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BuildingStone MAGAZINE

Winter 2009 • Volume 32, Number 4

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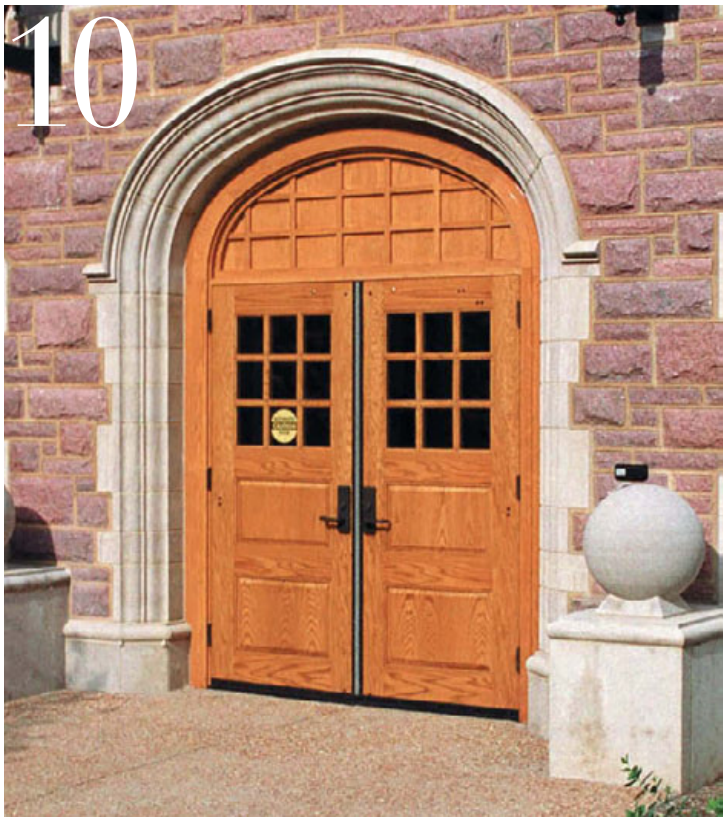

On the COVER:

Faced with Indiana limestone, Simon Hall at Indiana University was designed to fit comfortably with the university's historic campus buildings that date from the 1880s. *Photo courtesy of Indiana Limestone Company © MyersCroxton Group*

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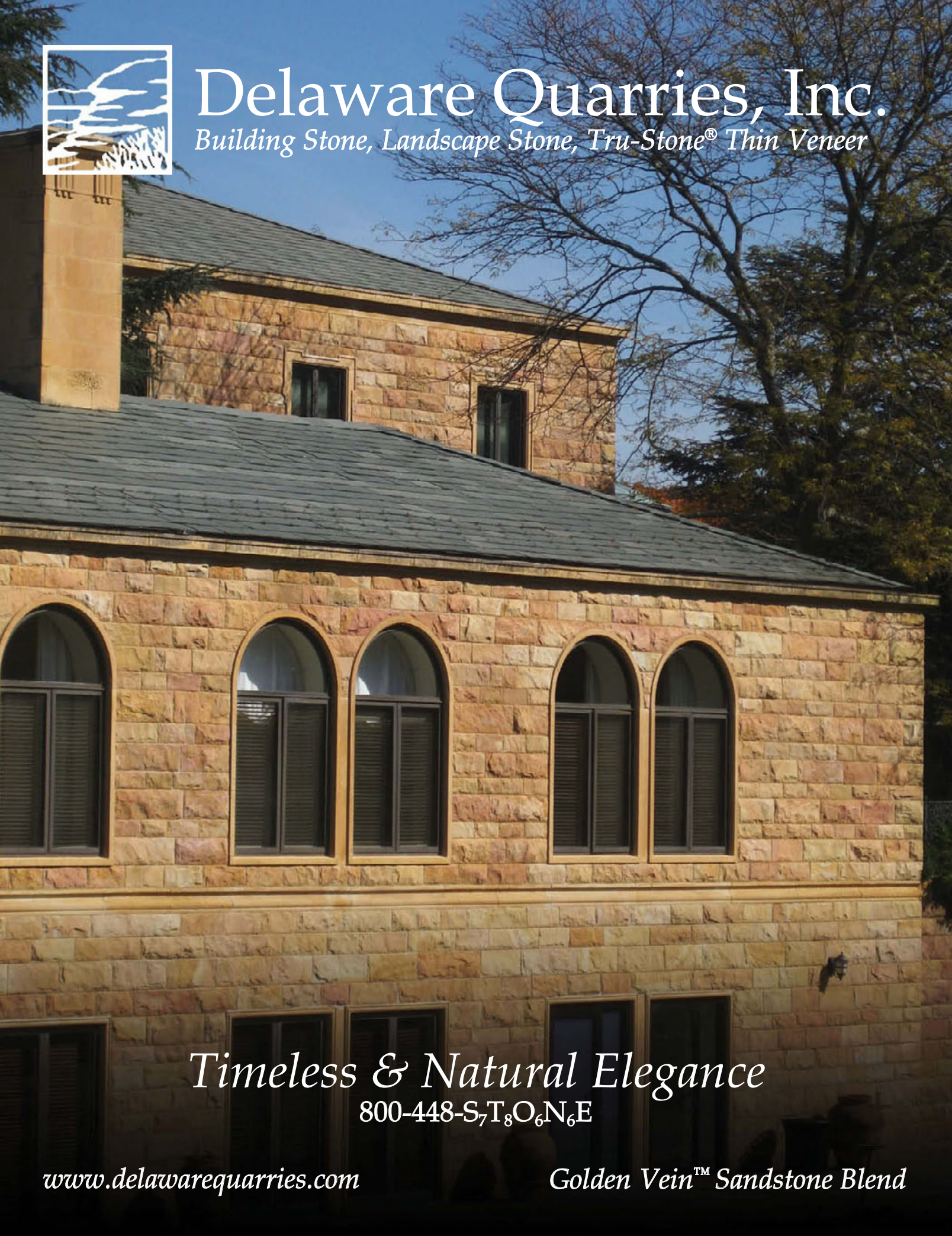
DEPARTMENTS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THE PERMANENCE, DIVERSE uses and unequaled beauty of natural stone are an immortal part of human existence that poets and writers have contemplated throughout the ages.

