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CURRICULUM/EDUCATION ARTICLE

Building Stone Treasure Troves

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Abstract Cities large and small have a treasure trove of building stones both local as well as imported from various regions of the country as well as foreign sources. Many of them contain fossils which are easily available for teachers to utilize for class field trips. For some areas guidebooks exist which are listed in the attached appendix. Even for localities where no guidebook exists these published guides can be helpful especially if they are illustrated. Field trips are a useful learning tool and teachers are encouraged to create various lesson plans utilizing this generally unrecognized resource.

Keywords Building stones · Field trips · Stone industry · Architecture

Many people, even educators, believe that the only places to see fossils are in museums, rock shops, books on paleontology, or perhaps in natural rock outcrops. They may not notice a treasure trove of fossils nearby in facades and lobbies of buildings, storefronts in malls, in rest room partitions, and even tabletops in furniture stores. In the last two decades, there has been an enormous increase in the use of natural rock in construction projects. Rocks used for building purposes are traditionally called building stones or dimension stones when they are cut to shape.

Responding to the marketplace and because the extraction of blocks of rocks is relatively easy once suitable materials are discovered, there has been a worldwide increase in the number of quarries, especially from third-world countries that may even lack the facilities for cutting and shaping the extracted block. Where no mills exist, the material is shipped to facilities sometimes a half a world away for shaping and finishing the stone for a particular project.

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As a result of this large worldwide increase in quarry activity, a great variety of rocks from almost every division of the geologic column arrives in the marketplace.

For the teacher who wants to use this available resource for lessons, the first challenge is locating appropriate stones in a building or other structure. Excursions for lower grades may only require the teacher to name the rocks and point out obvious features such as fossils and bedding (for illustrations of fossils, see Arduini 1987 and Horenstein 1988). There are also numerous web sites about fossils. For a start, try http://www.ucmp.berkeley.edu/exhibits/index.php and http://www.fossils-facts-and-finds.com. At higher levels, geology teachers would want to include the rocks' geologic occurrence. To eliminate confusion, stones in this paper are defined as rocks used by people—such as building stone, stone walls, stone pavements, and so on, while rocks are the materials found in their natural setting that have not been so used. Rock specimens used by students should still be called rocks.

If a teacher does not live in a community for which a guidebook or a list of stone installations has been written or compiled (see appendix), the next step is to find a stone dealer that is willing to help and who knows where the particular stones are installed (finding a local dealer or supplier on www.google.com, www.msn.com, and www.yahoo.com is easy: just list the state, or in many cases the city, and the resulting display in varying forms—mostly ads—will direct you to the business). Keep in mind that a guidebook for a distant city is not entirely useless, especially for stones that have a national or international distribution, especially if the guide contains images. Of course, some stones have only a limited local distribution, which the geology instructor would usually know about. Many guidebooks contain good examples for conducting excursions.

If you have the opportunity to look at available stone samples at a stone dealer's store, do not be disappointed if the proprietor may only know the commercial name and perhaps where it comes from—Italy, for example. If you

feel comfortable, you may also ask for samples of stones that are no longer available for sale but have been used in local buildings in the past. The labels will usually only have the commercial names on the stone as well as the dealer name. Surprisingly, some building managers may actually know the name of the stone used in their structure and perhaps where the material comes from. While there is considerable diversity in the exterior facades of buildings, including the interior lobby will often give the teacher a wider range of stone types. Many building stones are not suitable for exterior use but are for interior use. While in the past there usually was no difficulty in bringing a class into a lobby, today's heightened security demands make it more difficult. Any field trip plans should include prior permission to visit.

Finding the information about a particular stone, especially older, no longer quarried types, may take a considerable amount of detective work, but that is the fun of it. After obtaining information about where a stone is quarried either from a stone dealer, guide, or organization such as the Marble Institute of America http://www.marble-institute.com or Building Stone Institute http://buildingstoneinstitute.org, searching the literature for geological information is made relatively easier by such index databases as Geoscience World http://geoscienceworld.org. Winkler (1997) provides an up-to-date text on the properties and durability of stone, and Hannibal and Park (1992) provides an extensive list of selected sources of information on building stones.

