOPAL CHURCH

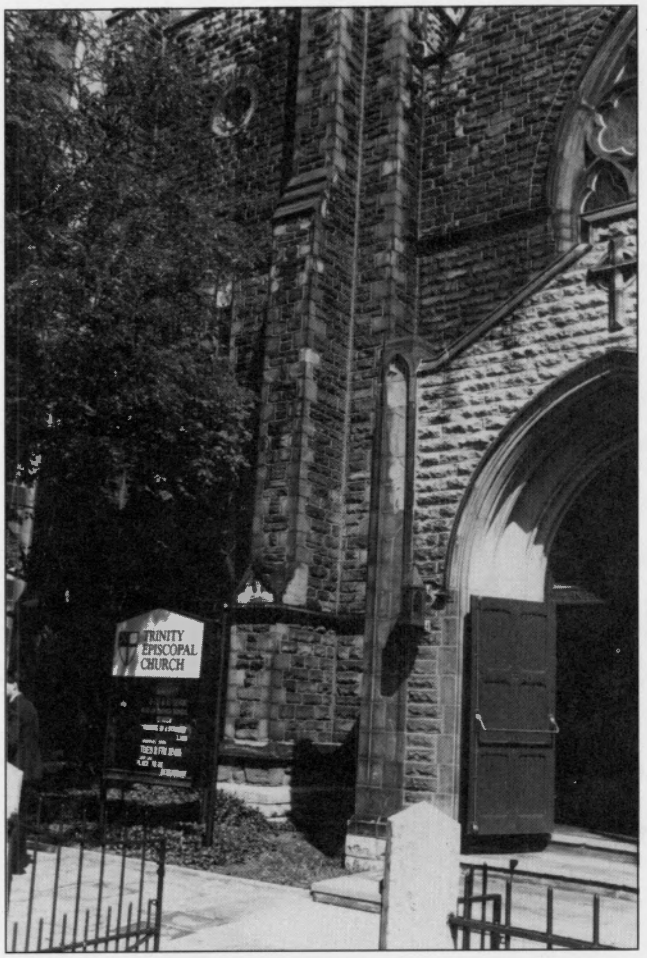


FIGURE 8.— Trinity Episcopal Church.

Located at 125 East Broad Street on the corner of Broad and Third, this building (fig. 8) is in sharp contrast to the large buildings in the downtown area. It was completed in 1869, eight years after the State Capitol, and reflects the early trend to use local or close-at-hand materials for its construction. The exterior was built with the Black Hand Sandstone Member of the Cuyahoga Formation (see Stop 6, St. Joseph Cathedral) from the Sharpe and Crook quarry near Sugar Grove in Fairfield County, Ohio, on a foundation of Columbus Limestone. The rock facing is set as **ashlar.** The exterior was cleaned and waterproofed in 1992. The church also features a hammerbeam roof (the wooden beams are extended) and a white *Italian marble* altar patterned after a fifth-century altar preserved in Ravenna, Italy. The building is a combination of English and Gothic architectural styles conforming to the traditional cruciform (cross-shaped) design.

The church is famous for its stained-glass windows, its art work (including wood carving by I. Kirchmayer of Oberammergau, Germany, and wall sculpture by Ann Entis, a noted central Ohio artist), and its Te Deum organ. Familiar to the downtown community is the sound of the Trinity chimes made by 10 hand-played bells.

Stop 5. BANCOHIO NATIONAL PLAZA

[Note: BancOhio National Bank will become National City Bank in 1993.]

FIGURE 9.—BancOhio National Plaza. Five of the six connected towers are visible in this view east-southeast from the Rhodes Tower.

Located at 155 East Broad Street, the BancOhio National Plaza (fig. 9) consists of six connected towers rising to various levels. It was dedicated in 1976. This building makes striking use of *Italian travertine* from Tivoli, Italy, where it is quarried extensively. Ninety percent of the exterior and 20 percent of the interior, including the lobby, are faced with the travertine, a light-colored, porous, calcium carbonate rock. Travertine is used extensively within some buildings, but this structure is the only one on this tour that uses it as an exterior building stone. Chafetz and Folk (1984) give more information on travertine.

The building is of "bundle-tube" construction, placed on a 5-foot slab footing, with poured-concrete reinforcing obtained from local sources. Trees and numerous other plantings, together with sculpture and photography, complement the design-with-nature theme of this building.

Stop 6. SAINT JOSEPH CATHEDRAL

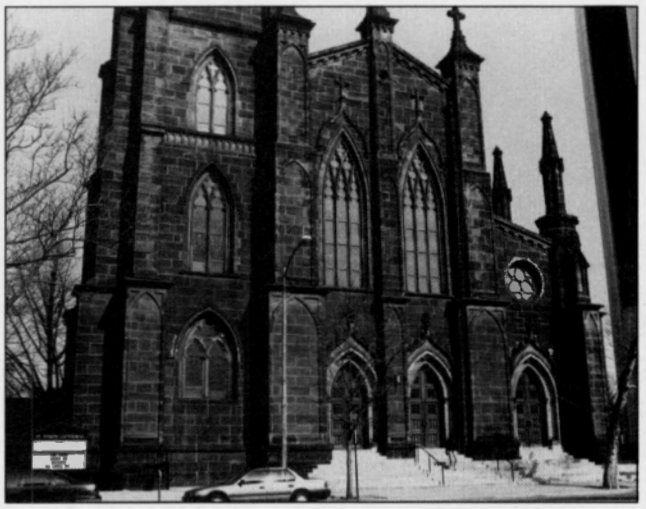


FIGURE 10.—Saint Joseph Cathedral.

This building (fig. 10), an outstanding landmark in Columbus for more than 100 years, is located at 212 East Broad Street. Construction began in 1866 and was completed in 1872. It followed the trend, set by the Capitol, of being constructed from stone close to the site. The exterior and interior are faced with Black Hand sandstone from two locations. The lower section came from a quarry near Hanover in Licking County; the upper section came from the Sharp and Crook quarry near Sugar Grove in Fairfield County (Bownocker, 1915). The Black Hand is a deltaic deposit of Mississippian age occurring in lobes throughout the southeastern and eastern part of Ohio (Hansen, 1975; Bork and Malcuit, 1979). It is cemented with hydrous iron oxide, and the well-cemented units of the Black Hand are most suited for use as a building stone. This stone also was extensively quarried for the construction of bridges and canal locks in the early 1800's. This local sandstone, with its **cross-bedding** and **conglomeratic** phase, shows typical city weathering (discoloration, rounded corners) where exposure is the greatest. The steps going into the cathedral are **fossiliferous** Columbus Limestone.

Inside the cathedral, the early pillars of the vaulted nave were cast iron. They were replaced by Salem Limestone pillars when the building was renovated in 1914. The altars and 12 crosses embedded in the walls around the church are *Italian marble.* The cathedral was designed to have a spire 250 feet high, but it was never built. Together with the rectory, the cathedral gives a sense of space and timelessness amidst the surrounding utilitarian buildings.

Stop 7. BROAD STREET UNITED METHODIST CHURCH

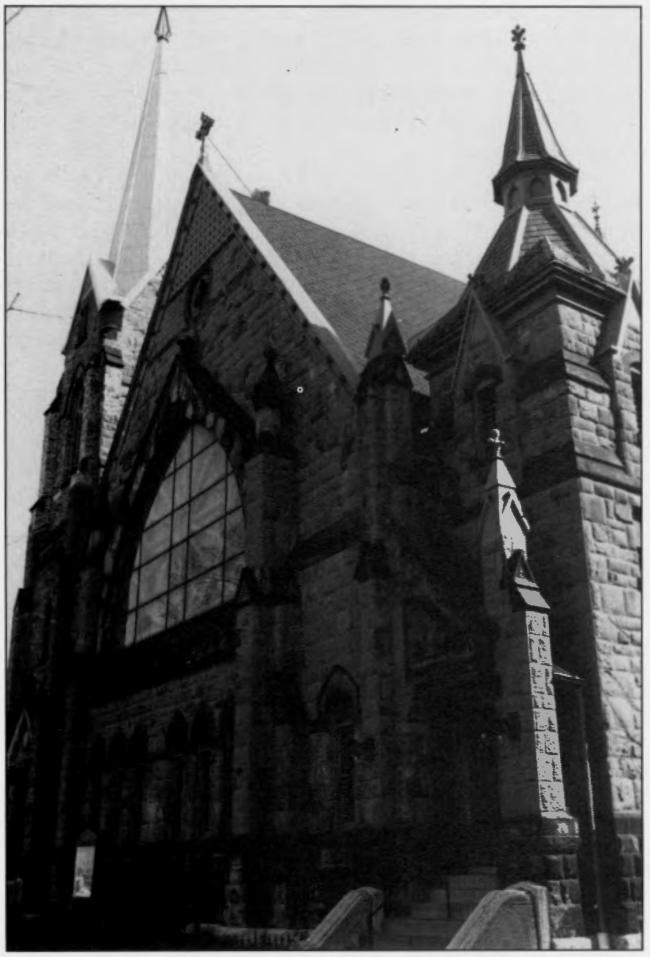


FIGURE 11.—Broad Street United Methodist Church, northwest entrance on Broad Street.

This church (fig. 11) is located at 501 East Broad Street, four blocks east of Saint Joseph Cathedral. Completed in 1885, it was designed by J. W. Yost, a Columbus architect who also designed Orton Hall (Stop 20). Its distinguishing feature is its facing of **serpentinite,** a rock consisting of **serpentine,** a group of minerals that are largely hydrous magnesium **silicates** (see Coleman, 1971, for more information on the petrology and origin of serpentinites). This green rock faces a brick understructure. Although the use of this rock is rare in central Ohio, it was popular in the middle 1800's in the Philadelphia area. It was probably quarried in one of the many quarries in Chester County, Pennsylvania, as described by P. Frazer (*in* Lesley, 1883, p. 64). Brinton's quarry, 3 miles south of West Chester, is one possible source. It was opened in 1730 and by 1880 had produced over 500,000 cubic yards of stone. It supplied stone for the University of Pennsylvania, the Academy of Natural Sciences, and about 20 churches in Philadelphia. Another possible source for the stone in this church is the Carter and Reynold quarry in Chester County, Pennsylvania, near Rising Sun, Maryland (Lesley, 1883). The age of the serpentinite is probably Ordovician (Helen Delano, personal communication, 1992).