Every facet of stone, starting with the understanding, concept and design, working through the extraction, fabrication, installation and eventual use is an exercise in human tutelage. This understanding and experience, coupled with the changing and expanding stone industry, necessitates an ongoing education to achieve the consummate *maestro* on all levels. The strength and feel of natural stone has not changed, but the technological advances in fabrication and installation are decreasing the costs and reducing the waste.

It is not an accident that the buildings of knowledge and higher education, since early civilization to the present age, have been built out of stone. In this issue, we will visit institutions of higher education and explore the various kinds of stone and architecture that was used.

I have been honored to serve as the president of the Building Stone Institute this year. With the help of the officers and the board of governors, we have worked through various challenges and continued to position this organization for the future. Our new executive vice president, Jane Bennett, is one such cornerstone. I am humbled to have been part of a long list (90 years) of distinguished persons who have served as the president of the BSI.

Douglas J Bachli

Douglas J. Bachli
2009 President, Building Stone Institute
Cee-Jay Tool, Inc.

HE BUILDED BETTER THAN HE KNEW
THE **CONSCIOUS STONE** TO BEAUTY GREW
- RALPH WALDO EMERSON

Correction

In the fall issue of *Building Stone*, we listed an incorrect designation for Peter Rolland, FASLA. Please accept our apology for the unintentional typo.

Building Stone magazine wants to hear from you!

We encourage BSI members, architects and designers to submit information for publication, and we are eager for your input. Have you recently worked on a natural stone project that our readers should know about? Is there a topic you'd like to see covered in a future issue? Please send high-resolution photos with photo credits, details about your impressive projects and article ideas to *Building Stone* editor Colleen Raccioppi at colleenr@naylor.com.

BuildingStone MAGAZINE

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LETTER to the editor

THE PAST ISSUE of *Building Stone* magazine was very well done. Please tell Colleen Raccioppi [*Building Stone* editor] that her good work is appreciated.

Once upon a time, the only stone magazine (done by Joseph Moore in Connecticut) closed, and then there was none. So, years ago, a few of us in the industry decided to start our own magazine titled *Architecture in Stone*. Buckingham Slate Co., Carthage Marble, Victor Stone and the Stone Center began to "underwrite" and publish this new magazine until the BSI was ready to start *Building Stone* magazine.

After the BSI got started, quite a few entrepreneurs launched marble and stone publications, and the world markets came to North America.

We love our industry. Our favorite magazine is the BSI's publication and those who bring out the best in it. For a long time, the "Tucker Award" was the best known quality award in the world. Bev Tucker was the marketing genius who, for many years, led the Buckingham Slate Co., and devoted so many hours and years to the BSI. So, thanks to Bev Tucker, Joe Busik, Bob Cradock Sr., Al Halquist, Bob Schwake, Bill Vetter, etc., and so many who started all this.

Keep up the good work.

Sincerely,
Robert M. Cradock
Stone Consultant, Inc.

Tell us what's on your mind

Thanks for the kind words, Bob. We love hearing from our readers. If you'd like to share your thoughts and feedback with *Building Stone* magazine, e-mail your comments to editor Colleen Raccioppi at colleen@naylor.com.

Announcement

Fred Clarke, FAIA, a senior partner in the Pelli Clarke Pelli firm, has agreed to serve on the BSI's Tucker Design Awards jury, replacing Cesar Pelli. Clarke is a native of Houston, a graduate of the University of Texas and a participant in all the projects of the firm since its founding in 1977.

A

the educated Edge

STONE IS THE SMART CHOICE FOR CLASSROOMS AND CAMPUSES

BY MARY LOU JAY

THE PERMANENCE OF NATURAL STONE MAKES IT THE MATERIAL OF CHOICE FOR MANY educational facilities. On college campuses, stone provides a sense of continuity for buildings constructed over a long period of time. It can help create an environment that will stimulate learning and student success.

Setting the style

Built for the 1904 World's Fair, Brookings Hall is the iconic building for Washington University in St. Louis. It sets the campus style with its collegiate gothic architecture and its façade of red Missouri granite and Indiana limestone.

The university wanted to build a new Earth and Planetary Sciences Building just northeast of Brookings. David Owens, AIA, principal with the firm of Tsoi/Kobus & Associates of Cambridge, Mass., found inspiration in Brookings and earlier English gothic buildings. He designed the new 59,000-square-foot science building with two elongated east/west wings, forming a courtyard that recreates the cloistered, sheltered feeling of the older buildings.