Particular stones may be popular for a while, then go out of production for a variety of reasons—such as changes in color tastes, weathering issues, or the quarry is no longer in, operation. The stones may no longer be wanted or quarried but to remain open the business may sometimes import blocks of stone from other quarries for sale. In that case, a stone can be said to be from a particular quarry when in fact it came from elsewhere. Building stones have great appeal because of their color, general appearance, and the geologic stories they tell, but you should be forewarned that if your main goal is to locate fossiliferous material, you will find the other groups of rocks equally compelling to your students who will want to know about them too.

Therefore, this article makes reference to all types of building stones. For the teacher uninitiated in geology, it does not take long to learn the three basic groups of rock classified on the basis of origin. Igneous rocks were once molten rock that forms deep in the earth's crust and cools and crystallizes there (example: granite) or erupts onto the surface in the form of lava (example: basalt). Sedimentary rocks form on the land or in the sea and are layered and may contain fossils (sandstone, limestone). Shale is one of several sedimentary rocks that are not suitable as a building stone. Metamorphic rocks are rocks that have been changed by heat and or pressure, a process that also takes place deep below the surface. For example, a sedimentary rock containing fossils will lose all traces of life if the degree of metamorphism is great (Horenstein 1994) See also http://pubs.usgs.gov/gip/fossils.

Teachers with a basic knowledge of rocks may find such commercial descriptions as "black granite" somewhat confusing (Horenstein 1990). It turns out that in the building stones industry, for the most part, the term granite includes any hard rock that can be polished, which lumps almost all of the igneous (from granite to gabbro) as well as many of the metamorphic rocks (from various gneisses to quartzite) into this category. Most soft rocks that can be polished that are not "granite" are grouped together as marble and include true marble, many limestones, and serpentinites. Therefore, do not overlook stones with the commercial name "marble" or reject them as nonfossiliferous just because the name implies a metamorphic rock and where any fossils that may have existed in the original parent material were destroyed by metamorphism. The commercial designation limestone includes carbonate rocks that cannot be polished, while the metamorphic rock slate is in a category by itself.

The "Appendix" contains a selected list of guide books of particular cities as well as a list of building stone resources by state. It does not make reference to studies that are entirely devoted to granite, but an excellent web resource is http://quarriesandbeyond.org/index.html.

The scientific and semipopular literature for imported materials is enormous and much of it non-English, although many commercial listings on the web are also in English. In addition, publications directly related to the building and dimension stone industry have not been included here. Teachers who want to expand their knowledge of this multidisciplinary subject should consult, for a start, the magazine *Stoneworld* (http://Stoneworld.com). One excellent source for images of stones is http://stone.network.com and A Web Gallery of Stone Buildings and their Building Stones (http://gly.uga.edu/railsback/BS-Main.html), as well as the web pages of building stone suppliers, especially useful if a community is lacking in stone buildings.

Once you have the name of a fossiliferous (or any other) stone and its company or country of origin, find geologic information by starting with some research at http://www.geoscienceworld.com. Commercial names often do not give you much information. For example, "Crab Orchard Sandstone" is sandstone from Crab Orchard, TN, USA but the St. Genevieve Golden Marble is not a marble that was quarried in Ozara, St. Genevieve County, MO, USA but a Devonian age limestone containing colonial and rugose corals. Radio Black Marble on the other hand, used in Radio City Music Hall in New York, NY, USA is a black Ordovician limestone from Vermont containing large examples of the snail *Maclurites* sp., algae, crinoids, and early corals, but it is also called Champlain Black Marble.

Fig. 1 Barre, Vermont granite quarry (Image by Sidney Horenstein)

Many stones have multiple names for a variety of reasons related to the commercial aspect of stone sales, including competition with other dealers. As stated earlier, you will find fossils in buildings throughout the Phanerozoic (Paleozoic, Mesozoic, Cenozoic eras), but they are generally most abundant in rocks formed during the Ordovician, Devonian, Jurassic, and Cretaceous times when the continents were covered with large epicontinental seas.

It is an unhappy surprise when a favorite building stone disappears because its building is demolished or new owners remodel the lobby or facade. Normally, the material is not recycled into another building but is destroyed and ends up in a land fill. One hopes to find out about the renovation early so that some samples can be saved for class use. Awareness of alterations is important when using a guidebook, especially when the description of a stone just does not add up. One way to avoid this problem is only to visit historic landmarks. On the other hand, it is of interest to know why the alteration took place.

