



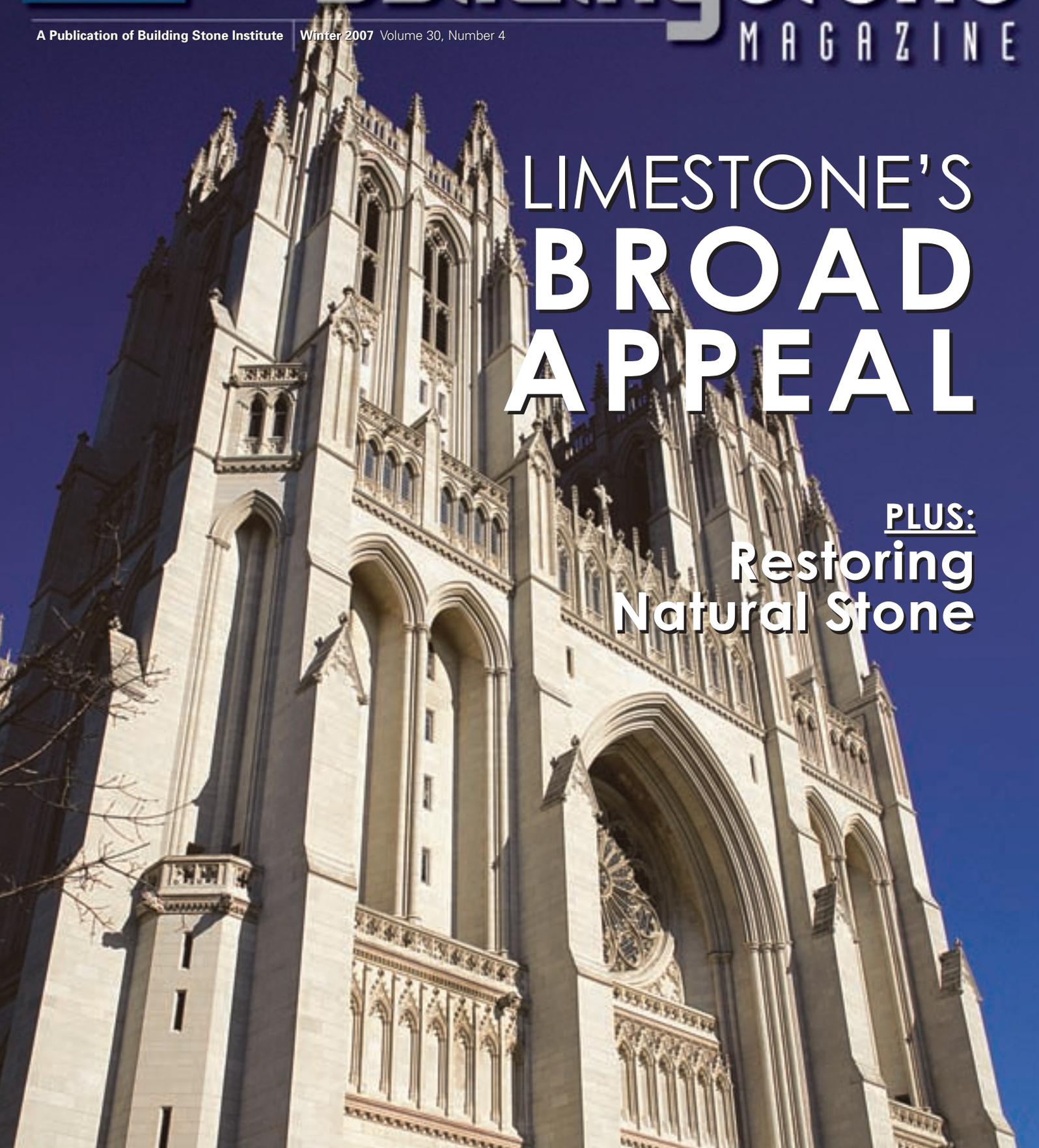
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A Publication of Building Stone Institute | Winter 2007 | Volume 30, Number 4

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Photo courtesy of Adam Ross Cut Stone



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The Washington National Cathedral is one of many buildings in our nation's capital made from limestone. In this issue, discover why limestone is an ideal choice for projects from ornate architecture to garden landscapes.

Photo courtesy of Indiana Limestone Company

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Photograph by Michael Rogol



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I AM PLEASED TO HAVE the opportunity to introduce myself to you in this issue of *Building Stone Magazine*. This magazine, the flagship publication of the Building Stone Institute (BSI), with a circulation of more than 17,000, offers a comprehensive view of the latest trends in the natural stone trade and serves as a resource for the latest information on BSI's programs, products and services.

As I assume the role of the President of the Board of Directors of BSI, I am honored to be guiding the path of this outstanding trade association, which has, for nearly 90 years, been working on behalf of its member companies, representing all facets of the natural stone industry.

Historically, trade and professional associations have played important roles in society. One key role, that of education, evolved from the guilds of the Old World, which provided an opportunity for craftsmen, and later professionals, to band together for training and dissemination of information. In our modern age of technology and as we operate in a global economic market, associations are critical vehicles for providing information exchange quickly and thoroughly.

BSI provides educational programs and resources to its members, enabling them to offer the highest level of quality natural stone products and services while emphasizing to end-users the many benefits of designing with natural stone. Our work takes on a multi-faceted approach. First, we continually strive to provide programs and resources that enable our member companies to offer the highest level of quality products and services. Second, we work with the architectural and design communities ensuring that they are well versed on the applications, both structural and aesthetic, of natural stone. Finally, we create materials designed to communicate to the end-user the various benefits of designing their projects with stone. The programs, products and services we offer must and do evolve to keep pace with the dynamic world marketplace.

People join professional associations for the same reasons that they join other organizations: to meet basic social, economic, education needs; to engage in the exchange of business ideas; to resolve problems or issues; and to enhance leadership skills. Access to services that help members in their businesses or professions is a primary reason to join an association.

If you have recently renewed your membership to BSI, thank you! If you are a past member, we'd love to have you be part of the "new" BSI. And if you need information about BSI membership, I invite you to visit our Web site at www.buildingstoneinstitute.org, or call our office toll-free at 866-STONE13 (1-866-786-6313). If you are in the natural stone business, you *need* to be a part of the Building Stone Institute! ♦



Bob Barden

2008 President, Building Stone Institute
Barden Stone Inc.
Memphis, Tenn.

BUILDING STONE INSTITUTE

Margie Lechowicz, **Executive Vice President**
551 TOLLGATE ROAD, SUITE C
ELGIN, IL 60123
Tel: 847.695.0170
Fax: 847.695.0174
Web: www.buildingstoneinstitute.org
E-mail: margie@buildingstoneinstitute.org

BUILDING STONE INSTITUTE 2007 OFFICERS

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PUBLISHER

Margie Lechowicz

PUBLICATION MANAGEMENT

LIONHEART PUBLISHING, INC.

506 ROSWELL STREET, SUITE 220

MARIETTA, GA 30060

Tel: 770.431.0867

Toll Free: 888.303.5639

Fax: 770.432.6969

Web: www.lionhrtpub.com

President John Llewellyn

E-mail: llewellyn@lionhrtpub.com

Editor Brooke Schmidt

E-mail: brooke@lionhrtpub.com

Assistant Editor Cory Sekine-Pettite

E-mail: cory@lionhrtpub.com

Feature Writers

Lorayne Bryan

Christina B. Farnsworth

Mark Haverstock

Stephanie Aurora Lewis

Amy Meadows

K. K. Snyder

Art Director

Alan Brubaker

E-mail: albrubaker@lionhrtpub.com

Production Designer

Christopher John

E-mail: chrisjohn@lionhrtpub.com

Online Projects Manager

Patton McGinley

E-mail: patton@lionhrtpub.com

Advertising Sales

Art Shaeffer

E-mail: art@lionhrtpub.com

Advertising Sales

Aileen Kronke

E-mail: aileen@lionhrtpub.com

Advertising Sales

Kevin Storey

E-mail: kevin@lionhrtpub.com

Advertising Sales

Marvin Diamond

E-mail: marvin@lionhrtpub.com

China Representative

David Tang

Tel: 0086.592.5051001

Fax: 0086.592.5053313

E-mail: stonebtb@msn.com

International Media Sales

Anthony Fitzgerald

Tel: +44.1488.680623

Fax: +44.870.199.2491

E-mail: mail@afitzgerald.co.uk

Reprints/Subscriptions

Kelly Millwood

E-mail: kelly@lionhrtpub.com

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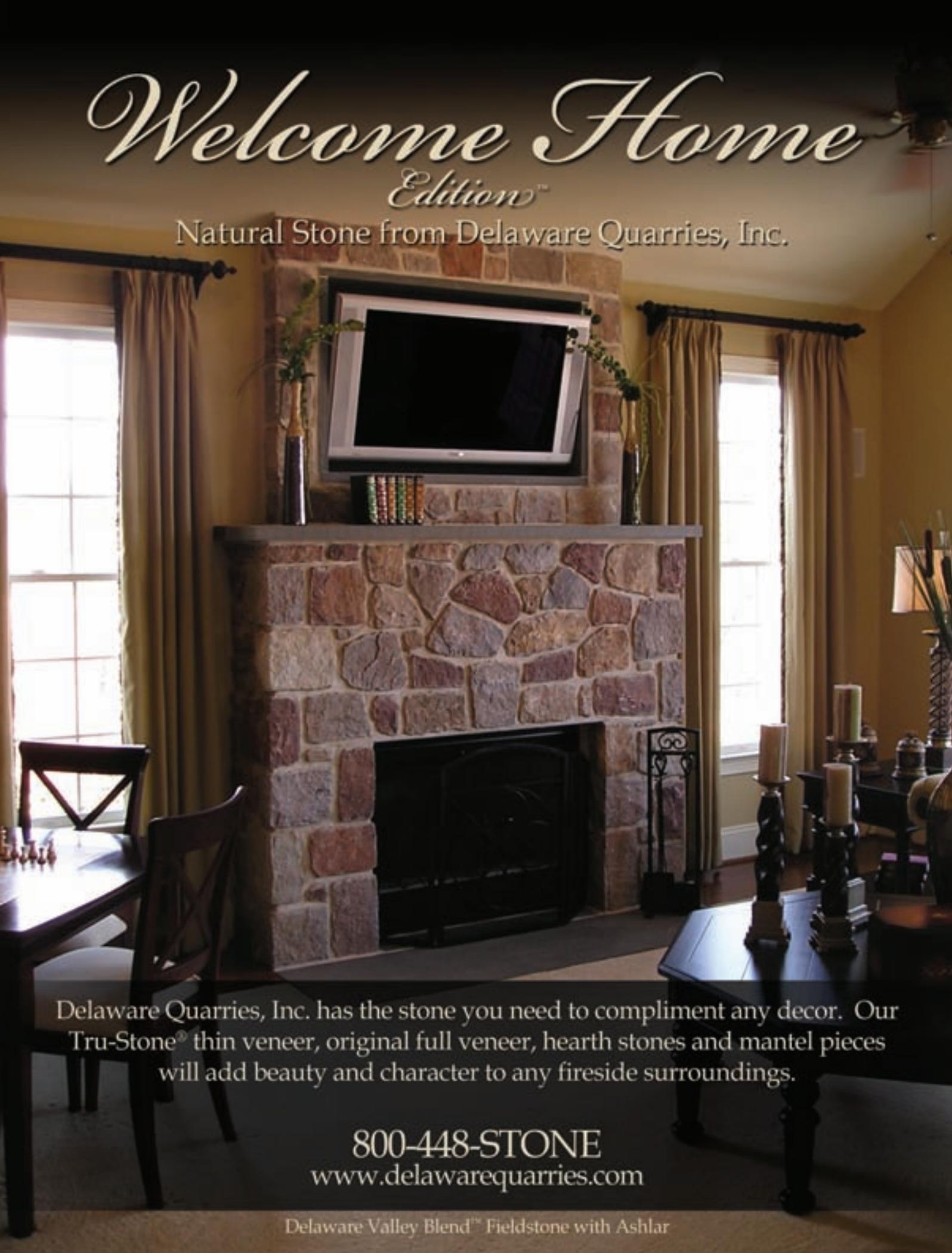
Building Stone Magazine is published quarterly for the Building Stone Institute, the American stone industry's international trade association founded in 1919.