The stone façade of the Earth and Planetary Sciences Building imparts a sense of timelessness to the structure. It includes 45,000 square feet of random ashlar granite in three course heights and more than 6,000 pieces of carved limestone used for stepped quoins, multi-story window surrounds, arches, canopies, edging and finials. The granite was quarried at Missouri Red Quarries Inc. in Ironton, Mo., split at the North Carolina Granite Corp., and then shipped to St. Louis Stone & Supply, Inc., for final cutting. St. Louis Stone hand pitched the edges of the granite to create a cabbage face finish. Leonard Masonry, veteran of many Washington University projects, handled the stone installation, working within heated tents during the winter to remain on schedule. The general contractor was Tarlton Construction.

"The building's stone carries its own weight," Owens says. "There are no relieving angles anywhere; all the stone window heads are structural. It is genuine masonry construction. The goal with this building is to develop something that will last for 200 to 300 years."

A. The limestone and granite stone façade of the **Earth and Planetary Sciences Building** imparts a sense of timelessness to the structure.

B. The **Earth and Planetary Sciences Building** features two elongated east/west wings, forming a courtyard that recreates the cloistered feeling of the collegiate gothic buildings on the campus of Washington University in St. Louis.

C. More than 6,000 pieces of carved limestone were used for stepped quoins, multi-story window surrounds, arches, canopies, edging and finials at the **Earth and Planetary Sciences Building.** *Photos A-C © Douglas Abel Photography*

D. Designed to complement the surrounding limestone buildings, which date from the 1800s, **Simon Hall** is faced with Indiana limestone and features intricate limestone carvings.

E. Four thousand tons of limestone, including the smooth-surface, buff-colored stone used at openings and cornices, was specified for **Simon Hall** at University of Indiana. *Photos D-E courtesy of Indiana Limestone Company/© MyersCroxton Group*

Fine detailing

Simon Hall at Indiana University also had to fit comfortably within a historic campus location. Buildings in the Old Crescent area date from the 1880s; most are made from Indiana limestone. Architect David Black, AIA, design principal with Flad Architects of Madison, Wis., kept Simon Hall compatible in size and appearance with its neighbors by placing 65,000 of its 141,000 square feet below ground and by facing the structure with the limestone.

In designing the multidisciplinary science building, Black re-interpreted the patterns and details of the adjacent 1937 Art Moderne structure. Simon Hall's intricate limestone carvings, for example, recall the older structure's ornate detailing.

Indiana Limestone Company supplied 4,000 tons of limestone, including the smooth-surface buff-colored stone used at openings and cornices. "There were little things we did during the cutting and shaping to help it match the other buildings on the campus," says Indiana Limestone Company's Chief Operating Officer Duffe Elkins. Company craftsmen carved limestone sculptures for the façade—paramecium, mouse, E.Coli bacterium, maize and fruit fly—symbolizing the building's scientific work.

Bybee Stone Company prepared the 4-inch thick, variegated limestone veneer with a chat-sawn finish, obtained by using a steel gang-saw with chat (sand and buckshot-sized metal) as a fluxing agent. Chat-sawing gives the stone a slight rusty hue from the reaction of the stone with the metal. Bybee is one of the few remaining companies in the United States to use this traditional stone-cutting technique.

Formed from stone veneer, air cavity, concrete block and interior gypsum, the walls of Simon Hall are roughly 2-feet thick in places. "We were able to shape the stone around the window and door openings so we can achieve the appearance of a great depth of stone in the wall," says Black.

He wanted the stone to have integrity and gravity, attributes sometimes missing in newer stone buildings with steel relief angles. "It was important to me that we return to a more traditional way of building the exterior wall," Black says.

Extending the outdoors

Christopher Ward, AIA, of CWArchitects did not require historical references when he designed the renovation of a warehouse into the new home of Park Century School. Stone served a different purpose in

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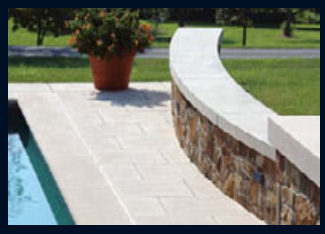


INDIANA LIMESTONE COMPANY

Simon Hall, Indiana University
Bloomington, Indiana


F


G

F. Flagstone adhered to mesh netting was used to create an interior Main Street at **Park Century** elementary school, bringing the outdoors in for its young students.

G. At **Park Century School** in Culver City, Calif., modular flagstone mats were used for the flooring, which helped keep costs down and the job on schedule for the elementary school's September 2008 opening. *Photos F-G courtesy of Doug Olson*

this elementary school for learning disabled students, located in Culver City, Calif. "The city required us to devote almost the entire exterior of the property to parking, which left no room for outdoor space for the children. So, we decided to use natural stone throughout the ground floor of the building to bring the outdoors in," he says.

Ward specified ROX PRO's Placer Gold large flagmats (flagstone adhered to mesh netting) to create an interior "Main Street," the school's primary corridor. "The job was complicated because we had to bring the whole floor up to the level of the gym floor," says stone installer Shay Yakobi of Certified Tile and Marble. But the 3 ½-foot square modular stone mats required less labor than traditional stonework, which helped keep costs down and the job on schedule for the school's September 2008 opening.

Using anchors at every 16 inches, Yakobi's crews also installed ROX PRO's ledgestone veneer panels on an 18 x 20 foot interior wall at the school's entrance. The ledgestone panels are hand selected and trimmed pieces of natural ledgestones affixed together to form modular panels, which allows for the streamlined installation of drystacked ledgestone veneer.

"It was rewarding to watch students, parents and teachers react to their new school building," says Bob Grush of Ed Grush Construction, the project's general contractor. "It's awesome that these children will have a building like this that will make their education so much better, that will help stimulate the learning process."