Most of my experience studying building stones has been in metropolitan New York. Unlike many other localities, New York City is endowed with numerous rock outcrops, often conveniently located in New York City parks. Although easily accessible, their diversity is limited to a small variety of metamorphic rocks and even smaller sampling of sedimentary rocks. But New York City harbors a treasure trove of rocks in the building facades, lobbies, rest rooms, storefronts, sidewalks, and curb stones, among other sites. Thanks to the rich architectural history of the city and the wide use of building stones, a great variety of rock types is readily on view not only to students of all grades but also to the general public. Many people find the fossils entombed in stone the most compelling. Some of the participants on public tours continue their search later as they travel around the city and elsewhere, looking for additional fossiliferous building stones. They are delighted when a discovery is made and on occasion call me for more detailed information about their new locality. Figures 1, 2, 3, 4, and 5 are examples of fossiliferous building stones found in New York City, while Fig. 6 was taken in a Barre, Vermont granite quarry.

My interest in the use of building stones for teaching purposes began in the mid-1960s when I found samples of building stones in the rock collection of the Geology and Geography Department of Hunter College—City University of New York. At the time, I was teaching an evening course in introductory geology that included several units in mineral and rock identification. Although a field trip was conducted to nearby parks (including Central Park), it did not expose the students to the variety of rock formations that they would have seen on a formal bus trip to localities outside the city. Such field trips were not organized then because most of the students had daytime jobs. See Kemp (1992) and Wetzel (2002) for examples of student tours and projects related to buildings tours and class projects.

To rectify this deficiency somewhat, I asked students to examine a city street near their job or home to identify the rocks in facades. Their assignment came after the units on mineral and rocks identification were completed. Here was a practical application of what they learned in class to a real-world situation. Not only did identification of rocks become important but, students also became aware of which stones held up well in building facades and which ones exhibited signs of weathering. They were asked to evaluate the conditions that caused the excessive weathering.

I was confident that each student could identify at least ten varieties of rocks (at least one had to contain fossils), and not only did that turn out to be true but some of them also added notes about the building history, and a few added the commercial names of the dimension stones. Obviously, they did some additional homework. One of the educational rewards was that some of the students not only became interested in a practical aspect of geology but also in architecture, as well as the historical aspects of the

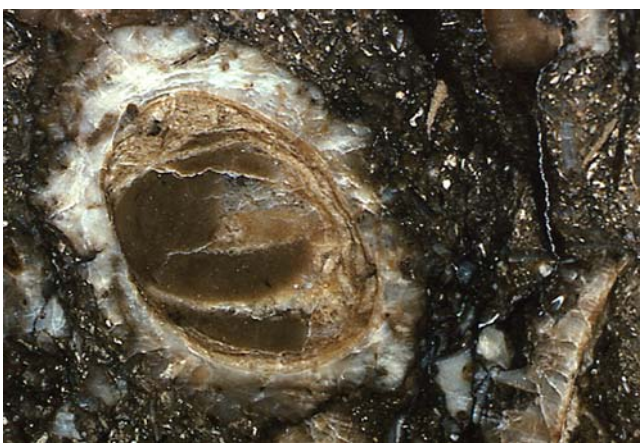

Fig. 2 Rudistid, Trieste, Italy, Cretaceous (Image by Sidney Horenstein)

Fig. 3 Coral—stromatoporoid reef, Devon England, Devonian (Image by Sidney Horenstein)

building and its site. Thus, the study of building stones can be truly multidisciplinary, including history of mining and quarrying, tools for stone work, and for example, the labor movement in the stone industry and international financing of building projects.

For advanced geology classes, assignments can include creating an illustrated guidebook with descriptions of the buildings or structures, detailed descriptions of the mineralogy and fabric of the rock, other features such as fossils and stylolites, as well as how well the stone has performed in terms of weathering and an appropriate substitute for the poorly performing stone.

The choice of a particular stone for a project is based on many factors, including the architect's design, availability of material, appearance of the stone, where the stone is used in the project, appropriate physical properties such as compression and water absorption, suitable mineral composition for the particular climate, and very often, cost. Because they often need less stringent requirements, stones used for interior settings contain a much broader range of rock types than those used for exterior facades, monuments, and curbing. In addition, lobbies