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STONE RESTORATION

Preserving the Old for New Generations

By Mark Haverstock



Photo courtesy of Tourism Toronto

OPPOSITE LEFT: What Toronto residents refer to as "Old City Hall" is located on Queen Street at the top of the original Bay Street. It was begun in 1889 but not opened until 10 years later on Sept. 18, 1899.

HISTORIC STONE STRUCTURES are precious resources that provide us with a tangible link to our past. Their unique designs and solid construction often reflect the best work of accomplished stone masons and stone carvers from their respective time periods. We cannot afford to lose the materials, ideas, skills and knowledge of our past.

Though natural stone is among the most durable materials used for construction, it ages and weathers with time, necessitating repair or replacement. Finding suitable stone for the repair of historic structures can be difficult, since few of the original quarries remain in use. Often, significant detective work is required for stone identification, sourcing and matching.

If the exact stone is no longer available, other options can be considered. Hundreds of quarries around the United States produce a wide variety of building stone and are potential sources. Quarriers and fabricators of stone, including several Building Stone Institute members, have worked with architects

and contractors to successfully match or recycle stone on a variety of restorations. Here, *Building Stone Magazine* examines several of these projects.

Toronto's Old City Hall

What Toronto residents refer to as "Old City Hall" is located on Queen Street at the top of the original Bay Street. It was begun in 1889 but not opened until 10 years later on Sept. 18, 1899. In one structure, these municipal buildings combined City Hall, in the east portion, and the courthouse in the west. This building is constructed mostly of Credit Valley sandstone, a grey stone with a sandpaper-like texture quarried near Toronto. Massive, round-arched, and richly carved, it is in the Romanesque Revival style, which was popular in cities throughout North America at the time. The interior includes a large stained glass window by Robert McCausland. In 1965, the Municipality of Metropolitan Toronto acquired the building when the city offices moved to a new City Hall on the adjacent Civic Square.



Photo courtesy of Adam Ross Cut Stone

ABOVE: Unlike many state capitol buildings, which are inspired by Classical architecture, the New York State Capitol building was inspired by the design of the Hotel de Ville in Paris.

“Owen Sound Ledgerrock has been working on this for about 10 years, replacing at least one part of every architectural element on the building over four phases as we work around the building,” explains Andrew Negus, “sills, coursing, banding, cornices, carvings, steps, arches, columns, etc.” They have been working mostly with The Ventin Group Architects and Clifford Restoration of Toronto. Most of the more decrepit areas of the stone masonry construction have been cleaned, replaced or rehabilitated.

Most recently they’ve completed phase four, which involved about \$1 million in custom sandstone work. “It’s a similar circumstance to the Parliament Building,” explains Negus. “We’ve been completing all kind of product, including customized carved items to match existing carvings on the

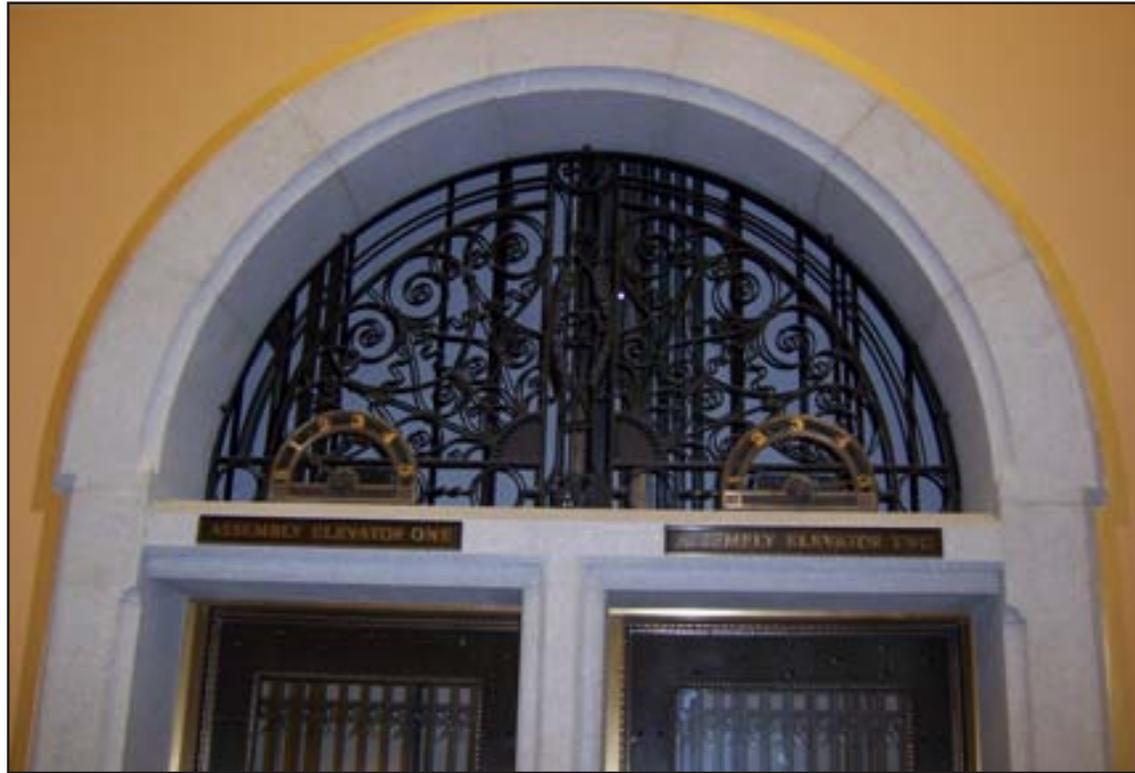
building, arches and columns on the 450-foot clock tower on the front portion of the building – many of the items right at the top.” He notes that the clock tower was actually completely wrapped in scaffolding over 400 feet high and equipped with a special high mass-load elevator for shipping pieces from the ground to the top. The tower was closed off allowing masons to work both inside and outside of the building.

Negus says that some of the stones they replaced weigh as much as 13,500 pounds – mostly mammoth sills and headers. “It’s a masonry construction building – typical of construction in its day,” he explains. “That’s what supplies the major support, as opposed to today where your primary support is concrete and steel. Some of these sills are 40 inches deep.”

RIGHT: Today, the New York State Capitol building is undergoing an extensive renovation to return spaces to their appearance a century ago.

New York State Capitol Building, Albany

Unlike many state capitol buildings, which are inspired by Classical architecture, the New York State Capitol building was inspired by the design of the Hotel de Ville in Paris. The structure was designed and constructed over a 32-year period and finally completed in 1899. At that time, it was admired by many as one of the most beautiful buildings in



An advertisement for Global Granite & Marble. The background is a photograph of a curved stone waterfall with water cascading into a dark basin. The stone has a warm, reddish-brown hue. The advertisement is overlaid with several text elements and logos. In the top right corner, there is a circular logo for "GLOBAL ARCHITECTURAL PRODUCTS" with a stylized figure holding a compass. Below this, the text reads "EXCEPTIONAL STONE PROJECTS REQUIRE AN EXCEPTIONAL STONE SUPPLIER". Further down, it says "Our stone experts can assist you with drawings and pricing, installation and maintenance" and provides the website "www.globalgranite.com". In the bottom right corner, there is a blue and orange box containing the text: "GLOBAL ARCHITECTURAL PRODUCTS - A DIVISION OF GLOBAL GRANITE & MARBLE", "10330 Page Industrial Court", "St. Louis, MO 63132", "866 480 4931 ext. 119", and "samk@globalgranite.com". In the bottom left corner, there is a green logo for "GLOBAL GRANITE & MARBLE" featuring a globe. On the left side of the advertisement, the text reads "NATURAL STONE IMPORTER & DISTRIBUTOR" and "ST. LOUIS LOUISVILLE SPRINGFIELD, MO".

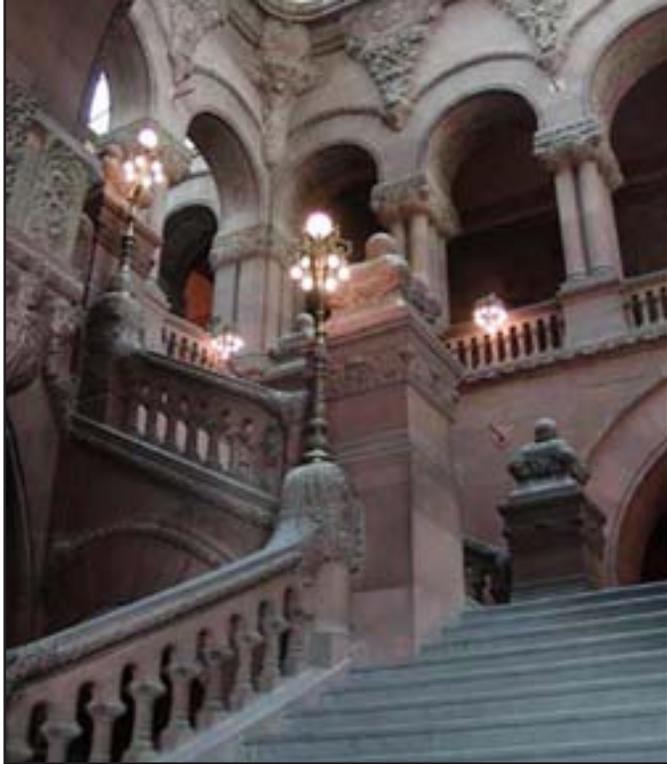


Photo courtesy of Albany County Convention and Visitor's Bureau Inc.

MILLION DOLLAR STAIRCASE

One of the New York Capitol's most spectacular features is the Great Western Staircase, also known as the Million Dollar Staircase. The structure, made from Corsehill sandstone quarried in Scotland, is 119 feet high with a 3,000-square-foot skylight at the top. It was designed by architect Isaac Perry and took 13 years to complete.

Six hundred stone carvers were hired to carve the structure by hand. Corsehill was chosen because it is soft when first quarried and allowed the carvers to cut the stone instead of hammering it. After exposure to air, the stone slowly hardens.

The staircase features 77 famous faces carved into the pillars – among them George Washington, Abraham Lincoln, Christopher Columbus, Walt Whitman and Susan B. Anthony. Once the famous faces were set in stone, the carvers were then allowed to carve the faces of anyone they chose, including family, friends and people off the street. They became known as the Capitol Unknowns. Along with the faces, many birds, animals and fruits were carved into the banisters.

ABOVE: The New York Capitol building's Million Dollar Staircase, made from Corsehill sandstone quarried in Scotland, is 119 feet high and took 13 years to complete.

America and ridiculed by some as an expensive boondoggle. But no one could deny that it was unique.

It was built by hand of solid masonry – in places its walls are

four or five feet thick. When construction began, electric lighting did not exist and mechanical heating and ventilating were primitive at best. Before it was completed, improvements had been made in building technology. Electricity was used to light the Capitol and advances in heating were incorporated into the structure.

Today, the Capitol building is undergoing an extensive renovation to return spaces to their appearance a century ago. At the same time, improvements are being made to ensure that the building will meet the needs of New York State government in the future. "We've been involved in almost all the work in some way," says George Mallette, vice president of Adam Ross Cut Stone, Albany, N.Y. "It's an ongoing project with numerous phases and proposals that extend 15 to 20 years into the future."

Originally, three teams of architects worked on the Capitol building construction, led by Thomas Fuller from 1867-75, Leopold Eidlitz and Henry Hobson Richardson from 1875-83, and Isaac G. Perry from 1883-99. The various architects'

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RIGHT: The New York State Capitol building was constructed of solid masonry – all by hand.



Photo courtesy of Adam Ross Cut Stone

influences likely account for the wide variety of stone used in and outside the building. Finding the right match for each can be a challenge. “On the outside of the Capitol, the only stone that will match is Concord Gray Swenson granite, but on the inside, there’s stone from almost anywhere you can imagine,” Mallette says.

Adam Ross Cut Stone is presently doing a project that involves importing stone from Nova Scotia – and that’s from a quarry which is currently closed. “As for this closed quarry, there was an operating quarry in the vicinity of the closed quarry,” says Mallette. “Often the owner of the operational quarry will purchase miscellaneous, previously-cut blocks from the current owner of the land.” Normally, after a quarry is closed, it is nearly impossible to re-open it because of residential and commercial development surrounding the quarry. It is not a typical practice to obtain stone from a closed quarry, so the search begins for comparable stone from other sources.

However, some searches connected with this renovation are easier than others. Over the years, they’ve had the foresight to save leftover stone from previous work on site. “A lot of times, I’m able to go into the basement archives and pull out a good portion of what I need,” he says. “We can often recut and reuse it.”