The environmental choice

The sandstone exterior of Kroon Hall pays tribute to Yale's traditional stone structures. But the building, which houses Yale's School of Forestry and Environmental Sciences, has a modern environmental consciousness. Designed by Hopkins Architects of London in partnership with Connecticut-based Centerbook Architects, Kroon Hall is expected to earn a Leadership in Energy and Environmental Design (LEED) platinum rating.

"It is an extremely energy efficient building," says Centerbrook's James A. Coan, AIA, LEED AP. "Its simple shape, a rectangle with a long, south-facing side, provides the best solar orientation for photovoltaic systems." A geothermal system and state-of-the-art air handling systems will help reduce the building's energy usage by 50 percent.

Briar Hill Sandstone, used for the building's façade and site walls, was supplied by the Briar Hill Stone Company. The stone is quarried only in one area in Ohio, which is within 500 miles of Yale's New Haven campus. That helped the project earn LEED points

H. At **Kroon Hall**, Yale's School of Forestry and Environmental Sciences, the environmental advantages of locally quarried sandstone contribute to the building's state-of-the-art energy efficiency.

I. Architects chose golden tan sandstone for **Kroon Hall** and specified 470 tons of split-face finish stone in five different course heights and six different lengths for the project. *Photos H-I courtesy of Michael Marsland/Yale University*

for regional materials. The stone's durability and low maintenance also were environmental advantages.

"Stone helps in the overall building envelope," says Coan. The walls, made from 6-inch stone, 4-inch air cavity, insulation and autoclaved aerated concrete brick, have a very high insulation value. The depth of the exterior wall provides natural shading at windows.

Briar Hill provided 470 tons of split-face finish stone in five different course heights and six different lengths for the project. On the site walls, 10,300 square feet of 3.5-inch stone was used—that's even more than the 8,000 square feet of 6-inch bed-width stone used on building's exterior.

The architects chose a golden tan stone, excluding extreme lights and darks. "We worked very hard with masons to make sure the overall patterning was correct and appeared to be random," adds Coan.

The durability of stone makes it an ideal material for educational structures—both on college campuses like Yale and in primary education buildings like Park Century School. "It is a product that will never have to be changed and requires very little maintenance. I honestly think stone makes the place what it is," says Chrisopher Ward about Park Century. ◆

Mary Lou Jay is a freelance writer based in Timonium, MD.

Resources

EARTH AND PLANETARY SCIENCES BUILDING AT WASHINGTON UNIVERSITY IN ST. LOUIS
Location: St. Louis, Mo.
Designer: Tsoi/Kobus & Associates, Inc. • tka-architects.com
Contractor: Tarlton Corp • tarltoncorp.com
Quarry: Missouri Red Quarries Inc. • 573.546.3430
Stone fabricator: North Carolina Granite Corp. • ncgranite.com
Stone supplier: St. Louis Stone & Supply, Inc. • 314.731.3484
Stone installer: Leonard Masonry • leonardmasonry.com
Stone types: Indiana limestone and Missouri red granite used in exterior; slate used on the roof

SIMON HALL AT INDIANA UNIVERSITY
Location: Bloomington, Ind.
Designer: Flad Architects • flad.com
General Contractor/Masonry Contractor: F.A. Wilhelm Construction Company, Inc. • fawilhelm.com
Stone supplier: Indiana Limestone Company • indianalimestonecompany.com
Stone fabricators: Indiana Limestone Company
Bybee Stone • bybeestone.com
Stone types: Indiana limestone used on exterior

PARK CENTURY SCHOOL
Location: Culver City, Calif.
Designer: CWArchitects • cwaarchitects.com
Contractor: Ed Grush General Contractor • edgrush.com/management.html
Stone supplier: ROX PRO • roxproducts.com
Stone installer: Certified Tile and Marble • 818-785-4088
Stone types: Placer Gold flagstone mats and veneer ledgestone panels used in interior

KROON HALL SCHOOL OF FORESTRY AND ENVIRONMENTAL SCIENCES AT YALE UNIVERSITY
Location: New Haven, Conn.
Designers: Hopkins Architects • hopkins.co.uk
Centerbrook Architects and Planners • centerbrook.com
Contractor: Turner Construction Company • turnerconstruction.com
Stone supplier/fabrication: Briar Hill Stone Company • briarhillstone.com
Stone installer: Joe Capasso Mason Enterprises, Inc. • joecapassomason.com
Stone types: Briar Hill sandstone used in exterior

quartzite: Beauty, strength and durability

BY MW PENN

SHARPENED FLINTS; POINTED SPEARS; HAND-AXES: IN THE LITHIC PERIOD, 18000 BCE-8000 BCE, in a canyon along the Continental Divide of northern Colorado, groups of hunter-gatherers quarried quartzite intensively, forming tools and weapons from the stone on site and leaving behind shards and fragments to cause us wonder.

In the rugged canyon country of southeastern Colorado, the tributaries of the Cimarron River shelter further prehistoric archaeological sites: quarries of quartzite and rubble of tools.

In the Magothy Quartzite Quarry Archeological Site in Anne Arundel County, Md., several large outcroppings of quartzite were utilized by prehistoric Native American groups as early as the Middle Archaic period, 8,000 to 4,500 years ago.

Ancient Egyptians, too, used quartzite; theirs was quarried from Gebel el Ahmar located near Cairo on the banks of the Nile, not far from Heliopolis. The site was in full production in the times of Akhenaton, Tutankhamen and Ramses III.