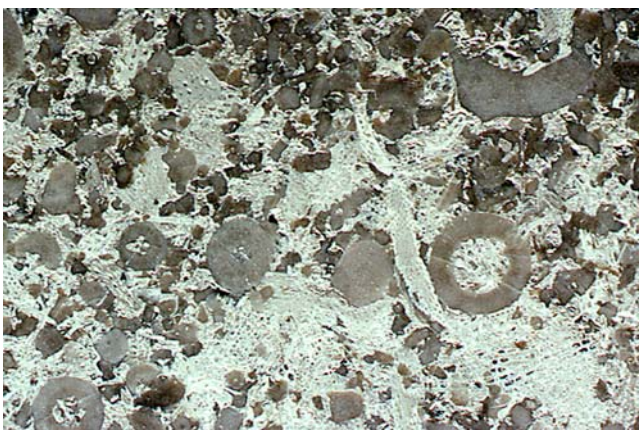

Fig. 4 Crinoids and bryozoans, Indiana Limestone, Mississippian (Image by Sidney Horenstein)

Fig. 5 Clams—Texas, Cretaceous (Image by Sidney Horenstein)

tend to be somewhat more exuberant in color than exterior facades. Choice of material takes into account amount of rainfall, climate, and occurrence of temperatures below freezing. Another important issue is the susceptibility of a stone to disruption by crystallization of salt used to melt ice during the winter. All of these factors result in the great variety of stone available for examination during building stones field trips.

After a few semesters of teaching geology in the New York City, I began to accumulate a list of "interesting" stones in the buildings around Manhattan. Later, I led field trips for an amateur fossil club, the New York Paleontological Society, stressing the paleontological aspects of the building stones and for the general public through the auspices of the American Museum of Natural History. The free public tours organized by the fossil club were an attempt to make the group known to the public and bring in new members, while the museum field trips were part of the educational outreach of the organization.

These trips caught the attention of the press and a number of articles were written about them over the years (see, for example, Steinmann 1978; Stoler 1980; Panek 1991; McFall and Wollin 1982; Mindlin 2006). Even my children were asked to write an article (Horenstein and Horenstein 1981).

Fig. 6 Goniatite—France, Devonian (Image by Sidney Horenstein)

Appendix

Building stone guides by locality

ARIZONA, FLAGSTAFF
Jackson, Marie D. (1999)
Stone Landmark's: Flagstaff's geology and historic building stones
Piedra Azul Press, 128 pages

BRITISH, COLUMBIA
Hora, Z.D. and L.B. Miller (1994)
Dimension Stone in Victoria, B.C.: city guide and walking tour
British Columbia Geological Survey, Information Circular 1994–15, 43 pages

COLORADO, DENVER
Murphy, Jack (1995)
Geology Tour of Denver's Buildings and Monuments
Denver Museum of Natural History, 96 pages

GEORGIA, ATLANTA
Dooley, Robert E. (1973)
Building stones of downtown Atlanta
Bulletin of the Georgia Academy of Science, vol.31, no.2, p. 81

INDIANA, INDIANAPOLIS
Mirsky, Arthur (1999)
Guidebook of building stones in downtown Indianapolis (8^{th} edition)
Indiana University-Purdue University at Indianapolis, 72 pages

ILLINOIS, MONMOUTH
Wiedman, L.A., R. Pletz and K.A. Emmert (1988)
A geological and historical walking tour of Monmouth, Illinois
Monmouth College Press, 32 pages

KANSAS, WICHITA
Skelton, Lawrence (1997)
Wichita's building blocks: A guide to building stones and geological features
Kansas Geological Survey
Educational Series 11, 28 pp.

LOUISIANA, NEW ORLEANS
Slagle, E.S. (1982)
A tour guide to the building stones of New Orleans
New Orleans Geological Society, 68 pp

MARYLAND, BALTIMORE
McCann-Murray, Sherry ()
A geologic walking tour of building stones of downtown Baltimore, Maryland
www.mgs.md.gov/esic/features/walking/index.html

MASSACHUSETTS, BOSTON
Crosby, William Otis and G. F. Loughlin (1904)
A descriptive catalogue of the building stones of Boston and vicinity
Tech. Quart. 17, pp. 165–185

MASSACHUSETTS, (HARVARD UNIVERSITY)
Williams, David B. (1997)
A geologist's Harvard
www.seanet.com~wingate/Harvard%20Rock.pdf

MINNESOTA, ST. PAUL
Kain, Joan (1978)
Rocky roots—three walking tours of downtown St. Paul
Ramsey County Historical Society, 32 pages