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Photo courtesy of Cold Spring Granite Company

ABOVE: The Marquette Plaza Project in Minneapolis is one example of how materials can be recycled.

BELOW: Construction and demolition waste makes up about 40 percent of the total solid waste stream in the United States. See the sidebar on page 14 to discover how projects such as this one are created through reuse.

Sometimes, Adam Ross Cut Stone is asked to rebuild areas that have been heavily modified or even removed. “For example, if I’m working on a third-floor restoration, they’ll refer me back to the first floor where everything is still intact and ask me to match it,” Mallette explains. “I’ll make plaster of Paris molds of carvings – everything has to duplicate what’s already there.”

Work of this scale is ongoing and takes a long time. “The building is just one large mass of hand carved work,” says Mallette. “The job I’m working on now started four years ago and I still haven’t cut a piece of stone for it yet. There’s a lot of prep work and searching for the best matching stone.”

RECYCLING NATURAL STONE

Construction and demolition waste makes up about 40 percent of the total solid waste stream in the United States. However, if builders design projects with material reuse in mind, it can reduce the amount of waste and extend the useful life of current landfill sites.

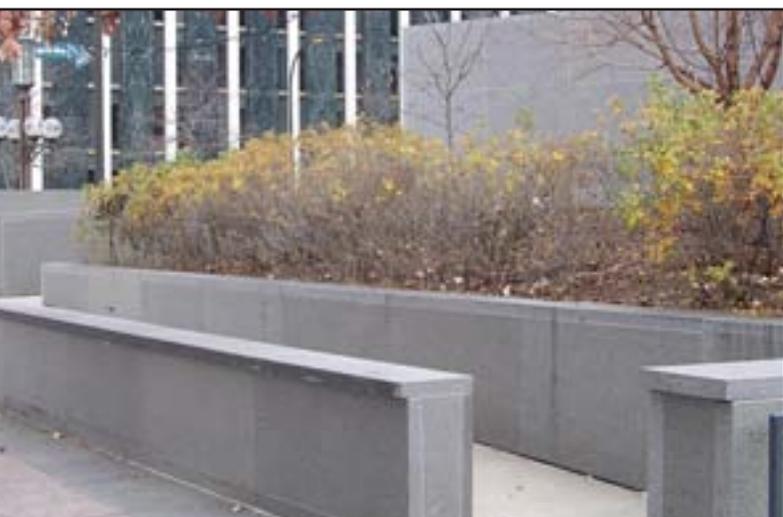
The Marquette Plaza Project in Minneapolis is one example of how materials can be recycled. Starting with the old Federal Reserve Bank structure, the building was remodeled and office space added to create a unique multi-tenant building.

Cold Spring Granite Company, the original supplier of the bank’s Charcoal Black Granite, suggested that the original pavers could be cut up and fabricated to make seating, coping and vertical facing panels. Of the total stone removed from the site, 30 percent was refabricated for the plaza. The rest of the material was brought back to be used for applications such as landscape byproducts.

Frisco, a northern suburb of Dallas, is the site of another unique effort to reuse materials that might have otherwise been discarded. The George A. Purefoy Municipal Center uses residual pieces of Cold Spring’s Sunset Red Granite as building material.

During a visit to Cold Spring’s Marble Falls facility, Malcom Holzman of Holzman Moss Architecture watched thin-cut material being fabricated into slabs. The process ended with the edges of the slabs being sent to a remnant pile. “Making granite columns is an expensive proposition. It occurred to us that using granite remnants would be an effective approach,” says Holzman.

The colonnade of the Purefoy Municipal Center is composed of 12, five-foot-diameter columns that are 32 feet tall. Red Granite remnants were placed edge-down in a quarter-round cylindrical form. Ties were then attached to each granite piece prior to pouring the concrete backing. Not only is the column unique, but it also appears to have flutes similar to traditional columns.



Photos courtesy of Cold Spring Granite Company



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ABOVE: The gun decks at Fort Ticonderoga are all clad with South Bay quartzite from Champlain Stone, which provided more than 200 tons of flagging from 1999 to 2006.

Fort Ticonderoga, N.Y.

Built by the French in 1755, Fort Ticonderoga, N.Y., was the gateway to Canada and the site of a decisive battle during the French and Indian War. On May 10, 1775, at the start of the Revolutionary War, Ethan Allen, an American Revolutionary soldier, led his Green Mountain Boys in an attack to overtake the fort. These soldiers from Vermont seized Fort Ticonderoga and all of its valuable artillery stores without a struggle.

RIGHT: To date, restorers have refurbished approximately 40 percent of Fort Ticonderoga. Unfortunately, a substantial amount of the current restoration includes correcting mistakes from previous work.



Photo courtesy of Champlain Stone Ltd.

In 1820, William Ferris Pell bought the ruins of Fort Ticonderoga and the Garrison Grounds to preserve them. Pell built the Pavilion, a hotel to cater to the growing tourist trade in the area. His grandson, Stephen H. G. Pell, officially began the fort's official restoration in 1908. Since then, several rounds of restorative efforts have been made. "We've addressed a substantial amount of work in the last 10 years – officially in excess of \$4 million worth," says Lyle St. Jean, superintendent of buildings and grounds. "Currently, we're building a new education center within the fort itself. We're careful not to alter the original footprint or the style of work done here."

According to St. Jean, they strive for 100-percent authenticity with the fort. They reuse stone where possible and fill the gap by carefully matching new stone from local quarries. Champlain Stone of Warrensburg, N.Y., supplied nearly 90 custom pieces of Great Meadow limestone from its nearby quarry in 2006. "Most of what we reuse is on the façade – as an average our walls are 20 feet high, the face of any single bastion is an average of 80 feet long, making 1,600 square feet on any given face on a bastion," St. Jean says. The gun decks are all clad with South Bay quartzite from Champlain Stone, which provided more than 200 tons of flagging from 1999 to 2006.

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To date, restorers have refurbished approximately 40 percent of the fort. Unfortunately, a substantial amount of the current restoration includes correcting mistakes from previous work. “Most of the restoration done between 1910 and 1940 did not follow good, solid practices,” says St. Jean. “Those walls have failed, and we still have 50 to 60 percent of that work to catch up with over the next 10 to 12 years to comply with the recent State Historical Preservation Office standards.” During the original restoration, they backfilled the walls with clay as an inexpensive fix. Over time, poor drainage and freeze-thaw cycles pushed the walls over.

Restoring the walls starts with removing any earth or clay behind them. “We then rebuild with concrete, structural steel, precast or cast-in-place concrete and clad the face,” St. Jean says. “So all we’re looking at when we get done is the face itself. In other words, we take a three-foot wall down and put back a 16-inch veneer, so we actually gain stone on most of our projects.” The wall appearance is authentic and more structurally sound than the original 1755 structure.

Wacker Drive, Chicago

Wacker Drive, a historic, bi-level roadway built in the 1920s, runs alongside the Chicago River and is home to many of the city’s notable landmarks. But after suffering decades of Chicago’s harsh weather, the original road was falling apart. Despite repairs in the 1970s, the road continued to show failures. In 2001, Walsh Construction began the monumental task of reconstruction.

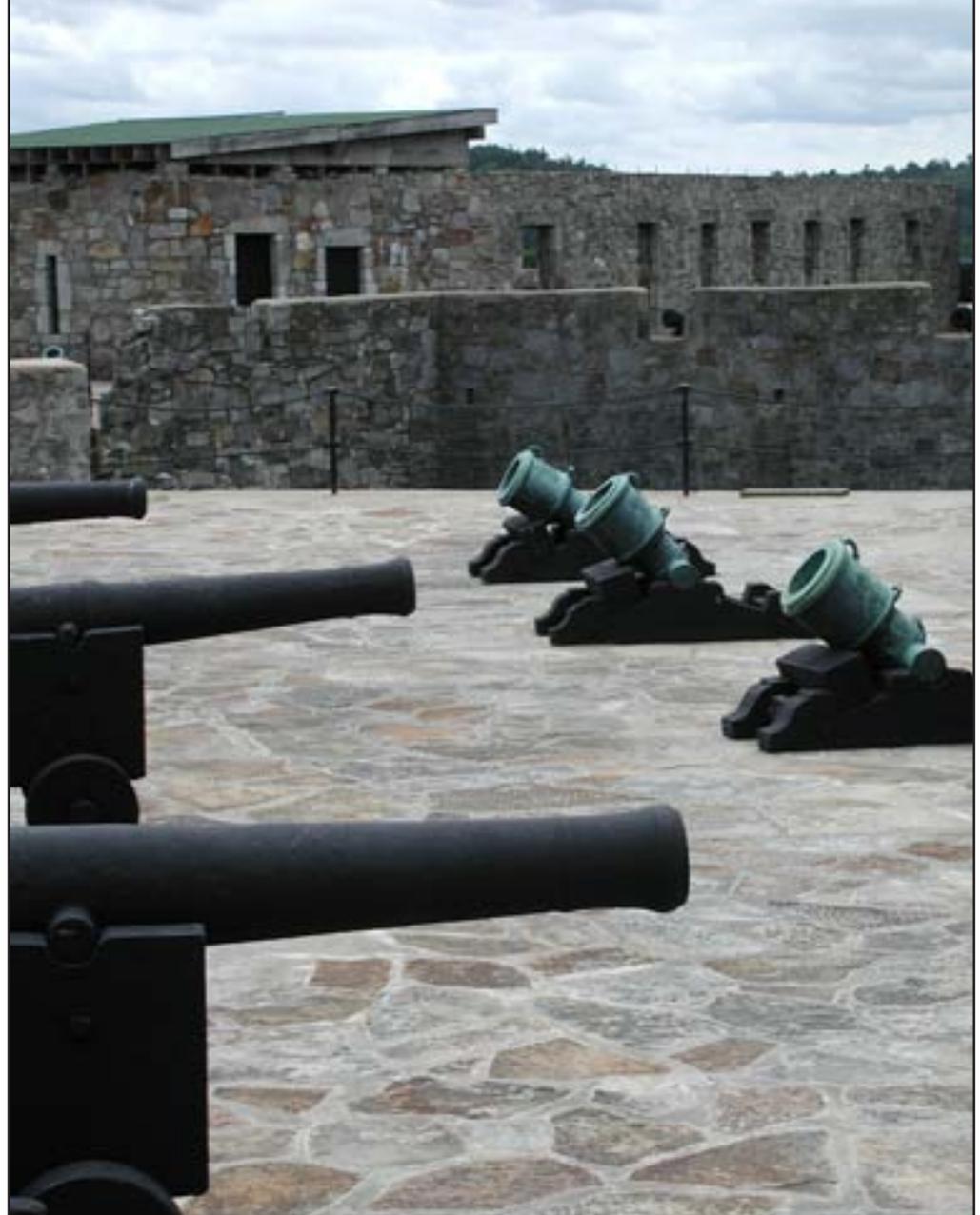


Photo courtesy of Champlain Stone Ltd.

The purpose of the reconstruction was to replace the existing structure and to widen the street to accommodate the demands of today’s traffic in the Windy City. The challenge was to upgrade the structure while preserving its original characteristics. “The goal of any infrastructure project is to respect the context and to recognize its value as public architecture,” said Charlie Friedlander, senior architect, DLK Inc. of Chicago. “It’s not only individually iconic, it’s part of the city fabric.”

Before the road construction began, collaborative teams of architects, preservation specialists and engineers on the project

ABOVE: Lyle St. Jean, superintendent of building and grounds at Fort Ticonderoga, says during restoration, he strives for 100 percent authenticity.



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decided how much of the existing natural stone could be reused from the cladding, base, staircase, and other defining stone features. These pieces were cataloged, disassembled, stored and repaired for reinstallation. Pieces that were too worn would be replaced with matching units.

Matching new stone to the old was the next challenge. "Matching a 100-year-old weathering condition with new stone is problematic," says Bill Grosche of Johnson Lasky Architects, Chicago, Illinois. "You have to decide to what extent you want the new stone to match the old after the old stone has been fully cleaned, so as to avoid a patchy appearance. Matching the stones was complicated by the variable surface appearance, due not only to irregular weathering and staining, but by the past application of preservative surface treatments."

Restoration teams worked with Cold Spring Granite of Cold Spring, Minn., on stone selection and Cornelian granite



Photo courtesy of Cold Spring Granite Company

RIGHT: The purpose of the Wacker Drive reconstruction was to replace the existing structure and to widen the street, accommodating the demands of today's traffic in the Windy City.