In 1990, the church was closed for a short period because chunks of stone and concrete (some with 5+ cm of brick attached) had fallen on the sidewalk. This deterioration indicates weathering of the underlying brick.

There are conflicting statements on the soundness of using serpentinite as a building stone in this climate. Its popularity peaked in the early 1870's and continued for about 10-15 years (Stone, 1932, p. 105-107). Hawes (1884, p. 29) described serpentinite as being ". . . sufficiently soft to be easily carved into any desirable shape, and can be readily turned on a lathe. It acquires a good polish, and is one of the most beautiful stones for mantels, table-tops, and all manner of indoor work. For outdoor work the polished stone is entirely unsuited, since when exposed to atmospheric influences, especially in cities, it soon loses its gloss, and the surface weathering unevenly, it soon becomes as unsightly as it was once beautiful."

But also in Hawes (1884, p. 148) is the statement, "Serpentine [serpentinite] is becoming more popular as a building material. Quite a number of important buildings have been constructed of Chester County stone in Philadelphia, Washington, and Chicago. The stone is apparently very durable, and buildings in the neighborhood of West Chester, which have been erected over 100 years, are fresh and maintain their attractive color unchanged. The stone is easily worked, and it is claimed that it can be furnished at a smaller cost than any other stone at the quarry." The latter statement may be part of the explanation for its popularity; however, the statement of durability might suggest that urban weathering conditions in the last 100 years were worse than those of the previous 100 years. Two other factors in the rapid weathering of some of the stone here might be the placement of some of the serpentinite blocks with inherent planes of weakness parallel to the wall surface, and the natural variability of the stone. However, the stone in this church may not be weathering faster than serpentinite in buildings at the University of Pennsylvania. According to Simon Elliot (personal communication, 1992), several buildings there are undergoing renovation; the stone is considered to have been a poor choice for exterior use.

Unfortunately, the material supplied for this church has not performed as well as that claimed for the walls of houses in Chester County during the last century. When examined in thin section, a sample of serpentinite from the church was found to contain about 90 percent serpentine, 5 percent **pyroxene,** and 5 percent **olivine** (David Elliot, personal communication, 1992). With this composition, severe weathering is not unexpected. By 1953, weathering required renovation and repointing of the surface with green-colored cementitious material (also referred to as stucco or parging in some reports) to cover depressions left by eroded stone and to fill spaces where the blocks had been removed down to the brick layer. At this time the surface was also waterproofed. According to Reverend Alexander (personal

communication, 1992), a memo to the church from Norman R. Weiss, a consultant from New York, suggested that the weathering problem that led to the 1990 fall of material may have been aggravated by "moisture entry and entrapment, perhaps as a result of combined use of sealers and richly cementitious patching compounds." He noted that poor repointing detail also may have been a factor in water entry. The renovation probably improved the appearance and the safety of the building temporarily. However, it did not solve the problem. Two evaluations of the problem had been received by summer 1992. One suggested careful mechanical removal of fractured and soft stone and failed stucco, followed by replacement of mortar. The consultant offering this solution also suggested the possible use of consolidants and noted that vapor-permeable patching might be considered.

The second consultant suggested masonry cleaning, mortar joint removal and repointing, parging removal with hand tools, installation of matching rock-faced sandstone, limestone, or **gunite** over brickwork, and the application of a tinted breathable masonry coating, consolidant, and masonry water repellant. Another option would be to replace all the serpentinite with another stone.

Two factors complicate the situation. First, the building is listed on the National Register of Historical Places; and second, it is owned by a congregation with limited resources.

Two other stones were used on the exterior of the building. Columbus Limestone was used in the base course, as steps, and as walls adjacent to the steps. Berea Sandstone was used in the five lower courses of the walls, around the doors and windows, and in part of the buttresses.

Stop 8. OHIO BELL BUILDING

FIGURE 12.—Ohio Bell Building. View from the southeast.

Located at 150 East Gay Street, one block north of Broad Street, this high-rise office building (fig. 12) was completed in 1973. The lower part of the building and the outside plaza at first appear to be slate or **phyllite** because of their shiny, **micaceous** surface. A sample in cross section, however, shows that this stone is **quartzite.** It was quarried in Sweden and brought as ballast to the United States. The upper part of the building is enclosed with modular units of precast concrete, some of it from local sources, and solar bronze plate-glass windows. The floors and walls of the two-story lobby are quartzite. A beautiful desk in the lobby is made of rock termed "black granite" by the builders; it is a gabbro showing large feldspar crystals. A large cube structure of concrete bearing the Ohio Bell logo decorates the southeast area of the plaza.

Stop 9. WILLIAM GREEN BUILDING

The William Green Building (fig. 13), on the north side of Spring Street between Front and High Streets, houses the Ohio Bureau of Workers' Compensation and the Industrial Commission of Ohio. The pre-assembled exterior stone walls use a steel truss system that backs several sections of granite in each unit. Although it was built in 1991, about the same time as the Riffe Center (Stop 16) and Three Nationwide Plaza (Stop 10), all three buildings use different systems for fastening stone to the frame of the building (Bernard Costantino, personal communication, 1992). The stone for this building was supplied by Moliterno Stone Sales of Rhode Island. The exterior is primarily (90 percent) polished *Cardinal Red granite* of Precambrian age from Finland. This dark-red porphyritic granite is described as being "softer" than most granites used in this country. It tests at 1290-1460 **psi** (pounds per square inch), whereas most stone used has a strength of at least 1500 psi. Deer Isle Granite, used for the other 10 percent of this building, is about 1850 psi (John Ward, personal communication, 1992). According to Dale (1923), *Cardinal Red granite* contains some phenocrysts of potassium feldspar up to 2.5 cm in length, smoky quartz, and milk-white **oligoclase** in addition to biotite.

The lighter colored, polished Deer Isle Granite makes up the banding in the columns, the window trim, and other highlights of the building. This coarse-grained, white to gray biotite granite was mined on Crotch Island, Stonington, Maine. On the walkways surrounding the building, *Cardinal Red granite* is used beneath the overhangs and on the handicap ramps. *Cardinal Red granite,* brick, and another dark-red granite, similar to *Agate granite* of Three Nationwide Plaza

FIGURE 13.—William Green Building. The Atrium is in the foreground and Three Nationwide Plaza is on the right.

(Stop 10), are used for the sidewalks. The dark-red granite trim on the sidewalk at the southwest corner of the Green Building has a wider range of textures (**migmatitic** to **pegmatitic**) than other granites used in the plaza and sidewalks of the Nationwide-Green block.

The interior walls and ceiling of the east and south atriums are covered with *Cardinal Red granite.* On the core or interior walls of the first, second, and third levels and in the north lobby are panels of *Comblanchien limestone* of middle Jurassic age. This brownish-red building stone may have been quarried at Nuit St. George, Burgundy, France. It is also quarried in other areas in the Cote D'Or (Comblanchien, Ladoix, Serrigny, Corgoloin, and Villars) (Jean-Marie Verliac, personal communication, 1992). It is described as a marble because it will take a polish, as seen in some areas of this building. However, in other areas an unusual finish—**flamed** finish—was used, resulting in some popping or exfoliation at the surface. This stone contains some noticeable white blebs of **calcite,** pink fossil burrows, and some body fossils, including snails. *Comblanchien limestone* ranges in color from buff to brown to yellow.

The interior floor of the building contains a dark and a light travertine from Italy. Inset at the junctions of the travertine tiles are tiles of flamed and polished *Cardinal Red granite.* The north lobby has two colors of travertine on the ceiling and walls. Reddish-orange *Breccia Pernice marble* and light-colored *Italian travertine* are found in some of the walls of the north lobby adjacent to the Atrium at Three Nationwide Plaza.

Stop 10. THREE NATIONWIDE PLAZA AND THE ATRIUM

FIGURE 14.— Three Nationwide Plaza and the Atrium.

Three Nationwide Plaza and the Atrium at Three Nationwide Plaza (fig. 14), at 250 North Front Street, is the third office building in the Nationwide Insurance group of buildings completed since 1978. Three Nationwide is between One Nationwide Plaza (Stop 11) on the north and the William Green Building (Stop 9) that parallels Spring Street between High and Front Streets on the south. Parts of Three Nationwide opened in 1988; the Atrium was completed in 1989. The State of Ohio and Nationwide Insurance planned, designed, and constructed Three Nationwide, the Atrium, and the William Green Building in the largest coordinated office-building construction project undertaken in the United States by government and private business.

The design of the three buildings called for several types of stone on the interior and five on the exterior. A curtain-wall system, in which stone wall panels rest in aluminum clips, was used for Three Nationwide (Bernard Costantino, personal communication, 1992). (Compare this system to the systems used about the same time in the Riffe Center, Stop 16, and the William Green Building, Stop 9, and contrast all with the steel frame and bearing-wall system used in Orton Hall, Stop 20, built at The Ohio State University in 1893.)

The exterior stone was supplied by Capital Marble, which was later bought by the Cold Spring Granite Company. The two polished red granites are *Texas Red,* which, with the gray granite, covers most of the exterior, and *Napoleon Red,* which is used as an accent and can be seen on the exterior corners of the Atrium. The medium- to coarse-grained rose-beige *Texas Red granite* was quarried and prepared at Granite Shoals, Texas. It is probably of Precambrian age. The medium-grained medium-dark-red *Napoleon Red granite* is about 1.2 billion years old (Stig Bergström, personal communication, 1992) and was quarried in Vånga, Sweden. Its geologic name is Vånga Granite. It also is known as *Sweden Red* and can be seen at other buildings in Columbus, such as the Riffe Center (Stop 16) and the Huntington Center (Stop 17).

Mondariz Granite, of Precambrian age, is the medium-grained gray granite with a **thermal** finish that covers about half of the exterior in reversed fields with the *Texas Red* (compare the relative positions of these two stones on the north and east sides of the building). The Mondariz Granite was quarried in Porriño-Salceda, Spain, and fabricated in Pietro Santa, Italy. The gray Mondariz Granite of Three Nationwide Plaza was selected to blend with the Salem Limestone *(Indiana limestone)* of One Nationwide Plaza to the north; the rose *Texas Red granite* was chosen to blend with the dark-red *Cardinal Red granite* used on the William Green Building to the south (Louis Fabro, personal communication, 1992).