MISSOURI, ST. LOUIS
Hebrank, A.W. (1989)
The geologic story of the St. Louis riverfront (a walking tour)
Missouri Department of Natural Resources, Division of Geology and Land Survey, Special Publication 6, 48 pages

NEW YORK, ALBANY
Fickies, R. H. and R.J. Dineen, R. J. (1979)
The building stones of the Nelson A. Rockefeller Empire State Plaza
IN: Friedman, G. M. Editor
Joint annual meeting of New York State Geological Association, 51st annual meeting and New England intercollegiate geological conference,
71st annual meeting; guidebook
Annual Meeting of the New York State Geological Association, no. 51, pp.318–325

NEW YORK, ALBANY
Fickies, R. H. (1986)
Building stones of the Empire State Plaza; a walking tour
New York State Museum Educational Leaflet 27, 12 pages

NEW YORK (CORNELL UNIVERSITY)
Chiment, J.J. (1999)
Building stones on the Cornell campus
http://www.cornell.edu/search/index.cfm?tab=facts&q=&id=1101

NEW YORK, NEW YORK
Steinmann, Marion (1978)
Fossil Hunters find ancient treasures around Manhattan
Smithsonian, vol. 9, pp. 143–151

NEW YORK, NEW YORK
Stoler, Peter (1980)
Stalking the city fossil
Discover, vol. 10, no. 10, pp. 55, 56

NEW YORK, NEW YORK
Horenstein, Sidney and John Patton (1986)
Appendix II Varieties of stone in the New York Public Library
IN: Reed, Henry Hope
The New York Public Library, W.W. Norton, pp. 276, 277

NEW YORK, NEW YORK
Horenstein, Sidney (1989)
Building stones of the New York City area
IN: Baskerville, Charles (Editor) Environmental, engineering, and urban geology of the New York Metropolitan area, Volume 1, American Geophysical Union, pp. 2–14

NEW YORK, SCHENECTADY
Hollocher, Janet and Kurt Hollocher (1995)
Building stones of Schenectady, New York
Field trip guidebook for the 67th annual meeting of the New York State Geological Association
IN: Garver, John I and Jacqueline A. Smith (Editors)
Guidebook—New York State Geological Association, Meeting, vol. 67, pp. 275–291

NEW YORK, SYRACUSE
Nye, O. B., Jr and R. Fazio. (1978)
Building stones used in the vicinity of Syracuse
IN: Merriam, D. F. (Editor)
New York State Geological Association guidebook, 50th annual meeting, pp. 354–367

NORTH CAROLINA, RALEIGH
Carpenter, P. Albert (2001)
Building stone used in historical and modern architecture of downtown Raleigh, North Carolina; a walking tour
Guidebook—Geological Society of America, Southeastern Section, pp. 119–134

NOVA SCOTIA, HALIFAX
Brown, Yvonne, Martha Devanney, Howard Donohoe, Susan Doyle and Margaret Shaw (1989)
A walking tour of rocks, minerals, and building stones in downtown Halifax
Nova Scotia Department of Mines and Energy, Information Circular 3, [8 pages]

NOVA SCOTIA, HALIFAX
Bishop, Katherine, Martha Devanney, Anne Stevenson and Howard Donohoe (1989)
A walking tour of rocks, minerals and building stones of Spring Garden Road, Halifax
Nova Scotia Department of Mines and Energy, Information Circular 10, [10 pages]

OHIO, AKRON
Hannibal, Joseph T. (2006)
Guide to the building stones and cultural geology of Akron
Ohio Geological Survey, Report 19, 75 pages

OHIO, CINCINNATI
Hannibal, Joseph T. and Richard Arnold Davis (1992),
Guide to the building stones of downtown Cincinnati; a walking tour
Ohio Geological Survey, Guidebook 7, 44 pages

OHIO, CLEVELAND
Hannibal, Joseph T. and Mark T. Schmidt (1992)
Guide to the building stones of downtown Cleveland; a walking tour
Ohio Geological Survey, Guidebook 5, 33 pages

OHIO, COLUMBUS
Mayer, Mona (1962)
Fossils in the Ohio State House
Explorer, vol. 4, pp. 20–23

OHIO, COLUMBUS
Melvin, Ruth W and Garry D. McKenzie (1997)
Guide to the building stones of downtown Columbus; a walking tour
Ohio Geological Survey, Guidebook 6, 33 pages

OHIO, TOLEDO
Camp, Mark J. (1994)
Early uses of ceramics and building stone in downtown Toledo
The Ohio Journal of Science, vol. 94, no. 2, pp. 28, 29.