The beauty, strength and durability of this natural stone have long been appreciated.

How it's made

Quartzite is composed of grains of quartz, a crystalline form of silica. The grains are solidly cemented together with chemical silica, so that the grains and the cement that bond them are of the same material. Silica cement interlocks the grains and fills in the pore spaces, creating a dense, compact stone of great strength.

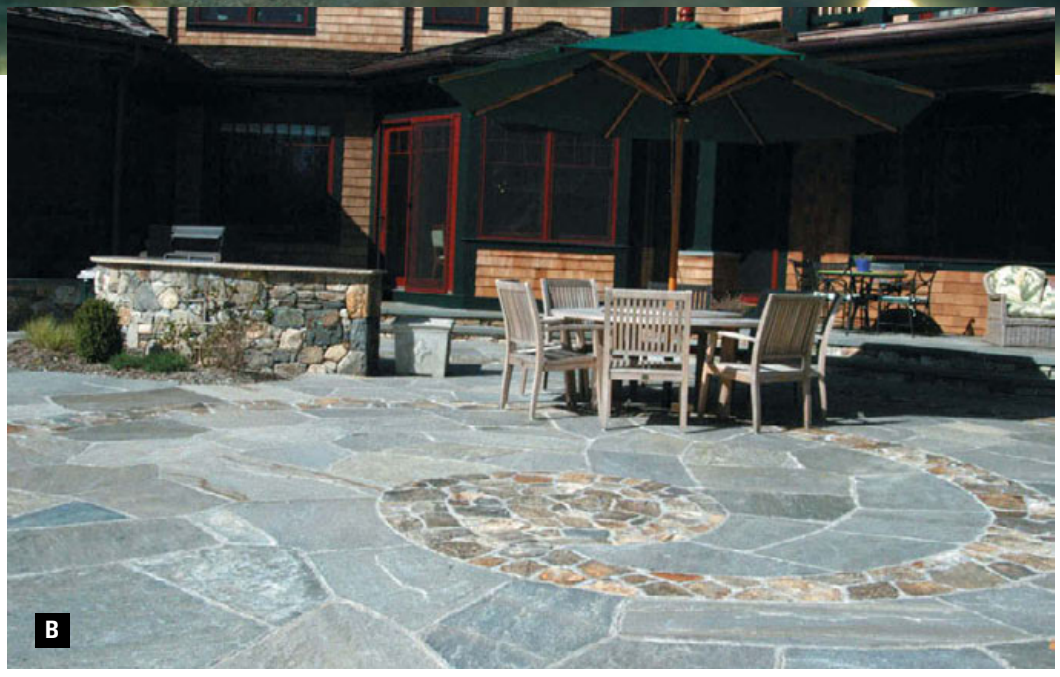
Quartzite was originally sandstone that converted into quartzite in two different ways:

In the first, through the intense heat and pressure usually related to tectonic compression, sandstone or chert recrystallized forming a metamorphic rock. This quartzite, in which all traces of the original grains and sedimentary structures are erased, may also be called metaquartzite. When sandstone is metamorphosed to metaquartzite, the individual quartz grains and the former cementing material recrystallize to form an interlocking mosaic of quartz crystals and the original texture and sedimentary structures of the sandstone are completely erased.

A. **Mt. Moriah Ledge** was used on both the inside and outside of this home, which was designed by Peterson Architecture & Associates, in Scottsdale, Ariz. The drystack application of quartzite is both durable and visually spectacular. *Photo courtesy of Pam Singleton Photography*

B. This striking patio in Fairfield, Conn., is **Loredo Blend quartzite** in super large irregular flagging with a natural cleft finish. The stone was installed over concrete and was supplied by Connecticut Stone Supplies.

A



B

C

Quartzite vs. Quartz

Note that there is a difference between quartz and quartzite. Quartz is a pure mineral, 7 to 7.5 on the Mohs hardness scale, while quartzite is a formed rock that contains the mineral quartz no longer in pure mineral form and rates a 7 on the hardness scale. The term quartzite implies not only a high degree of hardening or "welding," but also a high content of quartz.

C. Quartzite often forms ridges and projecting mountain masses or hilltops that are bare or covered with little vegetation. Mt. Moriah Stone Quarry in Baker, Nevada soars above 7,600 feet. Anasazi Stone acquires between 300 and 500 tons of **Mt. Moriah quartzite** annually. *Photo courtesy of Gary Luiz, Mt. Moriah Stone*

The second method involves sandstone at lower pressures and temperatures; here circulating fluids fill the spaces between sand grains with silica cement. This quartzite, also called orthoquartzite, is considered a sedimentary rock, not a metamorphic rock, because the original mineral grains remain and bedding planes and other sedimentary structures are still evident. Quartzitic sandstone is a metamorphosed sedimentary rock with hardness between sandstone and metaquartzite.

Because quartzite is very resistant to weathering, the rock produces only thin and very barren soil; thus the stone often forms ridges and projecting mountain masses or hilltops which are bare or covered with little vegetation. In the United States, many prominent ridges in the Appalachian Mountains are composed of highly resistant tilted beds of quartzite; formations can be found in parts of Pennsylvania and New York state, in eastern South Dakota, Central Texas and southwest Minnesota, in the Baraboo Hills in Wisconsin and the Wasatch Range of Utah, near Salt Lake City. A glassy vitreous quartzite is found in the Coeur d'Alene district of Idaho. Quartzite also is found in the Morenci Copper Mine in Arizona. The town of Quartzsite in western Arizona derives its name from quartzite in the nearby mountains in Arizona and Southeastern California.