The exterior paving stones in the plaza and the west sidewalks are medium-grained dark-red or brownish-red *Agate granite,* with both thermal and **split** finishes. It was quarried in Ortonville, Minnesota. The rock stream of *Agate granite* and the treed plaza park provide a pleasant contrast to the concrete, asphalt, and brick canyons in many areas of downtown Columbus.

The three types of stone used in the interior of the Atrium were supplied by Cleveland Marble Mosaic. Polished and **honed** salmon-colored *Breccia Pernice marble* (Jurassic age), from the Mt. Pastello area of Italy, is used in bands on columns, walls, and planter edges (Tim Fishking, personal communication, 1992). This stone is also seen in the BP America Building in Cleveland (Hannibal and Schmidt, 1992). Polished and honed beige-colored *Classic Roman travertine* (also known as *Geneva Creme travertine*) is used in the walls and columns of the Atrium. The dark-red *Agate granite* of the Atrium floor exhibits thermal, honed, and polished finishes.

Polished *St. Peter travertine* of Tertiary age is used on the walls and columns of Three Nationwide Plaza as trim. This stone is from Tivoli, Italy. Polished *Trani travertine (Perlato Royal Svevo)* from Trani, Italy, on the Adriatic coast, is the beige rock in the floor of the building.

Stop 11. ONE NATIONWIDE PLAZA

FIGURE 15.—One Nationwide Plaza. View north from the Atrium adjacent to William Green and Three Nationwide Plaza buildings.

This imposing building (fig. 15) is situated on the corner of Nationwide Boulevard and High Street four blocks north of Broad and High. Completed in 1977, it is 40 stories and 482.5 feet high, encompassing a total of 1,325,000 square feet. Anderson Concrete of Columbus furnished 64,000 tons of concrete for the structure. The exterior is faced with Salem Limestone (commonly known as *Bedford* or *Indiana limestone*), a limestone made up of sand-size grains cemented with calcite. The grains consist of **oolites** that have minute shell fragments as nuclei and fossils, including **foraminifera,** fragmental **bryozoans, crinoids,** corals, and brachiopods, as well as a minute amount of carbonate detritus of unknown origin (Bates, 1969; see also Thompson, 1990). It is a light-gray stone, Mississippian in age, deposited in a warm shallow sea about 325 million years ago. According to Bates (1969), in the 1960's at least 60 percent of the dimension limestone produced in the United States was Salem Limestone from south-central Indiana.

The interior lobby of the building has walls and pillars of beige *Italian marble* from Trani, Italy. The floor and exterior decoration on the plaza are *Agate granite* provided by the Cold Spring Granite Company from a quarry in Ortonville, Minnesota.

Stop 12. AMERICAN ELECTRIC POWER BUILDING

FIGURE 16.—American Electric Power Building.

This structure (fig. 16) is located at 1 Riverside Plaza west of Marconi Boulevard between Spring and Long Streets. The building, completed in 1983, was designed by the same architects as those who designed One Nationwide Plaza (Stop 11) and used the same stone (Salem Limestone) on the exterior. Three horizontal bands of light-pink granite, known as *Stony Creek Red granite,* from New Haven County, Connecticut, are used at various elevations to decorate the building. This stone is also used extensively in the lobby. It is coarse grained and has large pink feldspar crystals in a gray mass. This granite is actually a **migmatite,** consisting of biotite **gneiss** and granite, and in places is pegmatitic (Slagle, 1982). It is pre-Triassic in age. A turbine sculpture dominates the southeast corner of the building.

Stop 13. COLUMBUS CITY HALL

Columbus City Hall (fig. 17), located at 90 West Broad Street, occupies an entire city block and is an important part of the Civic Center complex. The building opened in 1926, but the original horseshoe-shaped structure was enclosed in 1936 to provide more space. The tan brick walls of the first building can be seen from the inside of the more recent structure. The exterior is primarily Salem Limestone *(Indiana limestone),* although a granite is used in the steps and the base of the walls. This stone is *Pearl Pink granite,* quarried in St. Cloud, Minnesota. It is medium to coarse grained and pinkish in color. It consists of pale-pink feldspar, hornblende and biotite in small flakes and masses, and abundant quartz in clear, glassy grains (Thiel and Dutton, 1935). It is Precambrian in age. Morton Gneiss, a migmatite or **granite gneiss,** trims the doorways (fig. 18); the inner walls and floors are *Tennessee marble.* In 1957, *Diamond Pink granite* from the Cold Spring area of Minnesota was purchased for City Hall. According to Ron Ranney (personal communication, 1992), it was probably used to make the star patterns and circle on the south patio.

The sedimentary, igneous, and metamorphic rocks, ironwork, woodwork, statues, urns, and the colossal Ionic columns of Salem Limestone effectively decorate this otherwise plain and utilitarian building.

FIGURE 17.— Ionic columns of Salem Limestone on west side of Columbus City Hall.

FIGURE 18.— Doorway of Morton Gneiss at Columbus City Hall.

Stop 14. LEVEQUE TOWER

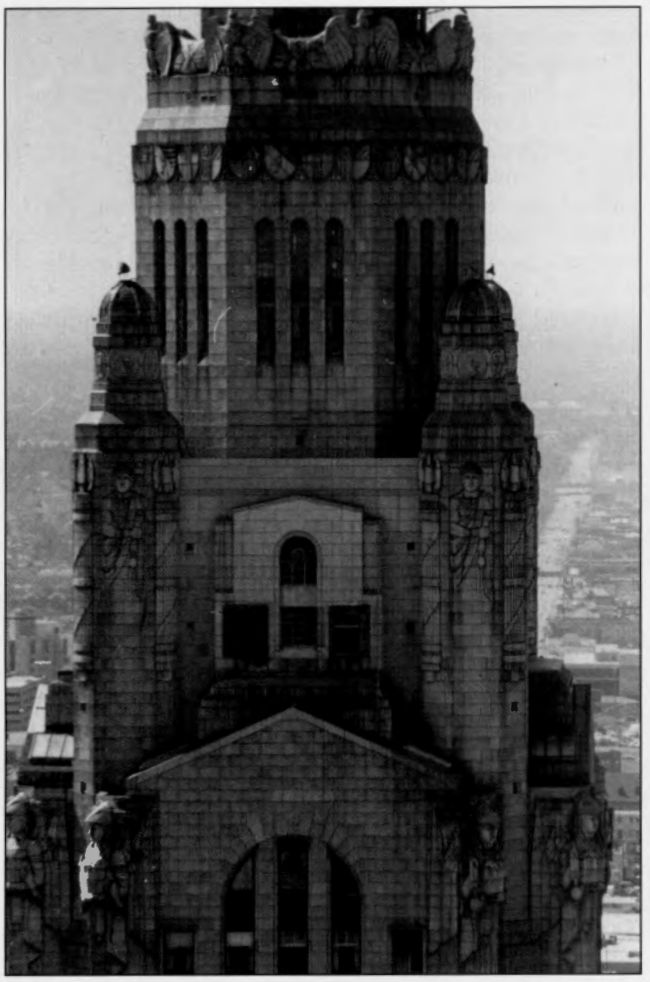


FIGURE 19.— Detail of terra-cotta sculptures on east side of LeVeque Tower. View from Rhodes Tower, 1986.

The 55-story LeVeque Tower (fig. 19), formerly known as the AIU (American Insurance Union) Building, at 50 West Broad Street, is as tall as the Washington Monument. The tower, built in 1924-27, is commonly called the first aerial lighthouse in the country because it served as a guide to aviators. For many years it was the only skyscraper in Columbus. It was the first to have a caisson foundation to bedrock. It is constructed of concrete; 10,000 tons were required to form the skeleton. Terra-cotta in a white oak pattern covers the concrete. Weathering through the years has made it necessary to remove some of the decorative terra-cotta and to replace some of the surface.

The lower 4 feet of the tower are faced with a gray granite, possibly *Rockville granite* from Rockville, Minnesota, although the stone is also similar to *Pearl Pink granite,* which can be seen across the street at City Hall (Stop 13). "Black granite" panels on either side of the west and south entrances are similar to larvikite, but the sparkling blue luster of typical larvikite is not well developed.

Belgian and Italian "marbles" decorate the tower entrance. The office building lobby is faced with travertine of Italian origin. Travertine in the western lobby appears to have a horizontal cut; that in the eastern lobby has a vertical cut. Two unusual panels in the lobby on either side of the east entrance are made of small rectangular pieces of travertine forming a mosaic-like decoration. The floor and steps in the western lobby are the original stone, described in a brochure as Italian and Belgian "marble." The light-gray **stylolitic** stone bears a close resemblance to *Tennessee marble* and is not a true marble but a limestone, as there are plentiful small fossils visible. The black stone insets in the floor are probably *Belgian Black marble,* a black limestone of Devonian-Mississippian age from Belgium (Edward Slagle, personal communication, 1992).

Stop 15. DEPARTMENTS OF STATE BUILDINGS

FIGURE 20.—Departments of State Building at 65 South Front Street. The Scioto River is in the foreground. In the background, the Riffe Center is on the far right next to the Huntington Center; at far left is the LeVeque Tower.

Three gleaming white *Georgia marble* (Murphy Marble) buildings constitute an important part of the Civic Center complex overlooking the Scioto River. The central building (fig. 20) is at the foot of State Street at 65 South Front Street. The Ohio Department of Transportation Building is to the north at 25 South Front Street; the Bureau of Employment Services Building is to the south at 145 South Front Street.

The original (central) building was constructed from 1931 to 1933, at a cost of $6 million, and was considered one of the finest state office buildings in the country. It was faced with gleaming white marble from the Georgia Marble Company of Nelson, Georgia. This coarse-grained, **metamorphosed** limestone (McCallie, 1907) of Cambrian age was installed with the Zibell Anchoring System, a new concept in marble application developed by the Georgia Marble Company. Construction was hampered by previously laid city water and sewer lines, and a gas leak caused a terrific explosion and devastation even before the building was completed.

The interior is famous for its marble breccias, varicolored marbles from Italy, glass-inlaid mosaics, and *Tennessee marble* flooring. The walls near the elevator are faced with a marble similar to *Yellow Verona marble.* The hearing rooms and lobby floors are decorated with murals depicting Ohio's growth. It has 13 office floors, three floors of book stacks of the State Library of Ohio and the Ohioana Library, two basements, and two attics.