OHIO, TOLEDO
Meinhart, James M. (2006)
Building Stones of Toledo Ohio: a survey of dimension stone use in significant structures
Thesis (M.S.) University of Toledo, 358 pages

ONTARIO, OTTAWA
Lawrence, D.E. (2001)
Building stones of Canada's Federal Parliament buildings
Geoscience Canada, vol 28, no. 1, pp 13–30

ONTARIO, OTTAWA
Freeman, E.B. (2003)

Geology of Parliament buildings; 3, Building stones of Ontario's Provincial Parliament building
Geoscience Canada, vol 30, no. 2, pp 43–57

PENNSYLVANIA, HARRISBURG
Geyer, A. R. (1977)
Building stones of Pennsylvania's capital area
Pennsylvania Geological Survey, Fourth Series, Environmental Geology Report, no. 5, 47 pages

TENNESSEE, CHATTANOOGA
Wilson, R.L. (1979)
Building stone of downtown Chattanooga
Privately published by author, 63 pp.

TEXAS, AUSTIN
Ellison, S.P. and Joseph J. Jones
Walking the Forty Acres: Building Stones—Precambrian to Pleistocene
www.lib.utexas.edu/geol/fortyacres/40acres3.html

TEXAS, HOUSTON
Galey, John, D.A. Des Autels and K.A. McDonald (1988)
Building stones of Houston; Houston city hall; One Shell Plaza, Houston public library, the downtown Exxon building, Republicbank center, and 1600 Smith
Bulletin Houston Geological Society, vol. 30, no. 10, pp 20–33

TEXAS, HOUSTON
McDonald, Kathleen A., A. L. Austin, David L. Risch and Dean Ayres (1989)
Building stones of Houston; Texas Commerce Tower, First City Tower, Interfirst Plaza, Lyric Office Center
Bulletin Houston Geological Society, vol 32, no. 3, pp 24–27

TEXAS, HOUSTON
Galey, John and K.A. McDonald (1988)
Building stones of Houston
Bulletin Houston Geological Society, vol 31, no. 4, pp 15–19

UTAH, SALT LAKE CITY
Utah Geological Survey
Building stones of downtown Salt Lake City
http://geology.utah.gov/online_html/pi/pi-60/index.htm

WASHINGTON, D.C.
Smithsonian Institution (1848)
Reports on building stones for the Smithsonian Institution
Annual Report Smithsonian Institution, vol 2, pp 4–74, 105–107, 109–114, 119, 121–122

WASHINGTON, D.C.
Withington, Charles F. (1975)
Buildings stones of our Nation's Capitol
U.S. Government Printing Office, 44 pages

WASHINGTON, D.C.
O'Connor, James V. (1989)
Building stones of Pennsylvania Avenue
IN: Moore, John E, Julia A. Jackson and Joan M. Rubin (Editors)
Geology, hydrology and history of the Washington, D.C. area
American Geophysical Institute, pp 9–16

WASHINGTON, D.C.
McGee, Elaine S. (1990)
Deterioration of building stones in Washington, DC; a field trip guide
U. S. Geological Survey, Open-File Report: OF 90–0479, 16 pages

WASHINGTON, D.C.
Olson, Don and Charles F. Withington (1998)
Buildings stones of our Nation's Capitol
United States Geological Survey, 36 pages

WASHINGTON, SPOKANE
McKelvey, G. E., Bonnie B. Bunning, F. William Burnet, Mike Hamilton and Byron Swanson (1981)
Cornerstones of Spokane; a guidebook to the building stones of downtown Spokane
Northwest Min. Assoc., 47 pages

WEST VIRGINIA, MORGANTOWN
Corbett, R.G. and A.E. Burford (1968)
Building stone in downtown Morgantown, West Virginia
Proceedings of the West Virginia Academy of Science 1967, vol 39, pp 327–336

Building stone resources by state

(The list does not include publications for granite only. Many of the publications indicate where the product was installed. This list is not complete; consult Bibliography of Geology. U.S. Geological Survey or for example GeoRef on line.)

ALASKA
Wright, Charles W. (1908)
The building stones and materials of southeastern Alaska
U.S. Geological Survey Bulletin 345-B, pp 116–126

ALASKA
Burchard, E.F. (1920)
Marble resources of southeastern Alaska
U.S. Geological Survey Bulletin 682, 118 pages

ARIZONA
Culin, Frank L., Jr. (1916)
Building stones
Arizona Bureau of Mines Bulletin, 11 pages.