BELOW: Wacker Drive, a historic, bi-level roadway built in the 1920s, runs alongside the Chicago River and is home to many of the city's notable landmarks.

became the material of choice. After some extensive research, site visits and analysis of the original materials, Cold Spring Granite found three finish "recipes" that had a good visual match and characteristics comparable to the original. The restored and new stone appear to blend seamlessly.

The renovated Wacker Drive opened in November 2002 after \$200 million of work was finally completed. Using a combination of modern, high-performance concrete and some old-fashioned stone renovation, it is expected to hold up for at least the next 100 years.

Queen's Park Parliament Buildings

Queen's Park, which opened in Ontario, Canada, in 1860, was long considered as a location for new parliament buildings. During 1879 and 1880, the Ontario Legislature and city council authorized construction, awarding the commission to architect Richard Waite of Buffalo, N.Y. The main block of the massive Romanesque Revival structure, with its towering legislative chamber, was completed in 1892. On April 4, 1893, the first legislative session in Queen's Park was opened under the direction of Premier Sir Oliver Mowat.

Owen Sound Ledgerock Ltd. has been involved with the exterior restoration of this historic structure since 1996. "During the very first phase of our work, we actually trucked our equip-



Photo courtesy of Cold Spring Granite Company

RIGHT: Collaborative teams of architects, preservation specialists and engineers on the Wacker Drive project decided how much of the existing natural stone could be reused to form the staircase and other defining stone features.

ment down to the Medina sandstone quarry and sawed a number of blocks out for that restoration ourselves – which is a little unorthodox,” says Andrew Negus, director of custom sales and design. “The quarry itself had limited capabilities at the time, so it’s likely we got the contract because we were able to provide the service. The quarry was not providing dimensional stone at the time and extraction was mostly for aggregate. They had no sawing equipment – they used only drilling/plug and feather technique.”



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ABOVE: The main block of the massive Romanesque Revival Parliament Building, with its towering legislative chamber, was completed in 1892.

Restoring this structure has required several other varieties of stone as well – some harder to find than others. Owen Sound Ledgerock has imported St. Bees sandstone from Cumbria, England and Medina from Rochester, N.Y. – both of which are fine grained and red in color – and Credit Valley sandstone from the Toronto area. “Most recently we’ve been doing the Whitney Block phases of that project, using stone from a defunct quarry near Niagara Falls – Queenston limestone,” Negus says. “When that quarry product ran out, we started using Victor Oolitic Indiana limestone, which the consultants decided was the closest match.”

Negus notes that his company has run into a number of challenges trying to locate quality stone to rebuild the parapet,

which is a six-foot-high structure around the outside of the building. “Obviously, we had to match all the profiles from the existing building and completely rebuild it to Heritage Standards,” he says.

When it came to matching finishes on this project, Owen Sound Ledgerock used a variety of methods. Surfaces other than carvings required a comb finish. “We intentionally made it rough using a comb tooth chisel and textured the surface, matching the appearance of the old stone before they had the ability to make it smooth,” says Negus. “It is my understanding that the original comb finish was used due to the fact that achieving a smooth finish, especially on sandstone, was quite difficult with the tools available more

than a century ago. Finish saws would have been much rougher and the types of grit used on sanding products would have been less effective. Also, combing gives you an additional texture while using the same stone, allowing you to have carved, smooth, bush-hammered split-face and combed to highlight certain architectural features.”

To match weathering, they employed several different techniques in finishing, such as heavy sandblasting. “Sometimes we would provide smooth stone and then a contractor would work it on site to match the texture,” Negus says. Anywhere there was a complete rebuild, texturing wasn’t necessary because it was on an elevation that would only be seen by itself. ♦

Mark Haverstock is a freelance writer.



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Photos courtesy of Gary Henry, PROSOCCO

Keep It Clean

RESTORATION AND PRESERVATION OF BUILDING STONE

By Lorayne Bryan

WHEN BUILDERS
CONSTRUCTED

Manhattan's beautiful Trinity Church in 1846, they could not have envisioned that this ornate Gothic Revival sandstone structure, which then dominated the lower Manhattan skyline with its soaring neo-gothic spire, would someday rest in the shadows of some of the world's tallest buildings.

Nor could they have envisioned that the golden sandstone would need protection from the air and the rain, which would become increasingly polluted over time. Forty years later, conservators added a wax coating to preserve the beautiful sandstone (specifically a New Jersey brownstone), but whatever protection it provided was nullified by the tendency of the sticky surface to attract dust and dirt.

As the decades passed and New York City grew, industry contributed to the grimy buildup on the surface of the sandstone, and by the turn of the century, the golden beacon had become as black as the soot that often hung in the surrounding air. The stone remained dirty for so long that most New Yorkers came to believe that black was the historical church's natural color. Imagine their surprise when in 1990 the landmark church went from black back to its original light color in a matter of weeks. Initially, area police received reports from concerned locals that the church was being vandalized. The remarkable transformation/restoration was achieved with the application of appropriate stone cleaners made by PROSOCO, a family-owned Kansas company dating back to the 1930s.

According to Gary Henry, a spokesman for PROSOCO, its cleaners have been used to clean and protect landmark architecture across America – from the U.S. Capitol and the Pentagon to Dodger Stadium and the Walt Disney Concert Hall in Los Angeles. “We don’t just make products and put them on the market,” he says. “We provide a level of customer care unmatched in the industry, including technical support, free jobsite troubleshooting and training presentations. We offer quality products, but the most important ingredient isn’t in the products – it’s the people who stand behind them.”

In the case of Trinity Church, PROSOCO experts conducted a careful analysis of the sandstone, gauging its fragility, and an analysis of the various components that had contributed to the dark buildup, which not

OPPOSITE LEFT: Cleaning and maintenance restored Trinity Church to its former beauty.

Photos courtesy of Gary Henry, PROSOCO



RIGHT: Before it was cleaned, Trinity Church's sandstone appeared black. It had been dirty for so long, that many people believed it was supposed to be this color.

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only coated the stone but was imbedded in it.

“Correctly identifying and evaluating the stone fabric of historic architecture is the crucially important first step on the road to a successful project. Not all stone can be cleaned by the same type of cleaners, and there are specific cleaners for specific stains and imbedded contaminants and debris,” Henry explains. For example, some types of stone tolerate aggressive acidic cleaners and some stone types will dissolve along with the stain if cleaned with acidic solutions – leading to etching, discoloration and even more significant damage.

One of the etched-in-stone rules of restoration is to identify every substrate on the building. In the case of Trinity Church, 150 years of bird droppings, mildew and environmental pollutants had significantly altered the appearance of the sandstone. It had long bore the patina of coal-operated boilers, soap factory smokestacks

and Hudson River power plants. But old photographs and records depicted a lovely, light-colored façade. And the restoration team used definitive tests to confirm that the sandstone was indeed sandstone. That is not always the case. Although Chicago's Church of the Epiphany appeared to be made entirely of sandstone, apparently during construction, workers replaced crumbling sandstone coping stones with granite that looked similar. Granite, like sandstone, is a siliceous stone and can tolerate aggressive acidic cleansers, but coverage rates for the two stones are different. So the distinction between the stone types was significant.

While many industry professionals are able to visually examine stone and determine the composition, few are willing to stake their business solely on a visual identification. For the purposes of initial identification, industry professionals usually can determine if a stone is siliceous or calcareous based on color and appearance.

Commonly used siliceous stones – granite, sandstone and slate – are made mostly of quartz-like particles (silica). Some granite can be identified by the tiny mineral flecks uniformly distributed throughout the stone. This often is referred to as a *salt-and-pepper* effect. Varying mineral content creates the variation in granite color. Sandstone color varies according to mineral content as well, ranging from light gray and yellow to red and brown (New Jersey brownstone). Slate is usually dark green, gray, black or dark red and has a distinct cleft texture.

Calcareous stones frequently used in construction include marble, limestone and travertine. Limestone is the most widely used building stone in North America, with the Empire State

Building being one of the most widely recognized examples. Typically, it is light gray in color and may reveal various fossils upon close examination. Marble varies in color according to its mineral content with high concentrations of colored minerals forming veins. Like granite, marble often is polished to a sheen, and this similarity sometimes leads to mistaken identity. Travertine is a sedimentary stone made essentially of calcite, deposited by calcareous waters. Its color is whitish, slightly yellow or reddish. Typically, it is used for floors or as a veneer. It is common in Tuscany, Umbria, Lazio and Marche, Italy. The Colosseum in Rome is likely the most well-known travertine structure.

For cleaning and treatment purposes, the most significant

difference between siliceous and calcareous stones is that calcareous stones are much more sensitive to acidic cleaners. Another distinction is that many products used for consolidation and water protection on siliceous stones won't work on calcareous stones. To accurately ascertain which category a stone falls into, a simple acid test is used. A few drops of a 10-percent solution of hydrochloric acid will create a bubbling reaction on calcareous stone and little or no reaction on siliceous stone. Be sure to apply the solution to the bare surface of the stone (in an inconspicuous location) rather than on a sealed or polished surface.

Determining the type of stone being restored or cleaned is just the first analysis in determining which products are most

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appropriate for the project. Other considerations include: the fragility of the stone, what finishes currently are on the stone, whether the stone is polished or unpolished, and the density and porosity of the stone. When all points have been considered, and the appropriate products selected, a test application should be performed prior to proceeding with treatment.

After work crews striped off the layers of contaminants that threatened the building, and completed the cleaning treatment of Trinity Church, conservators assessed the condition of the New Jersey brownstone construction and elected to strengthen the deteriorating stone by applying stone-strengthening and water-repellent consolidation treatments. The treatments replace the

stone's natural binding cement matrix lost to time and weather, essentially fortifying the façade and ensuring the integrity of the structure for perhaps another 150 years. On Sept. 11, 2001, the church was covered in smoke and pummeled with debris from the nearby World Trade Center disaster. Fortunately, damage was minimal, and the church served as a sanctuary for rescue and recovery workers. In the wake of Sept. 11, PROSOCO representatives volunteered as consultants in the architectural restoration and cleaning effort of Trinity Church.

The cleaning effort was minimal because of the earlier treatment of the stone. Unlike the 19th century wax coating that attracted grime and trapped water vapor, today's treatments are nearly 100-percent breathable, letting vapor

RESOURCES

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out without letting liquid in, and without changing the appearance of the stone. "Water is the greatest enemy of stone," Henry emphasizes. "If allowed to penetrate into the story, it carries contaminants from air pollution into the stone. But the greatest threat to the integrity of the stone is caused by

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the freeze-thaw cycle – the expansion and contraction can damage the stone's structure. That's why using the proper protective treatment is so important."

So what are the recommended cleaning and protective procedures for the most popular construction stones? General parameters follow. However, get professional advice when necessary, and test the product on a small area prior to full application.

Granite and Granite Tile

Granite is extremely durable with an absorption rate often below 1 percent. Clean construction dirt from the surface and use a non-acidic cleaner for general cleaning. Sealing the surface with a film-forming sealer or coating is not recommended and a granite floor need not be finished either.

Honed Limestone, Marble and Travertine

Most honed limestone is extremely durable and scratch-resistant, however etching and oil stains from common household food products can present a problem. Do not use acid-based cleaners unless testing indicates that it is safe. A general, all-surface stone cleaner should work on most construction soiling, as well as grease and oil stains. Oil repellants are recommended. These can last up to two years on exterior applications and up to five years on interior applications.

Polished Marble, Travertine and Limestone

Polished marble (and travertine and limestone) though durable, is highly prone to scratching, etching and oil staining from common household food products. An all-surface

stone cleaner is recommended for removing general construction soil, as well as grease and oil stains. Do not use acid-based cleaners as they will etch the stone. A penetrating oil repellent will help keep countertops new. Floor finishes are not recommended.

Sandstone Floors

With a wide range of colors and textures available, sandstone often is used for flooring. It can range from very porous to very dense, therefore, a consultation with your stone sales representative is recommended to help you determine the properties of your particular flooring. An all-surface stone cleaner will remove general construction soil as well as oil and grease. Sealing the surface with a film-forming sealer is sometimes desirable to prevent oil staining. Floor finishes often are used to prevent oil and dirt from penetrating the surface. Be sure and select a product that will not reduce slip resistance.

Slate

Slate is a durable stain-resistant flooring material that is easy to maintain. You can clean it with a general-purpose, all-surface stone cleaner. Most waterborne stains will remain on the surface of this dense stone for easy cleaning; however oil-borne stains may penetrate beyond the reach of most cleaners. Therefore, a film-forming sealer is often desirable, depending on the location of the flooring.