At the time of its construction this building was large enough to house all the departments of state, but by the early 1960's it was too small. The two adjacent buildings were completed in 1967. The two newer ones are also faced with *Georgia marble.* Their plazas and the lobbies are decorated with white marble and sharply contrasting walls of so-called "black granite." This stone is larvikite, from Larvik, Norway. It is an attractive black igneous rock composed mainly of feldspar and augite. The blue crystals consist of two intergrown feldspars, oligoclase and soda microcline or **orthoclase** (Slagle, 1982).

Stop 16. THE VERN RIFFE CENTER FOR GOVERNMENT AND THE ARTS

FIGURE 21.— The Vern Riffe Center for Government and the Arts. View west from Capitol Square.

The 503-foot-high Riffe Center (fig. 21), also called the Riffe Tower, was completed in 1988 at the northwest corner of State and High Streets. The building contains state offices, including the offices of the Governor and the House of Representatives, several theaters, an art gallery, a day-care center, and a restaurant. The architects, BOHM-NBBJ, used a stone-faced precast-concrete wall system. The stone was supplied by Formai and Mariani of Carrara, Italy.

Most of the exterior of the building has walls of thermal and polished *Sardinian Grey granite,* a medium- to coarse-grained light-gray granite from Sardinia, Italy. The horizontal trim and accent areas on the exterior walls and some of the paving stone are of thermal and polished *Napoleon Red granite* (Vånga Granite of Precambrian age) quarried in Sweden. This granite is medium to dark red and coarse grained. *Napoleon Red granite* is a very popular building stone and can also be seen in Three Nationwide Plaza (Stop 10) and the Huntington Center (Stop 17). Some of the paving around the building is *Sunset Red granite* (Town Mountain Granite), a coarse-grained pinkish-red granite from Marble Falls, Texas.

The interior of the building contains limestone and travertine. The reddish-brown stone is polished *Rojo Alicante marble,* a limestone of Jurassic age from Alicante, Spain; it is used in the base of and in accent strips on the wall. Most of the wall is a buff travertine, *Geneva Creme,* which has either a honed or satin-smooth finish. The floors in the lower levels of the building are also *Geneva Creme travertine* (also known as *Classic Roman travertine*); slightly darker *Rojo Alicante marble* is used as insets. There are fossils, including cephalopods, in the *Rojo Alicante.*

Stop 17. HUNTINGTON CENTER

FIGURE 22.— Huntington Center. View from Capitol Square.

In 1984 the Huntington Center (fig. 22) was constructed on the site of the Neil House hotel at 41 South High Street, directly west of the axis of the Capitol rotunda. It has 37 floors and 1 million square feet of space.

The building is supported by a tubular steel structure and consists of two slender towers linked by a transparent, multi-storied atrium pillar. It is a mini-scale version of the "super-frame" concept developed for ultratall high-rise buildings. Tubular frame components in the exterior corners of the building are interlinked with vertically spaced, multifloor exterior-face truss-type elements.

The building features the use of *Napoleon Red granite* (Vånga Granite, 1.2 billion years old), quarried in Vånga, Sweden, and cut in Italy. In comparison with the *Napoleon Red granite* in the Riffe Center, both granites are medium to dark red; however, where they can be readily compared the textures are different. The granite on this building is very coarsely porphyritic; that on the Riffe Center is coarse grained.

The lower, street, and gallery levels feature travertine floors trimmed in the granite, accented with highly polished bronze escalators, revolving doors, and handrails. The gallery floor is white *Italian travertine* and *Colorosa travertine*. The latter is a Quaternary-age stone from Colorado.

Stop 18. HUNTINGTON NATIONAL BANK

FIGURE 23.— Huntington National Bank.

This original building (fig. 23) of the Huntington National Bank, at 17 South High Street, was completed in 1926. It is constructed of buff brick and has a front facade of gray granite and sharply contrasting "black granite" (larvikite). This dark, highly polished rock contains large crystal faces of anorthoclase in a dark matrix; however, the blue luster is not as well developed as that of the larvikite in the Departments of State Buildings (Stop 15). *Tennessee marble* is used extensively on the interior floors and walls; the floor of the outer lobby is now covered with *Italian travertine.* Of special note in the spacious bank lobby is the ornate ceiling designed by Tiffany.

Stop 19. JAMES A. RHODES STATE OFFICE TOWER

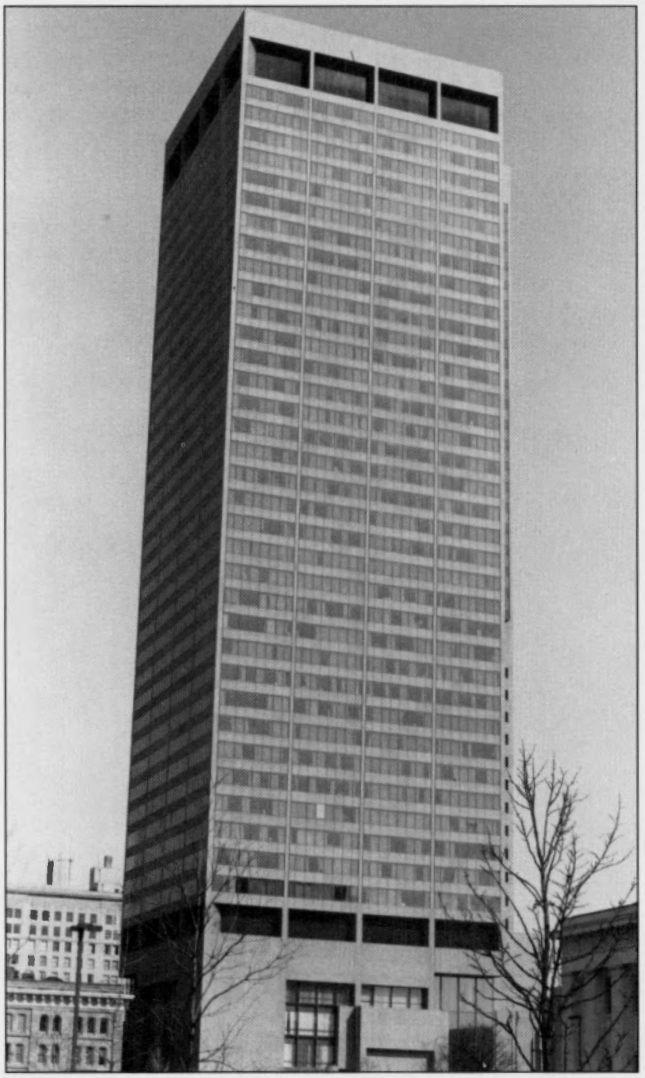


FIGURE 24.—James A. Rhodes State Office Tower. View northeast from Capitol Square.

This building (fig. 24), at 30 East Broad Street, is directly north of the State House and connected to it by an underground tunnel. Completed in 1975, it is 629 feet high, has 41 floors, and is the tallest building in Columbus.

The outside of the structure, the sidewalk area, and the lower part of the interior are lined with a veneer of a rock marketed as *Carnelian granite.* The formal geologic name of this stone is Milbank Granite. It was quarried in Milbank, South Dakota, by the Cold Spring Granite Company of Minnesota. It also is known as *Sequoya granite.* Milbank Granite is composed of microcline (pink feldspar), white plagioclase feldspar, quartz, biotite, and hornblende. Individual minerals are easily distinguished. It is thought to be more than 2 billion years old.

The granite encases a steel grid of columns and beams. Thirty-two concrete-filled steel caissons form the foundation and reach 100 feet below the surface to the limestone bedrock. These steel tubes range in diameter from 6 feet to 69 feet depending on the stress and location.

The 40th floor gives an excellent view of the Scioto River on the west, the beginning of the Appalachian Plateau on the east and southeast, the scope of the till plain to the north and south, and the Powell Moraine to the north, as well as the far-reaching city panorama.

[Note: Stop 20, Orton Hall, is not within easy walking distance of the other stops in this guide. It is located 2.7 miles from the Rhodes State Office Tower.]

Stop 20. ORTON HALL

FIGURE 25.—Orton Hall at The Ohio State University. Five different Ohio building stones, arranged in stratigraphic order, were used on the exterior.

Orton Hall (fig. 25), on South Oval Drive on the campus of The Ohio State University, reflects Ohio's geological history. It was completed in 1893 at a cost of $102,000 and was designed to house the Department of Geology, the Geological Museum, and OSU's main library. The building's structure and design were conceived by Dr. Edward Orton, the first president of the university and State Geologist of Ohio (1892-1899). About five different kinds of stone are used on the exterior and more than 30 in the interior, most readily visible as columns in the vestibule; all are native to Ohio. The design is Richardson Romanesque Revival, a style noted for its massive blocks of stone.

From base to tower, the layers are arranged in the same relative positions as they occur in the bedrock of the state. The oldest stone is from the Brassfield Formation, a limestone of early Silurian age. It is best seen on the south and southeast sides of the building. The next oldest stones are also of Silurian age. Limestone from the Dayton Formation and the Springfield **Dolomite,** which overlies it and is equivalent to the Lockport Dolomite, form the visible base of the building. The Dayton Formation contains fossils and crystalline masses of weathered and unweathered **pyrite.** The main and second floors are constructed of Berea Sandstone of Devonian-Mississippian age, quarried at South Amherst in Lorain County. (For more information on the Berea see Hannibal, Lanier, and Stover, 1991). The tower, doors, and windows are trimmed in *Hocking Valley Red sandstone* quarried near Carroll, in Fairfield County. This stone comes from the Black Hand Sandstone Member of the Cuyahoga Formation and is Mississippian in age (see also Bownocker, 1915). The gargoyles that ring the tower are made from the same stone and illustrate extinct animals: an ichthyosaur, *Triceratops,* a pterosaur, *Hesperornis, Dimorphodon,* and others.