CALIFORNIA
Jackson, Abraham Wendell (1888)
Building stones
Annual Report of the State Mineralogist for 1888, pp 885–894

CALIFORNIA
Aubury, L.E. (1906)
The structural and industrial materials of California, Part 1, Building Stones
California State Mining Bureau Bulletin No. 38, pp 13–170

CANADA
Parks, W.A. (1912–1917)
Report on the building and ornamental stones of Canada
Canada Department of Mines Branch, five volumes

COLORADO
Lakes, Arthur (1901)
Sedimentary building stones of Colorado
Mines Minerals, vol 22, pp 62–64

CONNECTICUT
Moore, F.H. (1935)
Marbles and limestones of Connecticut
Connecticut Geological Natural History Survey Bulletin 56, 56 pages

ILLINOIS
Lamar, John Everts and Harold Bowen Willman (1955)
Illinois building stones
Illinois State Geological Survey Report of Investigations., no. 184, 24 pages

INDIANA
Logan, William Newton (1921)
The building stones of Indiana
Indiana, Dept. Conservation, 2nd Annual Report, pp 257–263

INDIANA
Keith, Brian, and Todd A. Thompson (2002)
Salem Limestone in dimension stone quarries in Indiana
Indiana Geological Survey, Guidebook 15, 26 pages

IOWA
Houser, Gilbert (1893)
Some lime-burning dolomites and dolomitic building stones from the Niagara of Iowa
Annual Report of the State Geologist for 1893, pp 197–207

IOWA
Day, William C. (1895)
Notes of Iowa building stone
IN: Sixteenth Annual Report of the United States Geological Survey Part IV. Mineral Resources of the United States, 1894, Nonmetallic Products, pp 500–502

IOWA
Beyer, S.W. and I.A. Williams (1907)
The geology of quarry products
Iowa Geological Survey Annual Report, vol 17, pp 185–525

IOWA
Witzke, Brian (2001)
Geologic Sources of Historic Stone Architecture in Iowa
http://www.igsb.uiowa.edu/Browse/buildings/buildings.htm

KANSAS
Risser, H.E. (1960)
Kansas building stone
Kansas State Geological Survey Bulletin 142, part 2, pp 52–122

KANSAS
Grisafe, D.A. (1976)
Kansas building limestone
Kansas Geological Survey, Mineral Resources Series 4, 42 pages

KENTUCKY
Richardson, Charles Henry (1923)
The building stones of Kentucky
Kentucky Geological Survey series 6, vol 11, 355 pages

MARYLAND
Merrill, G.P. and Edward Bennett Mathews (1898)
An account of the character and distribution of Maryland building stones
Maryland Geological Survey, vol 2, part 2, pp 47–241

MARYLAND
Kuff, Karen R and James Brooks (1985)
Building stones of Maryland
www.mgs.md.gov/esic/brochures/buildst.html

MICHIGAN
Johnson, A.M. (1983)
Geologic and economic evaluation of building and decorative stone resources in Michigan
IN: Ault, C.H. and G.S. Woodward, editors, Proceedings of the 18th Forum on Geology of Industrial Minerals, Indiana Geological Survey, Occasional Paper 37, pp 113–126

MINNESOTA
Winchell, Newton Horace (1884)
Historical sketch of explorations and surveys in Minnesota; the general physical features of Minnesota; The building stones of Minnesota
Minn. Geol. Survey, pp 1–203

MINNESOTA
Brown, C.L. (1936)
Building and ornamental stones of Minnesota
Compass, vol 17, no. 1, pp 12–15

MISSOURI
Ladd, George Edgar (1890)
Building stones, clays, and sands of Iron, Saint Francois, and Madison Counties, Missouri
Missouri Bureau of Geology and Mines, 2nd Series, Bull. 1, pp 22–44

MISSOURI
Ladd, George Edgar (1891)
Notes on the clays and building stones of certain western central counties tributary to Kansas City
Missouri Bureau of Geology and Mines, 2nd Series, Bull. 5, pp 43–86

MISSOURI
Buckley, E.R. and H.A. Buehler (1904)
The quarrying industry of Missouri
Missouri Bureau of Geology and Mines, Vol 2, Series 2, 371 pages

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