Numerous stone restoration and protective treatments are available for commercial and consumer use. With all the many variables that can affect product selection, it is advisable to work with a company that offers technical support and even onsite evaluation and instruction. ♦

Lorayne Bryan is a freelance writer.



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Natural Stone Maintenance

USING THE RIGHT PRODUCTS MAKES
ALL THE DIFFERENCE

By Stephanie Aurora Lewis

NATURAL STONE IS AN ENDURING MATERIAL IF INSTALLED, maintained and repaired by qualified and knowledgeable caretakers. Josveek Huligar, of Huligar Stone Restoration, created the Natural Stone Restoration Alliance (NSRA) with a convenient Web log for the professional tradesperson as well as for homeowners (www.nsraweb.com). The purpose of the blog is to keep the most up-to-date products and current stone care tips available globally, to encourage interaction in the stone restoration trade, and to create an educational base fed by a community of all skill levels. Some repair projects, such as the restoration of Trinity Church in New York City and

the Great Hall of the Library of Congress in Washington, D.C., necessitate professional tradesmen and professional products. Alternatively, a full range of home-based products that homeowners can utilize is available. Some new products are Lustro Italiano™ Daily Cleaners and Bonstone®'s Last Patch™ Gel.

Stone Maintenance at Home

Choosing natural stone based on its chemical and physical properties is a key to successful ease of maintenance and repairs. One of the most important considerations is whether the stone will be in a high-traffic or highly-used area. Countertops, for example, are a location where hard stones such as granite and marble are

OPPOSITE RIGHT: In the Great Hall of the Library of Congress, PROSOCO's Sure Klean® Liquid Marble Cleaner was used on the white Italian marble stairways, wainscots, statuary and floors during an early 1990s restoration. The marble was grimy with years of accumulated smoke and pollutants from the building's original heating system. Plus, beeswax, used to polish the marble, had accumulated and yellowed over the decades. Conservators chose Sure Klean® Liquid Marble Cleaner because it could remove these contaminants without harm to the sensitive marble.

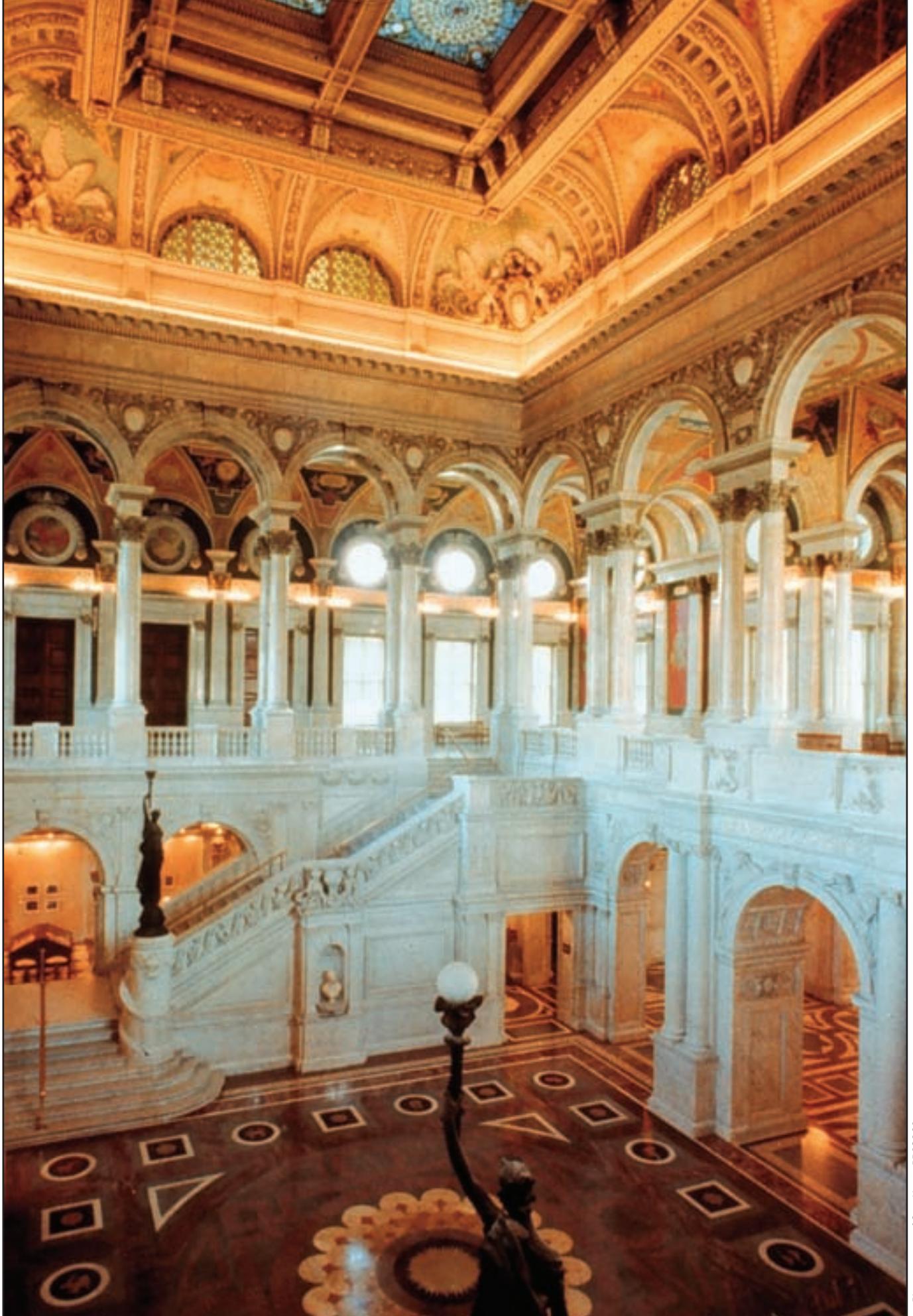


Photo courtesy of Gary Henry, PROSOCCO

ideal. Onyx, though it is an eye-catching stone in the wide variety of beautiful colors, is not recommended for countertops and kitchen islands because of its etchable nature and its high vulnerability to acid damage.

Now trendy, slate and limestone with a honed finish are ideal for a kitchen backsplash and for flooring. The soft rustic character of these stones can be

refined through color enhancers and sealants that slightly alter the dusty stone appeal. For exterior pavers, patios and grilling surfaces, slate and granite are perhaps the best choice in natural stones because they withstand freezing and thawing with an excellent perseverance. Marble, on the other hand, holds water through its veins that will later expand with freezing, leading to

BELOW: Patching Indiana limestone using Last Patch™ Limestone.

HULIGAR'S HOMEOWNER TIP #1

WATERMARKS

A watermark, commonly noticeable on marble, is actually a result of the water chemically eroding calcium from the surface. A properly selected and applied sealant will not stop this type of stain, but it will delay the watermark's damage until the water is removed and the stone is carefully cleaned. If a watermark has begun to etch into a marble surface, apply a marble polish and powder mix over the surface with a terry cloth. Finally, buff the polish to a shine. If the watermarked marble is left untreated for more than 30 days, however, the work should be left up to a professional who will resurface the stone. Professional stone restoration services could cost up to \$10 per square foot.



Photo courtesy of Paul Klees, Bonstone

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Photo courtesy of Joeveek Huligar, Huligar Stone Restoration.



LEFT: Cracked marble such as this can be repaired.

apply a superior impregnating sealant that soaks deep into the pores and veins of the natural stone. With an impregnating sealant application, water vapors are allowed to pass through the core of the stone.

“If you apply the correct sealer the first time, you very likely won’t have to seal it again,” Huligar says. There are three categories of impregnating sealants: solvent-based, water-based and silicone-based. Porous stones, such as travertine marble, require a thick silicone-sealant whereas dense stones, such as black granite, require a thin solvent-sealer. For the majority of other stones, a water-based sealant is most commonly applied because of its median thickness and clarity. Conversely, for low-usage areas such as a on a kitchen backsplash, a sealant is not obligatory. Exterior applications of granite and slate – such as pavers – do not need a sealer either unless they will be exposed to the possibility of

destructive cracks and spalling.

One misconception regarding the application of sealants is the difference between a “coating” and a “sealant.” Generally, a coating of any kind should never be applied to natural stone because it will close the natural pores and veins, thus creating a moisture barrier that will ultimately damage the stone’s physical strength and possibly the natural coloration. Rather, for highly used or high-traffic areas, select and

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RIGHT: This freedom stone, an honor to the victims of Sept. 11, 2001, was delivered with a saw cut finish. After the stone was polished, a fork lift accident nicked a 5-inch chunk from the stone's surface. In the repair, Huligar Stone Restoration incorporated pieces of the natural stone and tinted adhesives.

spilled acidic drinks or from barbeque grease or other food debris.

Regardless of the natural stone type and finish, it should be kept clean *daily*. Gritty dirt and acidic liquids such as those commonly found in foods and drinks should especially be removed in a timely manner. Selecting the correct type of cleaner for the type of natural stone is important. Granite and marble, for example, should not ever be cleaned with acidic cleansers. A product such as Lus-



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Photo courtesy of Josveek Huligar



Photo courtesy of Josveek Huligar



HULIGAR'S HOMEOWNER TIP #2 OIL AND GREASE STAINS

To clean oil spots out of a slate backsplash, first place a few drops of nail polish remover (pure acetone) over the oil stain, then cover it with white baking flour for two to three hours. Clean off the flour and the oil stain is removed. If left for days or weeks the stain may seep far into the stone, requiring the services of a professional. This acetone/flour procedure can be used as a degreaser for marble countertops and travertine flooring as well.

tro Italiano should be applied once a month, Huligar explains. This particular product does not have any added aromas, and it is completely transparent from the bottle to its application. Daily cleaners by Lustrò Italiano primarily enhance cleaning maintenance of polished and honed stones by leaving them better protected against the next acidic spill or watermark. The product is not recommended, however, for applications such as steam showers because the daily cleaner's chemical compounds can be

TOP AND LEFT: Damage to this memorial stone was repaired using a mix of natural stone and tinted adhesives.

RIGHT: By creating an adhesive using varying colors from this natural stone, a repair to the crack was successfully made. Once dry, adhesive was polished flush on either side of the seam. See results on following page.

altered by extra minerals in hard water. Additionally, this product is intended exclusively for natural stone rather than for Portland cement countertops or any other man-made products.

Professional Maintenance

The skill of professional tradespersons and the use of professional products are vital in historic preservation and



Photo courtesy of Josveek Hulligar, Hulligar Stone Restoration

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LEFT AND BELOW: The application of adhesive polished flush makes a smooth repair to this stone.

Photo courtesy of Josveek Huliger, Huliger Stone Restoration

restoration projects. The Standards for Preservation by the U.S. National Park Service include, “Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.”

In the past, harmful coatings such as paraffin wax were used to preserve historic buildings. In time, the coatings built up a thick layer, giving the natural stone a yellow-ish glow on interior stone and a black-ish film on exterior stones. Not only was the color altered, but on exterior applications, the wax contributed to the breakdown of the natural stone’s strength because moisture was trapped behind the thick coated layers.

PROSOCO’s Sure Klean® Restoration Cleaner was used by professionals to gently cleanse the grime-infested paraffin wax coating off the exterior of the 1846 Trinity Church in New York City. Later, PROSOCO’s Conservare H and OH Stone Strengtheners were applied to prevent any additional stone crumbling damage. For the Great Hall of the Library of Congress, PROSOCO’s Sure Klean Liquid Marble Cleaner was used to gently clean accumulated smoke and pollutants from the building’s original HVAC system on stairways, wainscoting, statuary and floors.

Photo courtesy of Josveek Huliger, Huliger Stone Restoration





Photo courtesy of Paul Klees, Bonstone

Epoxies with powdered colors to match natural stone are commonly used in a variety of stone restoration techniques. Until recently, large cracks on exterior stone cooktops or grills were repaired with polyesters and epoxies that discolor over time under UV penetration. New to the market is Bonstone's Last Patch Gel, a UV-stable epoxy product that can be used

ABOVE: This marble exterior was patched using Last Patch™ Gel.

HULIGAR'S HOMEOWNER TIP #3 CHIPS, CRACKS AND EFFLORESCENCE

Filling a small chip with clear nail polish can repair a travertine marble floor. Smooth the polish out with an emery board.

If a terrazzo floor suffers from differential settlement and a consequential crack, it also can be easily repaired. Insert pebbles into the crack with the bonding paste of the same terrazzo color, grind it up and shave off the extra substance with a razor blade. Finally, buff it to a preferred shine.