TABLE 1.— *Key to the building stones in the vestibule of Orton Hall (modified from posted explanation in Orton Hall)*

Column number	Trade name of stone[1]	Group, formation, or member
1	*Yellow sandstone* (Licking County)	Black Hand Sandstone Member
2	*Killbuck Brown sandstone*	Pottsville Group, Massillon sandstone
3	*Freeport Olive Buff sandstone*	Conemaugh Group, Mahoning sandstone
4	*Hocking Valley Red sandstone*	Black Hand Sandstone Member
5	*Glenford White sandstone*	Pottsville Group, Massillon sandstone
6	*Sandusky White limestone*	Columbus Limestone
7	*Mansfield Red sandstone*	Logan Formation
8	*Massillon Pink sandstone*	Pottsville Group, Massillon sandstone
9	*Euclid Blue sandstone (Euclid bluestone)*[2]	Bedford Shale (Cussewago Sandstone Member?)
10	*Mansfield Banded sandstone*	Logan Formation
11	*Lancaster Pink sandstone*	Black Hand Sandstone Member
12	*Iberia sandstone*	Berea Sandstone
13	*Waverly Banded sandstone*	Berea Sandstone
14	*Monroe County Blue sandstone*	Dunkard Group
15	*Mansfield Pink sandstone*	Logan Formation
16	*Constitution sandstone*	Monongahela Group
17	*Hocking Valley Brown sandstone*	Black Hand Sandstone Member
18	*White sandstone* (Licking County)	Logan Formation
19	*Grafton sandstone*[3]	Berea Sandstone
20	*Monroe County Buff sandstone*	Dunkard Group
21	*Sunbury sandstone*	Berea Sandstone
22	*Waverly Brown sandstone*	Cuyahoga Formation
23	*Buena Vista freestone*	Buena Vista Sandstone Member
24	*Freeport Buff sandstone*	Conemaugh Group, Mahoning sandstone

[1]Names in italics indicate current or former trade names for rocks.
[2]See Hannibal and Palermo (1980).
[3]Grafton is also the name of a sandstone in the Conemaugh Group. This trade name for the Berea Sandstone probably was derived from the city of Grafton, in Lorain County, near where the Berea Sandstone was quarried (Merrianne Hackathorn, personal communication, 1992).

The front steps of Orton Hall, originally of highly fossiliferous Columbus Limestone from the Marble Cliff quarry on Trabue Road, were replaced in the 1960's with Salem Limestone *(Indiana limestone).* As Orton Hall was designed to use Ohio materials, from the clay in the floor tiles to the exterior building stones, this change was not appreciated by some local geologists. More recent renovation has received the assiduous attention of Charles Summerson of the OSU Department of Geological Sciences. Columbus Limestone can still be seen on the east margin of the steps and on the wainscoting of the front hall.

Geological display was not the only motive for using Ohio building stones; Orton considered their use would serve as a guide for people planning to build other structures. The construction materials were donated for the most part by the industries of the state.

The vestibule of Orton Hall also follows Orton's idea of displaying native stones and materials of Ohio. The

floor tiles are made from Ohio clay; however, only the landing of the front stairs has the original tiles. The tiles in the main hall were replaced during renovation in the 1970's with donated architectural tile from eastern Ohio. Each of the columns in the vestibule is made from Ohio stone. A key posted on the wall beside the entrance identifies the source and type of stone used in each column (see table 1). The lintels and capitals are Berea Sandstone. They have intricate carvings of well-known fossils such as **trilobites,** clams, and primates. Above the east and west alcoves are bas-reliefs of Ohio's early geologists. The ribs of the barrel vault are *Danville Red sandstone* of unknown age. The spans on the ceiling are *Tippecanoe sandstone,* probably the Mahoning sandstone of the Conemaugh Group. This Pennsylvanian-age stone was quarried in Harrison County. The insets are stones from the Clinton formation (Brassfield Formation), a soft, gray limestone of Silurian age, which was quarried in either Clark or Miami County.

All but one *(Sandusky White limestone)* of the 24 columns in the hall are varieties of sandstone from Ohio. They belong to nine geologic formations or groups: Black Hand Sandstone Member (4 types), Berea Sandstone (4), Logan Formation (3), Pottsville Group (3), Cuyahoga Formation (2), Conemaugh Group (2), Monongahela Group (1), Bedford Shale (1), and Dunkard Group (1). Although the bright colors of the columns are quite visible now, until they were cleaned in the 1970's there was little visible color difference. Some of these stones are seen in the geologic column at Fountain Square (see Additional site); most are no longer used commercially.

In front of Orton Hall are glacial **erratics,** including a huge **granodiorite** boulder (Peters and Faure, 1972); Ohio Shale **concretions;** a large (48 inches in diameter) rock core of Massillon sandstone (Pennsylvanian age) donated by a coal company; and other specimens. A **bench mark** north of the main library indicates an elevation of 759.716 feet, a latitude of 40°00′00″N, and a longitude of 83°00′54″W.

Orton Hall now houses Orton Geological Museum, Orton Memorial Library of Geology (see the paintings of geological subjects by Bierstadt, Moran, and others), and part of the Department of Geological Sciences.

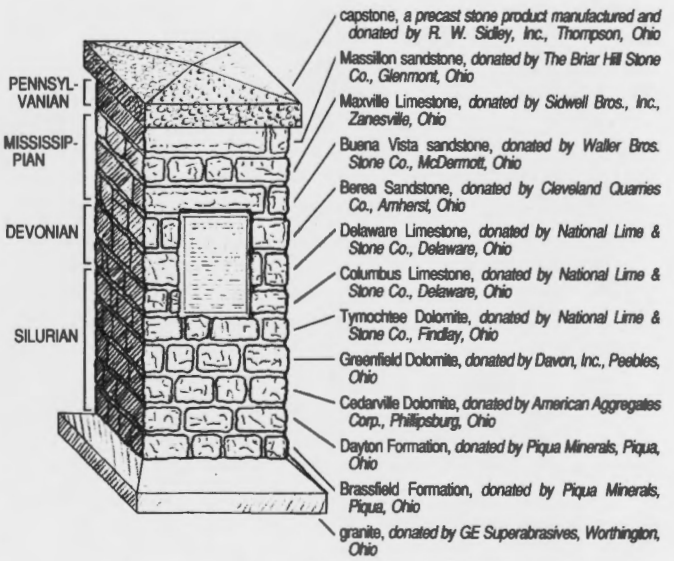
ADDITIONAL SITE

If time and transportation are available, take a side trip to see the Ohio Department of Natural Resources Earth Day 1990 Monument (fig. 26) at Fountain Square, south of Morse Road just east of Northland Mall. The monument is a geologic column consisting almost entirely of Ohio building stones (fig. 27). It was built with donations, including material, time, and labor, from the mining and construction industries and the geological and educational communities of Ohio. The monument was designed by Linda Gaertner and built by Ralph Styers. A time capsule in the monument commemorates the 20th anniversary of the first Earth Day.

The granite at the base of the monument represents Precambrian rocks (>570 million years old) that underlie Ohio at great depths. The Ohio stones are arranged in ascending stratigraphic order and range in age from Silurian (438 to 408 million years before present) to Pennsylvanian (320 to 286 million years before present). A precast stone cap represents the Quaternary Period.

The monument celebrates the use of geologic materials in building Ohio. The mining of industrial rocks and minerals such as limestone, dolomite, sandstone, shale, clay, sand, and gravel have been important since the early days of the state. In the canal-building era (1825

FIGURE 26.— Earth Day (1990) Monument at Fountain Square.



Monument sponsors and contributors: Anderson Concrete Corp.; Ben Cookson, Inc.; Columbus Stone Center, Inc.; Complete Resources Co.; Gaddis & Son, Inc.; George J. Igel & Co., Inc.; The Northern Ohio Geological Society; Ohio Aggregates Association; The Ohio Contractors Association; Ohio Department of Natural Resources; Ohio Department of Transportation; The Ohio Geological Society; Ohio Manufacturers Association; Ohio Mining and Reclamation Association; The Ohio State University; Dr. Paul E. Potter.

FIGURE 27.—Sketch of ODNR Earth Day Monument illustrating the building stones used.

to 1850), much stone was supplied for aqueducts and locks; by 1850, stone was an important building material for public buildings (see Stop 1, Ohio State House). Other building materials made from native industrial rocks and minerals include brick, tile, and ceramics.

If you are at Fountain Square during business hours, a visit to the Division of Geological Survey in Building B presents an opportunity to purchase maps and other materials of interest to geologists, educators, and the public.