Quarries, characteristics and applications

Potsdam Sandstone is a tilted, thin-bedded orthoquartzite of late Cambrian age (about 500 million years old) and is quarried by Champlain Stone, Ltd., in New York state. A light-colored stone with numerous shade variations from off-white to tan, Champlain's South Bay Quartzite often shows interesting ripple marks and displays advancing and receding surfaces resembling a windswept and sandy beach. Visually smooth, yet heavily textured with a blend of tan, antique white, ice blue, amber and brown, the stone is ideal for rustic cabins in the woods, bungalows on the beach and more formal installations between.

In Maryland, the quarries of Tri-State Stone & Building Supply, Inc. and Ben Porto & Son, Ltd., produce Carderock Stone, a beautiful mica-schist quartzite, with horizontal and vertical cleavage that make it easy to work into numerous installation styles. The vibrant blues, browns, grays and greens of Carderock create an aesthetically pleasing palette for any stone project, while the durability and ease of use of this mica schist quartzite make it a favorite of architects, designers, stone masons and homeowners. Because of the strength and structure of the stone, it is available sawn or in natural split-face and thermal face and can be used in veneers as thin as 1 ½ inch thickness. Gannett Headquarters in suburban McLean, Va., used extensive supplies of Carderock to create an outdoor landscape that benefits their employees by adding walking paths, water features, tranquility and beauty to the complex.

Strength is one of the many qualities of the quartzite, according to Greg Osterhout of Northern Stone Supply, Inc., quarries. Northern's Rocky Mountain Quartzite can be naturally split into ½ inch veneer and still retain great compressive strength. Suitable for indoor and outdoor use, quartzite of this minimum thickness cuts both freight costs and installation space, making the golden color range and beauty of this natural stone available to a broad range of applications.

Beauty, strength and durability: Quartzite withstands the test of time. ◆

MW Penn has published numerous articles on the quarrying, fabrication and architectural uses of natural stone, including interviews with many renowned architects.

Resources

REFRENCES

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Badger, Robert:, 1998
Stones: Ancient Egyptian Materials and Technology: Aston, B. G., Harrell, J. A. Harrell and Shaw, I; University of Cambridge Press, 2000

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Anasazi Stone Co., Inc. • anasazistone.com
Champlain Stone, Ltd. • champlainstone.com
Connecticut Stone Supplies, Inc. • connecticutstone.com
Northern Stone Supply, Inc. • 208.862.3353
Tri-State Stone & Building Supply, Inc. • carderock.com

D. A Stone Splitter at Northern Stone Supply uses a hammer and chisel to split **quartzite** into thinner sheets of flagstone. The stone can be naturally split into 1/2-inch veneer and still retain great compressive strength.

E. At its quarry on Middle Mountain near Oakley, Idaho, Northern Stone Supply produces **Rocky Mountain quartzite,** a natural cleft metamorphic stone, 900 million years old. Every piece of Northern's Rocky Mountain quartzite is hand split.

restoring Honey Bridge

LOCAL BRIDGE BUILT TO LAST

BY MARIANNE KUNKEL

THESE DAYS, WITH THE FEDERAL MINIMUM WAGE AT $7.25 PER HOUR, MOST JOBS—EVEN SELLING your worn-out jacket on eBay or babysitting your neighbor's toddler—will put more than $5 in your pocket.

But in the 1850s, when five men were commissioned by the town of Dresden, N.Y., to construct a stone arch bridge crossing over a local stream called Pike Brook, they were promised only $5 apiece. Other details about the $25 project are spotty. Rueben Hurlburt, a Dresden native, led the team, which comprised Hurlburt's brother James, Jonathan Tracy, a New Hampshire-based stone mason named Robert Smith Rhodes and a man whose name has been lost over the years.

"The men decided that the best stone for the bridge was quartzite stone because it's hard and relatively flat," says Michael B. Morey, president of Champlain Stone Ltd., which currently owns the bridge. Morey acquired the quarries from Harold A. Honey in 1982 and then obtained the surrounding land and nearby bridge from the New York Stone and Mineral Corporation in 1994. Since then, the bridge has been called Honey Bridge.

Produced locally

Long before the trend of "going green" and ethical pressure to use local materials, the town of Dresden hauled quartzite from the surrounding Adirondack Mountains to the bridge site—land that now makes up Champlain Stone Ltd.'s quarries and the Adirondack Park. Reuben's team used this stone to construct the bridge. Transporting outside stone by railroad in the 1850s would have been expensive and time consuming. Plus, using local stone emphasized Dresden's local pride. Morey explains, "That area is where the French-Indian War took place. It's very historic."

The arch bridge, which is considered the strongest type of bridge, dates back to Roman architecture. The five men began the bridge by building a skeleton form, or trestle-work, of the bridge made of nearby peeled poplar trees, and then filled in the trestle with stone. The story goes that, after installing the last large wedge stone, Reuben asked his team, "Now, who will go in and chop out the poles?" The men were silent with fear. So Reuben grabbed his axe, marched to the trestle and chopped down the structure. With a rumbling groan, the large stone arch settled into place, and the bridge was deemed successful.