If a stone floor or stone wall installation has three or four tiles with cracks, cut an "X" in the middle of each tile, cut away the grout from around each broken tile, and use a chisel and a hammer to remove the tiles completely. Then replace the missing tiles with new tile and re-grout them in place. If the original, old grout is not first removed before using a chisel and hammer, then new tiles on the sides also will start cracking in the process.

If the white chalky substance called efflorescence starts to show up inside a steam shower, simply clean it off when it is dry with a soft brush. Rinse with clear water. Keep in mind that efflorescence is not harmful to natural stone, and it is not an indication that the natural stone is damaged.

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RIGHT: Here a Galaxy Black Granite top is repaired with the aid of copper shavings, six shades of black tinted adhesive, a cup wheel, slow RPM grinder as well as converted layered and top polishing techniques. The top polish maintained the same reflection of the rest of the surface and displayed the same characteristics of the natural stone.

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Stephanie Aurora Lewis is a freelance writer.

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Building with Limestone

By K.K. Snyder

FOR HUNDREDS OF YEARS, thousands of types of stone have been quarried around the world from beds formed over millions of years. Obviously, some types of natural stone are superior to others, especially when being considered as a product for building. When it comes to beauty, workability and structural integrity, limestone often is a favored material among architects, builders and owners.

A rock of sedimentary origin, limestone is composed of calcium carbonate or calcium and magnesium, or a combination of these. With natural characteristics such as fossils and shell formations, calcite streaks or spots, pit holes, open texture streaks, honeycomb formations, iron spots and others, limestone has a varied appearance and texture lending even more versatility as a building material.

Bonded through millions of years of heat and pressure, limestone varies in hardness and is commonly found in colors including black, grey, white, yellow and brown. Recrystallized, limestone becomes marble – another natural stone popular with building projects that normally is more costly than limestone. But it is pure limestone that often is chosen as an exterior commercial or residential building material for ornate features of grand – and not so grand – structures. Its virtually maintenance-free characteristic is a huge selling point for many builders.



Photo courtesy of Indiana Limestone Company

Versatility Abounds

“Limestone is one of the [most common] stones used in the building industry. It has the ability to be worked very easily. It tools very, very well, so obviously you can make it very ornate,” says Joe Vinci, owner of Vinci Stone in Maryland, where he started visiting at age 12 the company started by his father and his uncle.

Noting the high number of ornate limestone buildings in Washington, D.C., Vinci said the

workability of the stone makes it a favorite in the industry. “They can be sawn easily and can be split on a hydraulic guillotine so it’s not a real expensive product to produce. And because it’s less abrasive than sandstone and the softer material when compared to granite, it’s a good choice for making ornamental features.”

Limestone weathers naturally over time and its color mellows and blends into a pleasing, natural patina. With no artificial coloring agents to fade and no

OPPOSITE LEFT: Limestone is one of the most commonly used stones in the building industry. When the stone creates exteriors such as the one on this home, it’s not hard to see why.

ABOVE: Because it is virtually maintenance-free, limestone is a solid choice for exteriors near landscaping.

Photo courtesy of Indiana Limestone Company



LEFT: Genuine limestone weathers naturally, without the use of sealers.

reinforcement rods to rust, the appearance of limestone actually improves with age, according to the Natural Stone Council (NSC).

“[Indiana limestone] tends to range in color, and with our stone the colors tend to mellow out over time,” says Jim Owens, executive director of the Indiana Limestone Institute. He notes that moisture in the stone upon excavation

causes variations in color, which change over time. “The stone tends to blend into a pleasing match, a more uniform match. Those varied colors will likely not be nearly as pronounced.”

Coloring agents used in some building products have a tendency to fade over time, whereas limestone, with no coloring agents and strength enough to be used without reinforcement



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Big Creek, LLC

A New Company with Deep Roots

Big Creek, LLC is an integrated quarry and fabrication company producing Indiana limestone products, including blocks, slabs, veneer, sills, coping, paving, and split products. Big Creek, founded in 2002, is located near Stinesville, the original home of the Indiana Limestone industry. Big Creek is locally owned and operated by members of the Edgeworth family – currently Terry, Mike, Maggie (Randall), and David – which first became involved in the Indiana Limestone industry in the late 1800's.

Indiana Limestone has a 150-year tradition as a quality building stone suitable for all aspects of construction. Big Creek owns approximately 350 acres in the northwest corner of the Indiana limestone "belt". The Big Creek quarry produces only buff colored limestone and no grey or variegated colors. Big Creek's buff limestone is consistent in color from top floor to bottom floor and typically has a medium grain. Big Creek's limestone has a medium density and hardness making it well-suited for all aspects of fabrication – slabbing, diamond saw cutting, planning, carving, and CNC work.

Big Creek produces quarry blocks for sale to fabricators and for use in its own production facilities. Currently, Big Creek cannot accept block orders for large commercial jobs. However, the company continues to expand its quarry operations with the goal of supplying larger jobs. The blocks produced by Big Creek are typical of the size of blocks produced around the Indiana Limestone belt – 8 to 9 feet long, 4 to 5 feet in channel, and 2 to 4 feet in width. Blocks are priced per cubic foot, depending on grade.



Big Creek produces slabs using a narrow belt saw. The narrow belt saw provides both the flexibility and productivity to efficiently produce slabs cut to each fabricator's requirements. For slab thicknesses two inches and over, the slabs are priced per cubic foot, depending on grade. For slab thicknesses below two inches, the slabs are priced per square foot. Currently, Big Creek ships slabs across the United States and Canada.

Big Creek produces finished and semi-finished products using a variety of diamond saws and finishing equipment. Many of these products are "square-cut", including sills, caps, wall coping, veneer, keystones and custom pattern patio, just to name a few. Big Creek also fabricates products such as sills with a wash, lugged sills, pier caps, and quoins with return. Big Creek typically provides these products to customers that primarily purchase its "square-cut" products. Consequently, Big Creek is not a "cut stone" fabricator that bids

on commercial jobs. Big Creek also produces machine-pitched (a.k.a., rocked-faced) sills, with or without a drip, on its pitch and drip line. For custom jobs, Big Creek hand pitches cut-to-size pieces. Pricing varies with the type of product; sills are priced per lineal foot while other products such as keystones or quoins are priced per unit.

Big Creek produces split products for building veneer and landscaping. The most popular product is a buff split-face veneer, split front and back, available in the 3, 4, or 5 standard heights, or in custom heights and patterns. Big Creek's splitface veneer is priced per ton at a very competitive price. Big Creek also produces split wallstone and split steps, as well as custom split products.

As owner/operators, the Edgeworths have over 90 years of experience in the Indiana limestone industry working with fabricators and retailers. The Edgeworths understand that honesty and a focus on customer service are, and must always be, the guiding principles of Big Creek. This focus has allowed Big Creek to grow from two employees to two shifts and nearly around the clock production.

Big Creek prides itself on being small enough to be flexible, but "big" enough to service our larger customers' needs. Our employees are dedicated to providing the absolute best limestone products available at very affordable prices. For more information contact Big Creek, LLC at 812-876-0835 or visit our website at www.bigcreekstone.com

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Photo courtesy of Indiana Limestone Company

ABOVE: Pavers, such as those surrounding this pool, are a popular way to incorporate limestone into a landscape plan.

rods, does not. “Another positive of genuine stone is that it weathers naturally without the use of sealers,” Owens adds.

In spite of limestone’s affordability and ready supply, some people choose to purchase instead any number of cheaper, man-made cast products on the market manufactured to mimic limestone, adds Vinci, who operates three quarries, including one of the oldest, continuously operating quarries in the country.

Limestone exhibits no preferential direction of splitting and can be cut and carved in a wide variety of shapes and sizes. Thus, it can be sawed, planed, turned on

a lathe or hand worked to match the requirements of demanding architectural designs, states the NSC’s Web site. Limestone has proven its use from simple treads and pavers to landscaping structures and bridges, to soaring cathedrals over and over again.

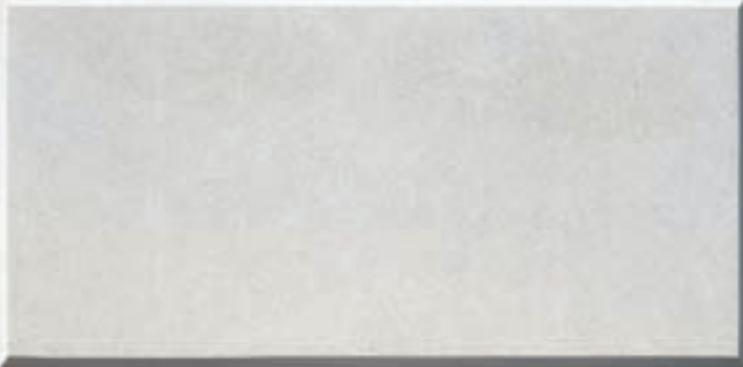
One benefit that has made limestone a choice product is the consistency of deposit. While subtle color and grain differences are present, limestone is extremely homogenous for a natural product. This is important, not only for the current project being built, but particularly when future expansions are contemplated.

When specifying building stone for structures that are expected to endure for generations, limestone is a great choice. Many colleges and universities across the country boast limestone buildings that are more than 100 years old. They continue using this venerable material in new construction, allowing them to match existing buildings and to maintain the context of their campuses.

Supply and Demand

In addition to its beauty and versatility, limestone remains an affordable building product because of the vast amounts available in the United States, particularly the northeastern region and states such as Indiana, Minnesota, Kansas and Wisconsin, says Ranier Devido, who started Ranier Devido Stone Company in New Castle, Pa., 52 years ago.

Devido says the supply in the United States is plentiful as long as new roads or other government actions don’t block access to potential new quarries. “We need to live on our natural resources,” Devido says, citing concern about a threat 10 to 15 years ago in which the government was considering taking quarry property to construct a new highway. And while there is no shortage of limestone in the United States, the natural stone often is imported from Europe, Mexico and Canada, giv-



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Photo courtesy of Indiana Limestone Company



ABOVE: Due to its plentiful supply, architects and builders often choose limestone for simple residential projects or ornate commercial jobs such as Washington's National Cathedral.

ing buyers an even wider array of colors and densities from which to choose, Devido adds.

Duffie Elkins, of Indiana Limestone Company in Bedford, Ind., quarries more than one million cubic feet of limestone each year. The company exports raw material to coun-

tries such as England, Italy, China and Japan. Operating one of the largest limestone quarries in the country, and fabricating what they excavate, Elkins says in spite of increased demand, he isn't concerned about limestone reserves in the state.

"Everybody in the construction industry would be a [potential] customer of ours. I think overall sales of limestone are up. The industry has broadened our product line and appeal," through an increase in demand for the types of products crafted from limestone, he shares. "But we have probably 50 to 100 proven reserves. We've done core drilling and investigated where we might go."

Across the construction industry, the most significant development to come down the line in the past 10 years is the move toward green, sustainable building. The Leadership in Energy and Environmental Design (LEED) Green Building Rating System (from the U.S. Green Building Council [USGBC]) has defined standards for building environmentally responsible structures. Using regional stone (regional stone is extracted, processed and fabricated within a 500 mile radius of the job site) or using salvaged or reclaimed stone in construction of a new commercial building are the two most common ways natural stone, such as limestone, contributes to LEED standards.

The natural stone industry as a whole is aware of the need to have a reclamation plan, and most quarries are trying to be as environmentally friendly as possible, cognizant of the need to fill in holes and plant trees, Elkins says.

"It's tough for us to prove that taking the stone out of the ground is environmentally sound," he admits, noting many in the industry who also are ahead of the pack when it comes to environmental aware-

ness and proactive efforts. “But we try to reclaim twice what we quarry in a year.”

While quarrying for limestone is not as destructive to the land as quarrying for aggregates, Indiana Limestone chooses to fill in with stone and dirt the 40- to 50-foot holes on the two to four acres they quarry each year, even though that effort is not required. Once the site is filled, the company plants and then “lets nature do the rest.” The company occasionally chooses to create a lake from a quarried site to serve as a recreational spot for employees, Elkins adds.

A source for limestone also exists in Canada, namely Owen Sound Ledgerrock in Ontario. Operating on the Niagara Peninsula for 50 years, the company quarries dolomite lime-



Photo courtesy of Jane Bennett, Champlain Stone Ltd.

stone, high in magnesium and dolomite, which makes it a very dense natural stone, says Steve McCallum. Like his U.S. peers, McCallum says supply is sound for 75 years and beyond at many of his company’s quarries.