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GLOSSARY

anorthoclase A sodium-rich mineral of the alkali **feldspar group,** $(Na,K)AlSi_3O_8$.
ashlar Rectangular pieces of stone that are set randomly in a wall and that are finished to permit very thin mortar joints.
augite A dark rock-forming **silicate** mineral containing iron and magnesium.
bearing capacity Maximum load per unit area that the ground can support without shear failure.
bedrock The solid rock which underlies a particular region.
bench mark A durable marker, commonly imbedded in stone or concrete, that indicates the elevation of a particular spot. Bench marks are used as standards for making other measurements of elevation.
biotite A common black or dark-brown **mica** containing iron and magnesium.
brachiopod A marine invertebrate with two shells that superficially resembles a clam. The shells are each bilaterally symmetrical.
breccia A rock made up of highly angular, coarse fragments which have been recemented together with fine-grained particles.
bryozoan A tiny **colonial** invertebrate. Bryozoans are known informally as moss animals. Individual tubes within a bryozoan colony are typically less than 1/2 mm wide.
building stone A natural or manmade stone used for building.
caisson Pillar of concrete used in the foundation of a building.
calcite A mineral composed of calcium carbonate ($CaCO_3$) that effervesces in weak acids. It is the principal mineral in **limestone** and **marble.**
Canadian Shield Igneous and **metamorphic** rock underlying Ohio's **sedimentary** series and extending into Canada, where it is exposed at the surface. It is Precambrian in age.
carbonaceous Describes a rock or **sediment** that is rich in carbon.
cephalopod A class of **mollusks** that includes squids, octopuses, and their relatives, modern and extinct, including shell-bearing forms such as the pearly nautilus.
colonial Said of animals that live together as an interconnected unit.
concretion A hard mass of mineral matter of spherical or irregular shape in a **sedimentary** rock, formed by precipitation from aqueous solution shortly after **sediment** deposition.
conglomeratic Pertaining to a rock consisting of rounded pebbles and boulders in a matrix of finer grained material.
coral A type of marine invertebrate with a soft body and a hard external shell composed of calcium carbonate. They are attached to the sea floor in shallow tropical seas. They may occur in colonies or as individuals such as horn corals.
crinoid A marine invertebrate (Phylum Echinodermata, Class Crinoidea) characterized by a disk-shaped or globular body with radiating appendages and a stem.
cross-bedding The arrangement of laminations of strata transverse or oblique to the main bedding planes.
crystalline Formed by crystallization, having a crystal structure, or said of a rock composed of crystals or fragments of crystals.
dimension stone Building stone that is quarried and prepared in regularly shaped blocks.
diorite A group of **igneous** rocks intermediate in composition between acidic and basic and characteristically composed of a dark-colored mineral (especially **hornblende**), acid **plagioclase feldspar, pyroxene,** and sometimes a small amount of **quartz.**
dolomite The mineral name for calcium magnesium carbonate. As a rock term it refers to a rock composed of the mineral dolomite.
erratic A piece of rock carried by ice away from its source and deposited over bedrock of different lithology. Size can range from a pebble to a house-size block.
feldspar A group of rock-forming **silicate** minerals which may be divided into **plagioclase** and **potassium feldspars.**
ferromagnesian mineral Containing iron and magnesium.
flamed A rough surface developed on **dimension stone** by a flame that causes spalling of the surface. Sometimes described as a **thermal** finish.
foraminiferan A type of single-celled organism having a hard exterior covering consisting of one to many chambers.
formation A particular body of rock or series of rock strata differing conspicuously from adjacent material; it may be subdivided into **members.**
fossil The remains (body fossil) or traces (trace fossil) of an animal or plant which has been preserved by natural means within the Earth's crust. Does not include organisms which have been buried since the beginning of historic time.
fossiliferous Containing fossils.
gabbro A dark **plutonic** rock consisting primarily of iron- and magnesium-rich minerals and calcium-rich **plagioclase feldspars.**
gastropod A **mollusk** characterized by a single shell that is usually coiled (for example, a snail).
glacier A mass of ice that has definite limits, that moves in a definite direction, and that begins with the compaction of snow by pressure.
gneiss A banded or layered **metamorphic** rock usually composed of **feldspar, quartz,** and **mica.**
granite An **igneous plutonic** rock that consists primarily of **potassium** and **plagioclase feldspars** and **quartz.** It may also contain small amounts of **mica** and **hornblende.**
granite gneiss A metamorphosed **granite.**
granodiorite A coarse-grained **igneous** rock intermediate in composition between **granite** and **diorite** and containing **quartz, plagioclase** and **potassium feldspars, biotite,** and **hornblende.**
gunite A mixture of cement, sand, and water applied under pneumatic pressure as a sealing agent.
honed (or flame-honed) A smooth rock finish with a dull sheen.
hornblende A dark-green to black **silicate** mineral distinguished in a hand specimen by its cleavage and color.
igneous A rock which has crystallized from molten **magma** either below the Earth's surface **(plutonic)** or at the Earth's surface (volcanic).
larvikite A **plutonic** rock composed predominantly of **potassium** and **plagioclase feldspars (syenite)** and that generally has abundant **phenocrysts.** It is named for Larvik, Norway.

limestone A **sedimentary** rock composed primarily of calcium carbonate ($CaCO_3$). It usually contains **fossils** and sometimes is known as "fossil rock."

magma Molten rock originating within the Earth at high temperatures.

marble A **metamorphic** rock formed by recrystallization, heat, and/or pressure from **limestone** or **dolomite.** The term is used by builders, however, to denote any rock composed of **calcite** or **dolomite** that can be polished.

meltwater Water which flows on, in, or from a **glacier.**

member A rock stratigraphic unit that is part of a **formation.**

metamorphic A rock derived from pre-existing rock as the result of **metamorphism.**

metamorphism Recrystallization of pre-existing rock due to heat and or pressure within the Earth.

metamorphosed Describes pre-existing rock that has been recrystallized due to heat and/or pressure within the Earth.

mica A rock-forming mineral which splits into thin sheets. Muscovite (clear or golden) is the light form of mica, **biotite** the dark.

micaceous Describes a rock containing **mica.**

microcline A type of **potassium feldspar** common in **granites.**

migmatite A composite rock containing both **igneous** and **metamorphic** minerals. Such rocks are commonly banded.

migmatitic Pertaining to **migmatite.**

mollusk A solitary invertebrate of the phylum Mollusca. Snails (gastropods) are one class of this phylum.

oligoclase A mineral of the **plagioclase feldspar** group.

olivine A green mineral of basic and low-silica **igneous** rocks that weathers readily.

oolite Sedimentary rock made up of small (0.25-2.0 mm) rounded grains (ooliths) formed by inorganic precipitation.

orthoclase A colorless to pink or gray **feldspar** mineral ($KAlSi_3O_8$); it is common in **granite.**

outwash Stratified **sediment** washed out of a **glacier** by **meltwater** streams.

pegmatitic Pertaining to very coarse grained (>1 cm) **igneous** rock, usually found in dikes or lenses, and having the composition of **granite.**

phenocryst A large crystal in an **igneous** rock that generally has a finer grained groundmass.

phyllite A **metamorphosed** rock intermediate in grade between **slate** and mica schist (a strongly foliated crystalline rock).

plagioclase feldspar A common rock-forming **silicate** mineral in **igneous** rocks. It ranges in color from white to gray.

plutonic Term describing an **igneous** rock which crystallizes below the surface of the Earth.

porphyritic Describes an **igneous** rock in which larger crystals are in a finer grained groundmass.

potassium feldspar A common rock-forming **silicate** mineral typically found in **granite.** It ranges in color from white to pink to red.

psi Abbreviation for pounds per square inch, a measure of force per unit area.

pyrite A gold-colored mineral composed of iron sulfide. It is informally known as "fool's gold."

pyroxene A group of dark **silicate** minerals common in **igneous** rocks.

quartz An abundant, glassy, clear to gray, rock-forming mineral, silicon dioxide (SiO_2).

quartzite A **metamorphosed quartz sandstone,** formed by deposition of secondary **quartz** between the grains, a process which makes the rock very resistant to weathering.

rock faced A rough type of finishing, resembling a natural surface, used for the exposed side of blocks of **building stone.**

sandstone A **sedimentary** rock composed of grains of sand (between 1/16 and 2 mm in diameter) cemented by mineral material.

sediment Unconsolidated material either in suspension or transported and deposited by water or wind and typically in layers.

sedimentary Relating to or containing **sediment.**

serpentine A group of typically green rock-forming minerals, rich in iron and magnesium, that occurs in **gneiss** and other **metamorphic** rocks. Derived by alteration of magnesium-rich **silicate** minerals (especially **olivine**).

serpentinite A rock consisting almost wholly of **serpentine**-group minerals.

shale A **sedimentary** rock composed primarily of clay-sized (<0.002 mm) particles.

silicate Compound whose crystal structure contains SiO_4. Silicates are the most common mineral group.

slate A rock derived from the **metamorphism** of shale.

split Rugged natural finish on **dimension stone** produced by fracturing of the stone.

stromatoporoid An extinct, spongelike organism.

stylolitic Pertaining to natural, irregular seams in **limestone** that formed where the rock was sutured back together after portions had dissolved away. The dark color of these stylolites is due to a concentration of insoluble material that remained.

syenite A **plutonic igneous** rock consisting principally of alkalic **feldspar** (such as **orthoclase**), usually with one or more iron-magnesium minerals such as **hornblende** or **biotite.**

terra-cotta A kiln-burnt clay that usually assumes a reddish-brown color.

terrazzo Flooring composed of stone chips set in a cement matrix.

thermal see **flamed**

till An unstratified, unsorted mixture of cobbles, pebbles, sand, silt, and/or clay left by a **glacier.**

trade name A manufacturer's name for a product such as a **building stone;** *Indiana limestone, Carnelian granite,* and *Napoleon Red granite* are typical trade names.

travertine Calcium carbonate ($CaCO_3$) deposited from solution by ground or surface water.

trilobite An extinct type of arthropod, generally recognized by the typical division into three segments.

Verde Antique The trade name for a massive dark-green **serpentine**-rich rock that has veinlets of calcium carbonate and magnesium carbonate; it is considered to be a commercial **marble.**

water-recharge area An area, such as an area of glacially deposited **outwash** sand and gravel, that can absorb water to the point of saturation, thus serving as a natural aquifer.

TABLE 2.— *Simplified geologic time scale showing the geologic periods during which building stones used in downtown Columbus were deposited or formed*[1]

Era	Period	Millions of years ago	Building stone
CENOZOIC	Quaternary		*Italian travertine, Colorosa travertine*
		1.6	
	Tertiary		*St. Peter travertine, Carrara marble*
		66.4	
MESOZOIC	Cretaceous		*Academy Black granite*
		144	
	Jurassic		*Comblanchien limestone, Breccia Pernice marble, Rojo Alicante marble*
		208	
	Triassic		
		245	
PALEOZOIC	Permian		
		286	
	Pennsylvanian		Mahoning sandstone
		320	
	Mississippian		Black Hand Sandstone Member, Salem Limestone, *Hocking Valley Red sandstone*
		360	Berea Sandstone
	Devonian		Columbus Limestone, Deer Isle Granite
		408	
	Silurian		Brassfield Formation, Dayton Formation, Springfield Dolomite
		438	
	Ordovician		Holston Formation
		505	
	Cambrian		Murphy Marble
		570	
PRECAMBRIAN			Town Mountain Granite, Milbank Granite, *Rockville White granite, Cardinal Red granite, Napoleon Red granite,* Mondariz Granite, *Agate granite, Pearl Pink granite*

[1]Dates for the time scale are from Palmer (1983).