Bringing the bridge back to life

"When I first saw the bridge, I thought, 'This is absolutely beautiful,'" says Morey. As recently as five years ago, the bridge was used by loggers in Dresden to carry harvested timber over Pike Brook to market. Upon

A. In the 1850s, local quartzite from the surrounding Adirondack Mountains was hauled to the site of **Honey Bridge**—land that now makes up Champlain Stone's quarries in the Adirondack Park. *Photo courtesy of Champlain Stone, Ltd.*

A

B. In recent years, Champlain Stone's seasonal holiday card included a winter scene of **Honey Bridge**. *Photo courtesy of Champlain Stone, Ltd.*

acquiring the bridge, Morey became frustrated with its poor treatment. Several Champlain employees picked up three loads of garbage left by people using the bridge as a party spot. Even worse, people who came to fish by the bridge had plucked stones from it. Morey ultimately decided to block off the road to Honey Bridge and restore the bridge's beauty.

Once the litter was removed from the bridge, Morey's biggest project was girdling the trees that started growing out of gaps in the bridge where stones were missing. "Harry Wilbur, a seasoned logger and forester—as well as a friend—girdled the trees so they wouldn't continue to grow," says Morey. "I wanted to make sure that the trees died first, so that pulling the roots out wouldn't pull the stones away."

In the next two years, Morey plans to register the bridge as a state historical monument. He is confident that once government authorities see the more than 150-year-old bridge, they will be enthusiastic to protect it.

What remains as powerful as Honey Bridge itself is the legacy of the five men who, through hard work, commitment and courage, constructed the bridge out of nothing more than the materials around them. Hopefully, with the help of Morey and state interest and protection, the inspiring work of these humble men can be shared as an example to all future builders.

As Morey explains, "Stone lasts and can be as enduring as your ideas. I think it's interesting that building companies now are becoming more and more influenced by the green movement and using building parts found within 500 miles. Back in the 1850s, people always used local materials because of common sense." ◆

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Neil Rippingale

SCOTTISH DRY STONE MASONRY, KENTUCKY STYLE

BY STEVEN CUTLER

PHOTOS COURTESY OF THE DRY STONE CONSERVANCY

IN 2001, MASTER mason Neil Rippingale made a journey which, like those taken by thousands of stone craftsmen in the 19th century, established Kentucky as one of the foremost centers for stonework in the United States.

"There is a great history of the Scots and Irish settling here in Kentucky," explains Rippingale.

Among the victims of the brutal "Highland Clearances," during which many thousands of Scots, and Irish who had settled in Scotland, were evicted from their land by wealthy land barons, dispossessed Scottish stone masons immigrated to British colonies around the globe.

A great number of masons landed in Kentucky, which explains why, says Rippingale, Kentucky is strewn with hand-laid structures reminiscent of the stonework that abounds in Scotland. "I have traveled through Kentucky thinking, 'This could be in Scotland,'" he says.

Like second nature

The skills these stone masons brought over with them from Scotland and Ireland have remained essentially the same for hundreds of years, especially those of the dry stone waller, who builds stone walls without using mortar to cement them. "It is still the same basic principles," says Rippingale, "but they adapted to the local stone. For instance, there is no limestone in Scotland, and Kentucky is all limestone and sandstone."

Rippingale first put hammer to stone 25 years ago, when he was 20, working on a farm in his native Scotland. When he first set to repair a dry stone wall on the farm, Rippingale discovered, "it was almost like second nature to me from the very outset." He took up the craft as a hobby, entered competitions while still working on the farm, and, he recalls, "I found that I was actually beating the professionals."

Blackhouse leads to Kentucky home

He soon started his own company in Edinburgh, employing a small team of masons for jobs within a 20-mile radius. "But from there I was sought by other organizations far afield," says Rippingale, within a 300 mile radius, including the Western Isles of Scotland. In 1993, he had the rare opportunity to build a "blackhouse," a uniquely Scottish, thatched-roof cottage with dry stone walls, on the Isle of Harris.

"It was the first time in 100 years that a house of this nature had been built new," says Rippingale. A Scottish television crew documented the project, for which the Dry Stone Walling Association of Great Britain awarded Rippingale its highest honor, the Full Pinnacle Award, in 1994.

The blackhouse won Rippingale world-wide acclaim and commissions from Switzerland to

A. In 2006 at the **Wilmore Culvert** in Jessamine County, Ky., poor-quality, 20th century stonework was removed to expose proper 19th century work and was replaced with dry stone and workmanship to match the original vault construction.

B. In 1993 on the Isle of Harris in Scotland, Rippingale helped build a **blackhouse**, a uniquely Scottish, thatched-roof cottage with dry stone walls. The project won the Full Pinnacle Award in Great Britain in 1994.

C. This 30-foot high **dry stone retaining wall** in Minisink Ford, N.Y, built in the 1840s and designed by now-famous bridge engineer John A. Roebling, was reconstructed after the adjacent Delaware Aqueduct was destroyed during the catastrophic Delaware River floods in 2005.

D. This **dry stone wall** was constructed at Millineum Farm in Fayette County, Ky. in 2004.

Australia, Nova Scotia, Montreal, Seattle and Kentucky. He was brought to Kentucky to lead a team of 25 stone masons in dismantling and reconstructing, by hand, the dry-laid limestone fences along the historic Paris Pike. This reconstruction is part of the complicated plan to widen the 14 mile road, stretching from Paris to Lexington, Ky.—a collaboration of several governmental and preservation organizations.

"My skills were recognized, and they said 'Well, we'll keep you for another year'—and the contract kept extending," recalls Rippingale. He's called Kentucky his home every since.

Not that he's lost any momentum; during his eight years in the United States, Rippingale has worked in some 30 states and with 20 different National Park Services.