“We’re limited and tightly monitored by the government here in Canada,” he says. “We have extractions of about 60,000 tons per year, so we’re fortunate that

ABOVE: Ranier Devido Stone Company in Pennsylvania fabricates Indiana limestone products.

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Photo courtesy of Indiana Limestone Company

ABOVE: Indiana limestone is recognizable by its creamy buff color.

we have unique stone so we can niche market competitively.” McCallum says the unique dolomite limestone is in the mid-high price range. The company has exported the material for projects in Dubai, Italy and the Canadian Embassy in Berlin among other projects in Canada and the states, including the University of Michigan, Middlebury College in Vermont, custom architectural details for Yale University, large residential projects in Connecticut and the St. Regis Hotel lobby in San Francisco, Calif.

Though they’ve not joined as USGBC members, Owen Sound does frequently supply LEED projects. “The exciting thing about this whole industry is that, even on a local scene, we might have once been seen as the scourge of the earth. People don’t get warm and fuzzy about extracting stone. ... However, within the past 10 years, because of the green building and key words coming out like sustain-

able building, the perception of our industry has changed.”

McCallum says more awareness by the general public of the non-invasive process of de-bedding stone, coupled with the knowledge that buildings constructed with natural stone can withstand centuries, thus reducing the cost and energy consumption of rebuilds, has contributed to a more positive attitude toward the industry.

Best Uses

Elkins says much of the limestone he sells is landscape products, as well as veneer products for residential use. Other mainstream uses for limestone are countertops, tile, fountains, pools, walls, walkways and fireplaces. Of late, people tend to want as thin a limestone veneer panel as they can get, either because of weight limitations on the building project or when under a time constraint

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Dimension limestone is divided into three sub-classifications that describe their densities in approximate ranges, as follows:

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- **HIGH DENSITY** – Limestone having a density greater than 160 lb/ft³ (2,560 kg/m³).

Source: www.natural-stone.com

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Photo courtesy of Indiana Limestone Company



LEFT: Easily fabricated, limestone will last for years.

that won't allow for a masonry set project, he says, but overall, today's use of limestone for building is consistent with its uses in the past.

"Indiana Limestone is a class two medium density stone, which means it has a creamy buff color," Elkins says. "People choose it because it's a complementary color that goes well with a lot of other exterior facades."

As a building product, limestone is a good choice because it's easily fabricated and though it's soft, it lasts for years. One downside is the way the stone reacts to acid rain and acid environment, adds Vinci.



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RESOURCES

Duffie Elkins
 Indiana Limestone Company Inc.
 812-275-3341
delkins@indianalimestonecompany.com
www.indianalimestonecompany.com

Jim Owens
 Indiana Limestone Institute
 800-210-4863
ili@genuinestone.com
www.iliai.com

Steve McCallum
 Owen Sound Ledgerrock
 519-376-0366
steve@ledgerrock.com
www.ledgerrock.com

Ranier Devido
 Ranier Devido Stone Company
 724-658-8518
rdevidostone@aol.com
www.devidostone.com

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 Vinci Stone
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RIGHT: Structurally sound, limestone is a solid choice for new construction.

“The only disadvantage that I see is that salt deteriorates the stone; it’s one of the main enemies of limestone,” Devido says, noting the practice in colder climates of salting roads and sidewalks to melt ice. “When limestone is used properly, it’s a very good building material.”

A unique characteristic of certain limestone is the fossils and seashells often found embedded in the surface, adding an organic element. Some limestone is very porous, offering a more rustic or aged appearance, but also a better chance for staining and scratching if used



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RIGHT: The Empire State Building is one of the most widely recognized examples of a limestone structure.

for countertops. An acrylic-based sealer is recommended to protect the stone, which adds sheen to its appearance.

“There are definitely some instances in which limestone shouldn’t be the first choice,” Elkins says. “Like on the base of a building that will see a lot of splash or be in contact with dirt. You might want to use granite or [a stone] more impenetrable than limestone.”

Throughout the industry, limestone is used today as it has been for centuries, for exteriors, architectural accents and fireplaces. But Devido sees one method changing. “They used to make [limestone] walls very thick; now they’re thinning it down because they have better insulation and you can do that,” he says. “And it works fine because limestone was always structurally strong.”

Devido adds that the fire safety aspect of using limestone as a building material also has been recognized. Following big fires in Chicago (1871) and Boston (1872), the government mandated that all newly constructed governmental buildings be built using limestone.

“You’ll find post offices in almost every state are made out of limestone,” Devido adds.

At the end of the day, limestone offers a reasonably priced, flexible and esthetically appealing option for commercial and residential construction.

“The flexibility of limestone is the biggest element of its widespread use,” Elkins says. ♦

Karen Snyder is a freelance writer.

Photo courtesy of Indiana Limestone Company



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Outside In

CONTEMPORARY INTERIOR DESIGN TRENDS

By Amy Meadows

ONCE USED IN ONLY THE MOST high-end custom applications, natural stone has become one of the most sought-after materials for residential and commercial interior design projects of all types and sizes. In fact, throughout the country, everything from granite and marble to limestone and travertine is making an appearance in homes, office buildings and commercial properties such as restaurants and hotels. It's being seen in clubhouses, community sales offices and banks. It's so popular these days that it's even being found in the interior design plans of hospitals nationwide.

Although a variety of trends have emerged in the way natural stone is being used in those settings, the material is far from trendy. "Once interior design gets past reality TV and quick fix decorator approaches to design problems, the solid elements remain – good use of texture, pattern, lighting, space planning and basic design principles," says Gary McCurry, IIDA, interior designer and showroom manager for Granite Mountain Stone Design-California in Fresno. "Natural stone has always been a material used in interior spaces and will continue to be a mainstay of good design."

There are several reasons for this. "We all yearn for a better balance with nature in our increasingly 'neon' world, and bringing stone indoors is bringing a natural element into our everyday sensory realm," explains Marcia Weese, director of design for 4240 Interiors, a division of 4240 Architecture Inc. in Denver. By bringing elements of the outdoors inside, McCurry adds, people are fulfilling "the need for materials that speak to quality, have a feeling of stability and impart a sense of time and history in today's fast-paced disposable society." Natural stone is enduring in both its

OPPOSITE RIGHT: Natural stone can be used to dazzle clients and attract future customers.





ABOVE: Natural stone helps create a spa-like atmosphere in master bathrooms – a design style growing in popularity among baby-boomers especially.

composition and its aesthetics, making it a perennial favorite in terms of design. What's more, he continues, natural stone products fit into the widespread and ever-growing "green" movement seamlessly, giving people the opportunity to select sustainable materials that are not only beautiful and timeless, but also beneficial for themselves, their families and the environment.

Of course, while natural stone has always been a popular tool for interior designers, recent advances in the industry have allowed it to be seen in an entirely new light, making it one of the more creative devices design professionals can use to enhance and personalize a space. According to Karen Ferguson, ASID, a designer with Harrison Design Associates Inc. in Atlanta, "The industry has changed, and

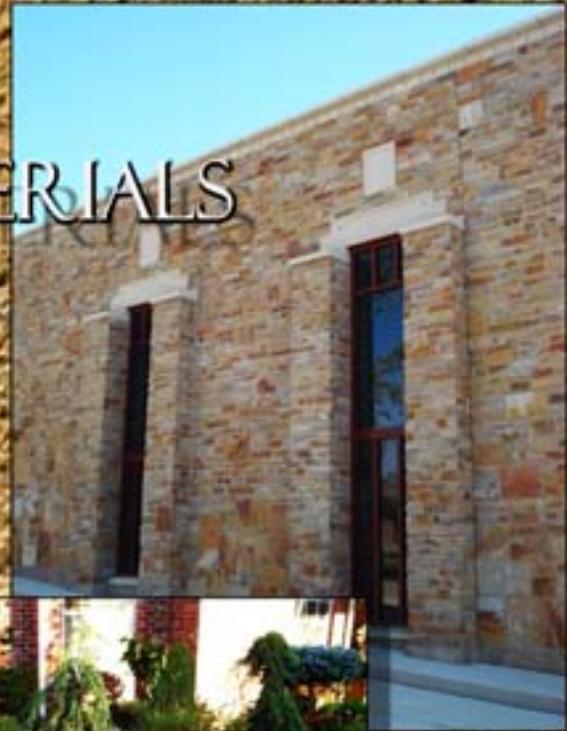
the options associated with natural stone materials and the areas in which to use them are virtually endless." Much of this can be attributed to the new fabrication technologies and techniques that have been developed and introduced to the market, notes Mark Fernandes, president of Charles Luck Stone Centers, headquartered in Richmond. It's those methods that have provided designers with an extensive palette of innovative finishes, textures and shapes with which to work and transformed a seemingly conventional material into a truly versatile and multi-faceted design element.

Home Sweet Home

In the past, natural stone was exclusive to the most upscale homes. However, Judith Sisler Johnston, president of Sisler

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Johnston Interior Design in Jacksonville and ASID allied member, reveals that the availability of materials such as granite and marble, as well as a considerable drop in price over the years, has made it possible for almost any homeowner to include natural stone in his or her design plans. “[Natural stone] used to be confined only to the world of the custom home market,” she asserts, “but now it’s even being seen in entry level markets.” Also, she observes, the demand for natural stone has increased significantly because “consumers are better educated than they ever were before” about the various ways stone can be incorporated into their interiors. And one of the first places they consider using it is in the kitchen.

Granite countertops are nothing new in regard to kitchen design. The sturdy material provides a perfect surface for the multipurpose space, and for food preparation in particular. But what has changed is the finish being applied to the stone. Homeowners have moved away from shiny polished granite and are going with other options. According to Weese, honed stone has moved into the spotlight. “It has to do with touch,” she says. “Honed stone feels softer and

warmer to the hand.” In addition, Fernandes indicated that granite featuring the leathered look is growing in popularity. And even marble and limestone are making their way into the kitchen. The trend is reminiscent of the styles found in Europe, where kitchens are not meant to be pristine and clean; a kitchen that has been used properly – to prepare large meals for family and friends – should look aged. The imperfections of natural stone provide that appearance. They also bring depth to the rest of the kitchen when stone is used in a variety of other ways.

“You can find natural stone everywhere in the kitchen except the cabinets nowadays,” Sisler Johnston notes. For instance, as Ferguson describes, “We are now fabricating sinks out of the stone that we are using on countertops – this allows for a seamless transition, as you do not have materials fighting with each other when you are trying to create a soft or restful palette.” Also, Sisler Johnston often applies four-by-four tiles of tumbled marble as a backsplash, turning them on a diagonal to fill in the space and complement granite countertops. Stone is even being applied to such design components as stovetop shrouds and entire floors, giving the kitchen a warm and welcoming ambiance. And



Photo courtesy of Charles Luck Stone Center



Photo courtesy of Sisler Johnston Interior Design

TOP AND RIGHT: Natural stone is being carried through the design of floors in commercial office buildings and used in corridors, bathrooms and other common areas.