TABLE 3.—*Summary of uses, sources, and ages of major types of building stones used for Stops 1-20 in downtown Columbus*

Building stone	Use	Source	Age
STOP 1.—OHIO STATE HOUSE AND SENATE BUILDING			
Columbus Limestone	exterior	Columbus, Ohio	Devonian
Town Mountain Granite *(Texas Pearl granite, Sunset Red granite)*	plaza, fountain	Burnet Co., Texas	Precambrian
Milbank Granite *(Carnelian granite, Sequoya granite)*	plaza trim & fountain	Milbank, South Dakota	Precambrian
white *Italian marble*	floor, balustrades	Italy	
Holston Formation *(Tennessee marble)*	balustrades	eastern Tennessee	Ordovician
pink marble	rotunda floor	Portugal	
purple breccia marble	rotunda floor		
Carrara marble	statues	Italy	Tertiary
Crown Point Limestone *(Champlain Black marble)*	floor	Vermont	Ordovician
Academy Black granite	fountain	Raymond, California	Cretaceous
black slate	fountain	Liguria, Italy	
Rockville White granite	curbs	Rockville, Minnesota	Precambrian
STOP 2.—THE OHIO THEATRE			
terra-cotta	exterior/interior	California	
Vermont marble	exterior & interior of entrance	Vermont	Ordovician?
porphyritic granite	exterior front		
Salem Limestone *(Indiana limestone)*	exterior front	Indiana	Mississippian
?*Red Levanto marble*	exterior front	eastern Liguria, Italy	Tertiary
green marble	exterior entrance		
Verde Antique	ticket booth	?Vermont	
Murphy Marble *(Etowah marble)*	washrooms	Tate area, Georgia	Cambrian
STOP 3.—U.S. POST OFFICE AND COURTHOUSE			
Berea Sandstone	exterior	?S. Amherst, Ohio	Devonian-Mississippian
marble	staircase, walls		
STOP 4.—TRINITY EPISCOPAL CHURCH			
Black Hand Sandstone Member	exterior	Fairfield Co., Ohio	Mississippian
Columbus Limestone	foundation	Columbus, Ohio	Devonian
Italian marble	altar	Italy	
STOP 5.—BANCOHIO NATIONAL PLAZA			
Italian travertine	interior/exterior	Tivoli, Italy	Quaternary
STOP 6.—ST. JOSEPH CATHEDRAL			
Black Hand Sandstone Member	exterior upper	Fairfield Co., Ohio	Mississippian
Black Hand Sandstone Member	exterior lower	Licking Co., Ohio	Mississippian
Columbus Limestone	exterior steps	Columbus, Ohio	Devonian
Salem Limestone *(Indiana limestone)*	interior pillars	Bedford, Indiana	Mississippian
Italian marble	altar, walls	Italy	
STOP 7.—BROAD STREET UNITED METHODIST CHURCH			
serpentinite	exterior	?West Chester, Pennsylvania	Ordovician
Columbus Limestone	base course, steps	Columbus, Ohio	Devonian
Berea Sandstone	5 lower courses, trim, buttresses	S. Amherst, Ohio	Devonian-Mississippian
STOP 8.—OHIO BELL BUILDING			
quartzite	exterior & plaza	Sweden	?Precambrian
"black granite" (gabbro)	interior desk		
STOP 9.—THE WILLIAM GREEN BUILDING			
Cardinal Red granite	exterior (90%), paving, interior walls, ceiling	Finland	Precambrian
Deer Isle Granite	exterior (10%)	Stonington, Maine	Devonian
Comblanchien limestone	interior walls	Cote d'Or, France	Jurassic
Italian travertine	floor		
?*Agate granite*	sidewalk trim		
Breccia Pernice marble	north lobby wall	Mt. Pastello, Italy	Jurassic
STOP 10.—THREE NATIONWIDE PLAZA AND THE ATRIUM			
Texas Red granite	exterior	Granite Shoals, Texas	?Precambrian
Napoleon Red granite (Vånga Granite, *Sweden Red*)	exterior trim	Vånga, Sweden	Precambrian
Mondariz Granite	exterior	Porriño-Salceda, Spain	Precambrian
Agate granite	paving, stream, atrium floor	Ortonville, Minnesota	Precambrian
Breccia Pernice marble	atrium trim	Mt. Pastello, Italy	Jurassic
Classic Roman travertine *(Geneva Creme travertine)*	atrium walls, building walls	Italy	

TABLE 3.—*Summary of uses, sources, and ages of major types of building stones used for Stops 1-20 in downtown Columbus*—Continued

Building stone	Use	Source	Age
St. Peter travertine	building walls, floor	Tivoli, Italy	Tertiary
Trani travertine (Perlato Royal Svevo)	floor	Trani, Italy	
STOP 11.—ONE NATIONWIDE PLAZA			
Salem Limestone *(Indiana limestone)*	exterior	Bedford, Indiana	Mississippian
Agate granite	exterior base, floor, plaza	Ortonville, Minnesota	Precambrian
Italian marble	interior	Trani, Italy	
STOP 12.—AMERICAN ELECTRIC POWER BUILDING			
Salem Limestone *(Indiana limestone)*	exterior	Bedford, Indiana	Mississippian
Stony Creek Red granite	exterior trim	New Haven Co., Connecticut	pre-Triassic
STOP 13.—COLUMBUS CITY HALL			
Pearl Pink granite	exterior base	St. Cloud, Minnesota	Precambrian
Diamond Pink granite	south patio	Cold Spring area, Minnesota	Precambrian
Salem Limestone *(Indiana limestone)*	exterior	Bedford, Indiana	Mississippian
Morton Gneiss	doorway trim	Morton, Minnesota	Precambrian
Holston Formation *(Tennessee marble)*	walls, floor	eastern Tennessee	Ordovician
STOP 14.—LEVEQUE TOWER			
terra-cotta	exterior	Chicago	
Italian marble	floor, steps		
Belgian Black marble	floor insets	Belgium	Devonian-Mississippian
?Rockville granite or ?Pearl Pink granite	exterior base	Minnesota	Precambrian
"black granite" (larvikite)	exterior door frame	Norway	Precambrian
marble	interior floor, steps	Belgium	
travertine	interior walls	Italy	
STOP 15.—DEPARTMENTS OF STATE BUILDINGS			
Georgia marble (Murphy Marble)	exterior	Georgia	Cambrian
Italian marble	interior	Italy	
Italian marble breccia	interior	Italy	
Holston Formation *(Tennessee marble)*	floor	eastern Tennessee	Ordovician
"black granite" (larvikite)	exterior of north & south buildings	Norway	
?Yellow Verona marble	interior wall	Verona area, Italy	Jurassic
STOP 16.—THE VERN RIFFE CENTER FOR GOVERNMENT AND THE ARTS			
Sardinian Grey granite	exterior	Sardinia, Italy	
Napoleon Red granite (Vånga Granite)	exterior trim & paving stone	Vånga, Sweden	Precambrian
Town Mountain Granite *(Sunset Red granite)*	exterior paving	Marble Falls, Texas	Precambrian
Rojo Alicante marble	interior wall base	Spain	Jurassic
Geneva Creme travertine (Classic Roman travertine)	interior wall & flooring	Italy	Quaternary
STOP 17.—HUNTINGTON CENTER			
Napoleon Red granite (Vånga Granite)	exterior/interior	Vånga, Sweden	Precambrian
Italian travertine	interior floor	Italy	?Quaternary
Colorosa travertine	interior floor	Colorado	Quaternary
STOP 18.—HUNTINGTON NATIONAL BANK			
gray granite	exterior		
"black granite" (larvikite)	exterior	Norway	Precambrian
Holston Formation *(Tennessee marble)*	floors/walls	eastern Tennessee	Ordovician
Italian travertine	lobby floor	Italy	?Quaternary
STOP 19.—JAMES A. RHODES STATE OFFICE TOWER			
Milbank Granite *(Carnelian granite, Sequoya granite)*	exterior/interior	Milbank, South Dakota	Precambrian
STOP 20.—ORTON HALL (see also table 1)			
Brassfield Formation	exterior south	western Ohio	Silurian
Dayton Formation	exterior	Dayton, Ohio	Silurian
Springfield Dolomite	exterior	Springfield, Ohio	Silurian
Berea Sandstone	exterior/interior	S. Amherst, Ohio	Devonian-Mississippian
Hocking Valley Red sandstone (Black Hand Sandstone Member)	exterior trim	Fairfield Co., Ohio	Mississippian
Columbus Limestone	exterior	Columbus, Ohio	Devonian
Salem Limestone *(Indiana limestone)*	exterior steps	Bedford, Indiana	Mississippian
Clinton formation (Brassfield Formation)	interior	western Ohio	Silurian
Danville Red sandstone	interior		
Tippecanoe sandstone (Mahoning sandstone)	interior	probably eastern Ohio	Pennsylvanian

TABLE 4.— *Trade names and rock-unit names of building stones and the buildings in downtown Columbus for which they are used*

Building stone	Building
Academy Black granite	Ohio State House
Agate granite	One Nationwide, Three Nationwide, William Green Building(?)
Bedford Shale	Orton Hall
Belgian Black marble	LeVeque Tower
Berea Sandstone	Broad Street United Methodist Church, Orton Hall, Old U.S. Post Office
"black granite" (larvikite)	Departments of State Buildings, Huntington National Bank, LeVeque Tower(?)
"black granite" (gabbro)	Ohio Bell Building
Black Hand Sandstone Member	Orton Hall, St. Joseph Cathedral, Trinity Episcopal Church
Brassfield Formation	Orton Hall
Breccia Pernice marble	Three Nationwide Atrium, William Green Building
Buena Vista Sandstone Member *(Buena Vista freestone)*	Orton Hall
Cardinal Red granite	William Green Building
Carnelian granite	Ohio State House, Rhodes State Office Tower
Carrara marble	Ohio State House
Champlain Black marble	Ohio State House
Classic Roman travertine	Riffe Center, Three Nationwide Atrium
Clinton formation	Orton Hall
Columbus Limestone	Broad Street United Methodist Church, Ohio State House, Orton Hall, St. Joseph Cathedral, Trinity Episcopal Church
Colorosa travertine	Huntington Center
Comblanchien limestone	William Green Building
Conemaugh Group	Orton Hall
Crown Point Limestone	Ohio State House
Cuyahoga Formation	Orton Hall, St. Joseph Cathedral, Trinity Episcopal Church
Danville Red sandstone	Orton Hall
Dayton Formation	Orton Hall
Deer Isle Granite	William Green Building
Diamond Pink granite	City Hall
Dunkard Group	Orton Hall
Etowah marble	Ohio Theatre
Euclid bluestone	Orton Hall
Geneva Creme travertine	Riffe Center, Three Nationwide Atrium
Georgia marble	Departments of State Buildings
Hocking Valley sandstone (Red and *Brown)*	Orton Hall
Holston Formation	City Hall, Departments of State Buildings, Huntington National Bank, Ohio State House
Indiana limestone	American Electric Power Building, City Hall, Ohio Theatre, One Nationwide, Orton Hall, St. Joseph Cathedral
Italian marble	Departments of State Buildings, LeVeque Tower, Ohio State House, One Nationwide, St. Joseph Cathedral, Trinity Episcopal Church
Italian travertine	BancOhio National Plaza, Huntington Center, Huntington National Bank, William Green Building
larvikite	Departments of State Buildings, Huntington National Bank, LeVeque Tower(?)
Logan Formation	Orton Hall
Mahoning sandstone	Orton Hall
Massillon sandstone	Orton Hall
Milbank Granite	Ohio State House, Rhodes State Office Tower
Mondariz Granite	Three Nationwide
Monongahela Group	Orton Hall
Morton Gneiss	City Hall
Murphy Marble	Departments of State Buildings, Ohio Theatre
Napoleon Red granite	Huntington Center, Riffe Center, Three Nationwide Atrium
Pearl Pink granite	City Hall, LeVeque Tower(?)
Pottsville Group	Orton Hall
purple breccia marble	Ohio State House
quartzite	Ohio Bell Building
?*Red Levanto marble*	Ohio Theatre
?*Rockville granite*	LeVeque Tower
Rockville White granite	Ohio State House
Rojo Alicante marble	Riffe Center
Salem Limestone	American Electric Power Building, City Hall, Ohio Theatre, One Nationwide, Orton Hall, St. Joseph Cathedral
Sardinian Grey granite	Riffe Center
Sequoya granite	Ohio State House, Rhodes State Office Tower
serpentinite	Broad Street United Methodist Church
slate	Ohio State House (Capitol Square)
Springfield Dolomite	Orton Hall
St. Peter travertine	Three Nationwide
Stony Creek Red granite	American Electric Power Building
Sweden Red granite	Three Nationwide
Sunset Red granite	Ohio State House, Riffe Center
Tennessee marble	City Hall, Departments of State Buildings, Huntington National Bank, Ohio State House
terra-cotta	LeVeque Tower, Ohio Theatre
Texas Pearl granite	Ohio State House
Texas Red granite	Three Nationwide
Tippecanoe sandstone	Orton Hall
Town Mountain Granite	Ohio State House, Riffe Center
Trani travertine	Three Nationwide
Vånga Granite	Three Nationwide, Huntington Center, Riffe Center
Vermont marble	Ohio Theatre
Verde Antique	Ohio Theatre
?*Yellow Verona marble*	Departments of State Buildings