Training for the future

As soon as he arrived in Kentucky, Rippingale threw himself fully into a mission he embraced almost from the moment he first picked up a chisel—training and mentoring young stone masons. He joined the Lexington-based Dry Stone Conservancy, the only organization in the country dedicated to protecting historic dry stone structures and preserving the craft and techniques of dry stone masonry, where he

serves as training program manager. "All in all," says Rippingale, "I've actually trained over 3,500 students in my nearly 35 years in stonework."

"There is a great future for stone masons," Rippingale tells trainees at the Conservancy in Lexington and at workshops around the country. The financial downturn has led many contractors and designers to return to basic materials. "With the recession," he says, "people are using dry stone in the landscaping industry—that is a big area to get into for new people coming into the field." The Conservancy offers a referral service for masons certified by the program.

He expects the craft to gain increasing respect with the new interest in sustainable materials. "It's a very green issue, a very environmental issue, with stone," says Rippingale. He adds, "There are public projects on the horizon funded by government stimulus money."

As for the commissions he undertakes in conjunction with the Conservancy—mostly out of state, so as not to compete with trainees of the program—"We are very fortunate in our organization," he says, "because when Jane [landscape architect Jane Wooley, restoration program manager of the Dry Stone Conservancy] and I look at a project, particularly with the National Parks Service, that's federal money that has already been allocated about two years before we get to it."

Working and teaching in the United States is especially gratifying, says Rippingale. "There is more respect for the dry stonework here. Whereas in Scotland, with all due respect to my homeland, I don't know that they have the same respect for historic structures, because there is so much of it. This country is so young; anything over 50 years is historic." ◆

Contact Neil Rippingdale at 859.266-4807 or neilnrsc@aol.com. For information on building with dry stone, visit the Dry Stone Conservancy Web site, www.drystone.org.

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Gallegos Expands Its Operations

STONE IS A classic, timeless element that can fit into any design scheme, and the ways it can be fabricated have changed leaps and bounds over time. The stone professionals at the Gallegos Corporation are excited to be a part of natural stone's many facets, and their pride and skills were on display at the October unveiling of the company's West Campus, a new fabrication facility just south of the Eagle County Regional Airport in Eagle, Colo.

The building was in the planning stages for two years before construction began in 2008. The state-of-the-art facility houses the mechanic shop, marble/granite fabrication facility, inside storage, stoneyard and related administrative offices. In the next decade, the company expects to move the main office and employee housing west as well.

"The new building represents our commitment to our clients, the company's future and our employees," says Gerald Gallegos, founder and CEO. "We have eliminated outside leases, improved water usage, upgraded our equipment and increased our operational efficiency." ◆

International Stonework Symposium, Jan. 19-23

THE NINTH ANNUAL gathering of the stone "tribe," will take place in Ventura, Calif., just north of Los Angeles. There will be interesting and informative presentations and demonstrations, lively discourse and camaraderie. Other events planned include the annual Rocknockers Rendezvous, the Second Lithic Olympics, the Stone Foundation's general membership meeting and a communal public art project. Prior to the symposium there will be a Japanese Dry Stone Walling Workshop (Jan. 8-18) and an Architectural Stone Carving Workshop (Jan. 12-18). Visit www.stonefoundation.org for more information. ◆

The Art of Deflection: A Debate over Proposed Masonry Structural Code

THE NATURAL STONE industry is debating proposed new language to establish a standard for the installation of non-anchored adhered thin veneer. Manufactured stone, brick and other masonry industries are using a proposed standard that, for most typical residential installations, will apply to adhered thin natural stone veneer, but this unilateral standard raises some concern by engineers with regard to the comparative weight of natural stone and deflection. This concern applies mostly to commercial applications because of the usually taller span between floors, but can apply to some residential construction with 10-foot ceilings or a large entry atrium.

Deflection criteria for masonry construction is proposed to limit or prevent flexing of the backup wall, which can cause cracks in the mortar joints and ultimately allow water penetration that may result in a break in the bond between stone and backup wall material. In an increasingly popular non-anchored application of thin stone, failure in bond means stones can fall off. The criteria for non-anchored thin natural stone veneer has been recommended as a deflection at the center of the span of L/1000 or less (with the stone limited to 2'-0" max in either direction and 3 sq ft maximum area) compared to a deflection or L/600 to L/720 suggested by manufactured stone and brick suppliers.

Opponents of the higher span argue that the more stringent structural code given to natural stone adhered thin veneer will add to construction costs and could put natural stone at a cost disadvantage over other materials. Proponents argue that the higher the span criteria, the better the quality of installation results, which will be better long term for the overall quality throughout the life of the project

Although more readily accepting of an L/600 standard, this issue is contentious in the manufactured veneer industry as well, to the point that as of this writing there is no consensus and no standard that has been published.

For more detailed information on this installation standard and other technical topics concerning the installation of natural stone, visit Tech Topics at www.buildingstoneinstitute.org and click on The Art of Deflection to learn more. ◆

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CHRONICLES in stone

PROMINENTLY VISIBLE FROM the north end zone of the University of Notre Dame football stadium, the Word of Life mosaic mural at the university's Hesburgh Library is better known as "Touchdown Jesus." The mural was designed by the late artist Millard Sheets in the early 1960s and is constructed of more than 6,700 individual pieces of granite that form 324 panels. Touchdown Jesus stands 134 feet high and 68 feet wide, and it is one of the many natural stone icons on university campuses in the United States.

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