ADDITIONAL NOTES, MARCH 1997

Stop 1. OHIO STATE HOUSE AND SENATE BUILDING. The restoration of the Ohio State House was completed in 1996. The stained-glass Seal of the State of Ohio in the dome of the rotunda is the original 1861 seal that was discovered behind a painted canvas seal during restoration. The 1861 seal features a canal boat, which is absent in later seals, including a second stained-glass seal that had been installed in the State House in 1926. The 1926 seal is now in the State House gift shop.

According to a brochure distributed during the grand reopening of the State House in July 1996, the floor of the rotunda consists of nearly 5,000 pieces of hand-cut marble from around the world. The stones in the center represent the 13 original colonies. The three marble bands represent the territories that were unorganized in 1860, the Louisiana Purchase, and territories gained during the War with Mexico. The 32-point starburst represents the number of states in the Union at the time the floor was designed. The final band represents the U.S. Constitution.

On the ground floor below the Atrium is the Map Room, which features a map of Ohio in stone. Six types of stone, none native to Ohio, were used to make this county map, which was donated by the County Commissioners Association of Ohio. The stone for Franklin County is *Clear Carthage*, a gray fossiliferous limestone (Carthage Limestone) of Mississippian age from Carthage, Missouri. Union County is represented by a reddish limestone with the trade name *Dark Cedar*. It is the Holston Formation (*Tennessee marble*) of Ordovician age quarried near Knoxville, Tennessee. *Dark Cedar* also is used in the Map Room as baseboard and in the east entrance to the Senate Building as baseboard and wainscoting. *Pink Tennessee*, another variety of the Holston Formation from the same area, is the stone for Licking County. This light-pink limestone is stylolitic (contains zigzag black lines formed by solution). *Verde Oriental*, a green marble from Taiwan more commonly known as *Verde Antique*, is the stone for Delaware County. The green color is due to serpentine (see discussion under Stop 7). Fairfield County is represented by *Breccia Oniciata*, a light-brown travertine showing broken rotated blocks that have multicolored banding. It is from Lombardia, Italy. The sixth type of rock used in the map, *Light Emperador*, is seen in Pickaway County. This dark-brown marble contains numerous blebs of white calcite and was quarried in Spain. Can you identify the rock type for the county where you live?

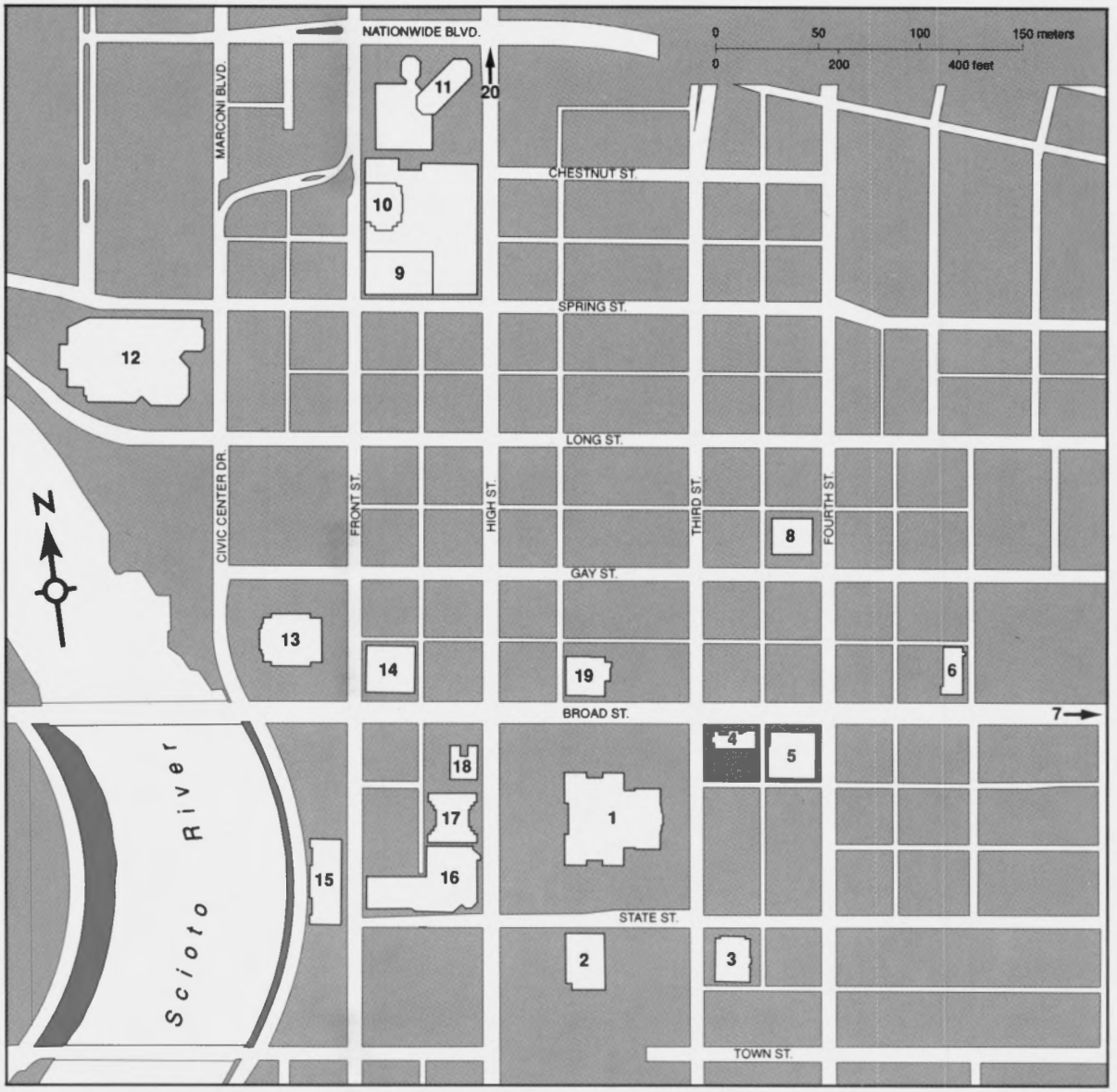
West of the Map Room is the Crypt. The central section of the floor is a combination of red slate and white marble squares (16 x 16 inches). The marble is similar to the other white marble in the Capitol and probably is *Italian marble*, although it and the other stone in this floor were originally installed in the Central Ohio Psychiatric Hospital on West Broad Street in 1877. The slate contains 2-inch-long dark inclusions that rise above the general level of the slate. A black border of *Champlain Black marble* (Crown Point Limestone,) has several white cross sections of the snail *Maclurites*, found elsewhere in the State House.

Stop 6. SAINT JOSEPH CATHEDRAL. The exterior of the cathedral was cleaned and restored in 1994. The change can be seen by comparing the current appearance with Figure 10. A chemical was used to clean the stone because sandblasting would have removed too much of the stone.

Stop 8. OHIO BELL BUILDING. Ohio Bell changed its name to Ameritech in 1994. The cube has been replaced by a gray metal sign.

Stop 15. DEPARTMENTS OF STATE BUILDINGS. The outside of the central building at 65 South Front Street is scheduled to be restored in 1997. The crumbling marble will be replaced with *Georgia marble* quarried from the same site as the original stone.

Stop 18. HUNTINGTON NATIONAL BANK. The facade on this building is *Indiana limestone* (Salem Limestone), not gray granite.



1) Ohio State House and Senate Building
2) Ohio Theatre
3) Old U.S. Post Office and Courthouse
4) Trinity Episcopal Church
5) BancOhio National Plaza
6) Saint Joseph Cathedral
7) Broad Street United Methodist Church
8) Ohio Bell Building
9) William Green Building
10) Three Nationwide Plaza and the Atrium
11) One Nationwide Plaza
12) American Electric Power Building
13) Columbus City Hall
14) LeVeque Tower
15) Departments of State Buildings
16) The Vern Riffe Center for Government and the Arts
17) Huntington Center
18) Huntington National Bank
19) James A. Rhodes State Office Tower
20) Orton Hall

MAP OF DOWNTOWN COLUMBUS INDICATING LOCATIONS OF STOPS 1–20