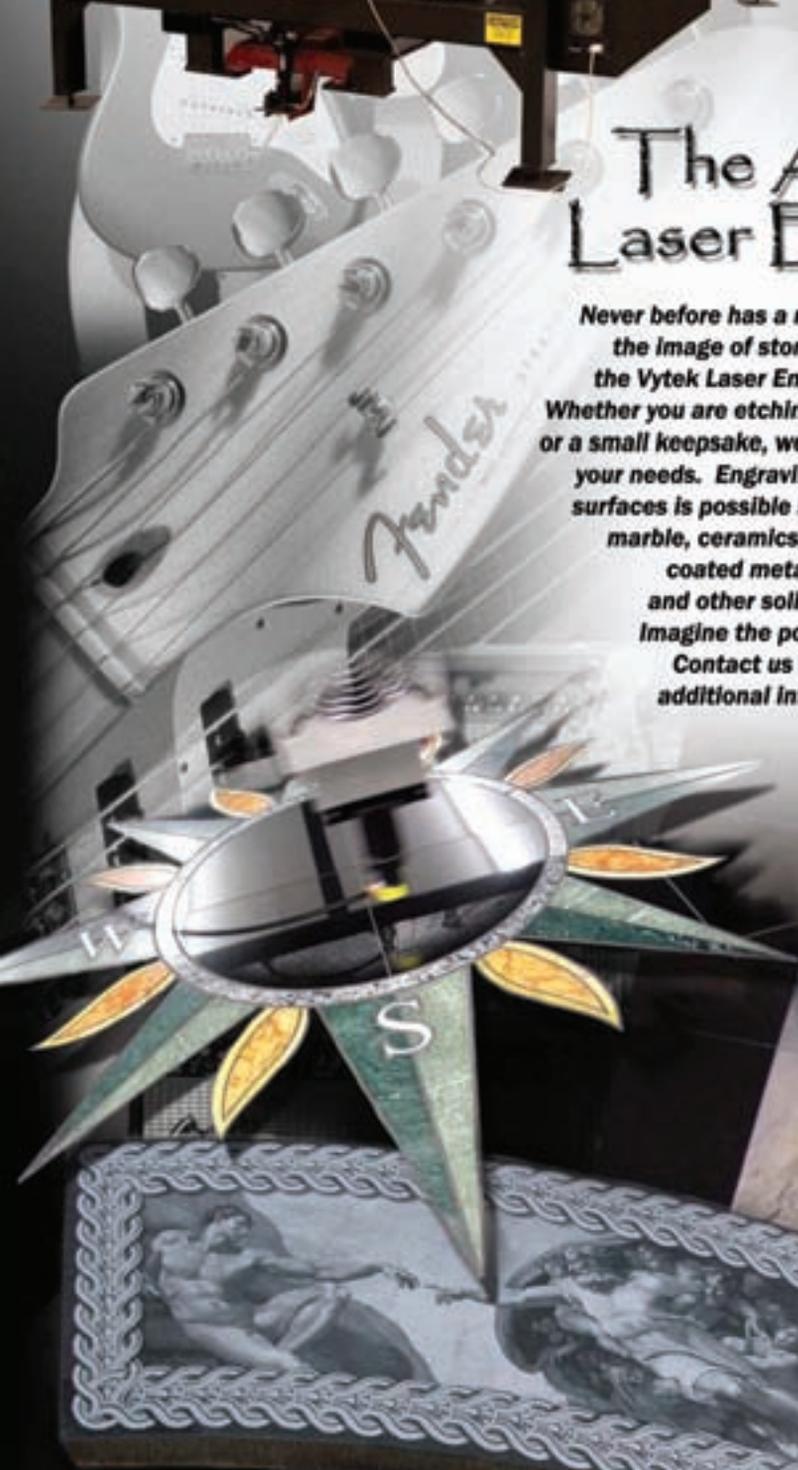
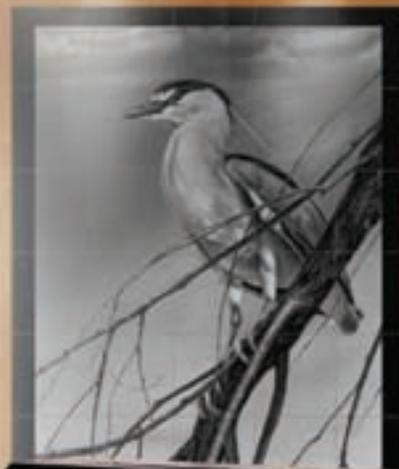
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Photo courtesy of Sisler Johnston Interior Design

ABOVE: The availability of materials such as granite and marble, as well as a considerable drop in price over the years, has made it possible for almost any homeowner to include natural stone in his or her design plans.

with techniques like sandblasting and laser etching, any design element made of stone can be personalized to fit a homeowner's taste, McCurry adds.

That same sentiment is being carried into the master bathroom, which has become a sanctuary for today's homeowners. According to Fernandes, many baby boomers, who travel to spas and resorts around the world, yearn to bring that aesthetic home and recreate the havens they discover while on vacation. He says, "The master bath is the new kitchen" in terms of how important the design of that space has become in recent years. "People want to create a real relaxing, spa-like atmosphere, so that's bringing

back neutrals and earth tones, as well as light-colored tumbled materials."

The vanity area and the floor are ideal places to incorporate natural stone, but it can also be brought into the shower and used on tub surrounds to produce a truly consistent look throughout the master bath. Furthermore, the walls are becoming a fashionable location for a wide array of stone products. "We're seeing more tile going up the walls instead of wallpaper in some bathrooms," Sisler Johnston comments. In fact, stone accent walls in powder rooms are seen much more often these days, as well as in other areas of the home.

Dining rooms, living rooms and entertainment spaces are being adorned with walls made of irregular flagstone, fieldstone, sandstone and even stacked stone. Bringing that natural outdoor façade indoors is a hallmark of architecture found in French chateau, English castle or Pennsylvania farmhouse designs, Fernandes observes. "It brings a warmth and classic sophistication to the space," he says, and it's something many homeowners are trying to duplicate in their own residences. The look is a wonderful accessory for a room with a traditional stone fireplace surround or a decorative stone alcove or one that's adjacent to a foyer that features stone floors. Furthermore, an accent wall can

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Photo courtesy of Charles Luck Stone Center

ABOVE: Designers and homeowners can collect ideas at showrooms such as Charles Luck Stone Center where this natural stone sink is on display.

be a very versatile design tool, as stone can change personalities depending on the materials and ornamentation that surround it. With natural stone, Sisler Johnston states, “You can get a rustic look. You can give it a western look, or you can give it a Mediterranean look. You can get a very formal ambiance or a very informal ambiance. You can get a décor that’s very traditional or a décor that’s extremely contemporary. It all depends on what other choices are made in the room.” And that makes stone an indispensable material for anyone who wants to create the look of their dreams in any room of their home.

Commercial Interests

Clearly, stone has had a major impact on the interior design plans of homes throughout the nation. But its influence does not stop there. “Natural stone is very applicable in commercial set-

tings,” declares Sisler Johnston. “Granite is used in almost every office building in the world because it is so practical and durable. It’s on the outside of buildings, as well as on the inside.”

When it comes to interiors, many office buildings are known for their beautiful lobbies, which feature wall-to-wall polished marble and granite for a very high-end effect. Recently natural stone has replaced the use of porcelain, which was thought to give a comparable look. However, Sisler Johnston continues, “I can walk into a building that’s 20 years old with porcelain and it’s dated. I can walk into a building that was done in marble and it’s not dated.” That may be why stone is being carried through the design of other floors in commercial office buildings and used in corridors, bathrooms and other common areas.

It’s also why the use of stone has become an interior design

trend in a variety of other commercial settings. "For professionals trying to differentiate themselves and make a statement, there isn't a better product than natural stone. It is the premier luxury material," Fernandes explains. "It helps establish a price point and say that this is a quality establishment." Restaurants have embraced this concept, using natural stone on the floors and adding it to reception areas, restrooms, bars and other guest spaces. On top of that, much like in homes, Weese says, "Restaurants are pulling stone from the floor up onto the walls. The stone wall can be lit in dramatic ways to emphasize the texture, again bringing the outdoors in." And this movement is not just happening in posh restaurants – even family



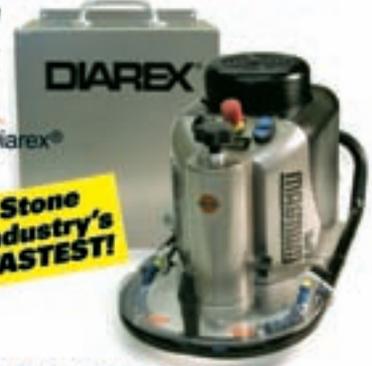
LEFT: For making a bold design statement, many believe there is no better product than natural stone.

Photo courtesy of Charles Luck Stone Center

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Photo by David Marlow, courtesy of 4240 Architecture Inc.

establishments and fast food restaurants are incorporating stone into their interiors. Fernandes mentions an Arby's in Richmond that used granite extensively in its design plans; the ambiance the restaurant created has allowed it to set itself apart from other well-known fast food chains and really pack in the customers at lunchtime.

Impressing consumers is an important strategy for any business, whether it's a bank, a resort or hotel, a neighborhood sales office or a community clubhouse or amenity center – which is why natural stone can regularly be found in these types of spaces on the floors, walls, counters and conference tables. But sometimes, natural stone is not only used to dazzle or attract potential customers. Oftentimes, it can be used to soothe people who find themselves in a sterile or seemingly cold environment, such as a hospital. Sisler Johnston has added granite countertops to nursing stations and natural stone accents to foyers, entry areas, lobbies, sitting rooms, community rooms and other waiting areas for family

members to bring a more comforting feeling to the spaces. That stone has even been used in some patient bathrooms, where Corian was once the predominant choice.

“When the price of granite came down to match the price of Corian, we started seeing some of these more expensive materials being used in more institutional and industrial-like settings,” she says. The trend is being found in hospitals across the country and does not appear to be losing any ground. And the same can be said for commercial establishments and locales from the East Coast to the West Coast.

Pressing On

“As an industry, we need to keep doing what we're doing,” Fernandes says. “The design community – from builders to homeowners – wants products that are unique and different. So we have to keep bringing new products to the market. If we do, then the future is going to be incredible for the industry.”

As people continue to gravitate toward natural products, there certainly will be a contin-



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Designer Education Series



OPPOSITE LEFT: In this project, 4240 Architecture Inc. chose Ashlar Rubble stone with a smeared grout joint. The stone was selected primarily due to its warm color, well-matched to the rustic old-world nature of the smeared grout technique.



Photo courtesy of Charles Luck Stone Center

ABOVE: Natural stone is becoming more commonplace in residential and commercial bathrooms.

RESOURCES

Karen Ferguson, ASID
 Harrison Design Associates Inc.
 Atlanta, Ga.
 404-365-7760
www.harrisondesignassociates.com

Mark Fernandes
 Charles Luck Stone Center
 Manakin, Va.
 804-784-6320
www.charlesluck.com

Judith Sisler Johnston
 Sisler Johnston Interior Design
 Jacksonville, Fla.
 904-288-0908
www.sislerjohnston.com

Gary McCurry, IIDA
 Granite Mountain Stone Design -
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ued and increasing desire for a myriad of natural stone options. And while natural stone is a limited resource, it's one that can and will stand the test of time and be a source of delight and pride for homeowners and business owners for years to come. "When people buy natural stone... it's a timeless look because it's so beautiful," Sisler Johnston concludes.

Trends come and go, but the use of natural stone will always be fashionable. Of course, it will be exciting to see the innovative ways it will be used in the future. Fortunately, the material has been around for millions of years, so there's plenty of time – and trend-setting – to look forward to. ♦

Amy Meadows is a freelance writer.

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NEW YORK'S ENDURING TWEED COURTHOUSE

By Christina B. Farnsworth



Photograph by Michael Rogol

ABOVE: The Tweed Courthouse restoration team repaired or replaced more than 1,500 pieces of marble across the entire building façade and replaced the entire 1,220-foot-long cornice, along with 335 modillions. To re-establish the main entrance, and to provide code-complying exits, the monumental Chambers Street stairway was rebuilt as the main entrance to the building.

THE BUILDING STONE INSTITUTE'S 2004 TUCKER award-winner, Tweed Courthouse, deserves recognition as New York City's second permanent government building (City Hall was completed in 1811). But that recognition rests on a lot of hard work and a great political story.

The hard work? The final, two-and-a-half-year push to complete the marble-clad building's total restoration. Architect Nancy Rankin said that the most difficult challenge was choreography to do so much work to

meet the deadline. Rankin, co-author of the 2006 Tweed Courthouse book, said the cornice had to be restored in the reverse of its original construction; the modillions, originally installed first, had to be installed last.

Choreography also involved sending stone from the defunct original quarry in New York to Georgia for cutting. Computer-driven machines carved the modillions in New Jersey. Rankin said Shi-Jia Chen, B & H Art-in-Architecture, Brooklyn, N.Y., spent a year and a half on site carving stone.

Photograph by John G. Waite Associates, Architects



ABOVE: Tweed Courthouse, constructed of Tuckahoe and Sheffield marbles, before the initial cleaning.

If one counts the feasibility study starting in 1989 and early restoration efforts, Tweed Courthouse took almost as long to restore as it did to build.

Tweed Courthouse was under construction for 20 years, from 1861 to 1881. The Civil War did slow construction, but even The Great Conflict was merely another opportunity for the Tammany Hall (the New York City Democratic Party political machine that controlled local politics up to the 1960s) political boss William Marcy “Boss” Tweed and his “Tweed Ring” to line their pockets with embezzled public funds. Showing his flair for self-aggrandizement, Tweed decreed the edifice should bear his name in perpetuity. And it does.

The total cost was \$11 or \$12 million – costs are understandably fuzzy given that no one knows exactly how much the Tweed Ring skimmed. The money scandal finally broke, stopping construction entirely from 1872 to 1876. In a rare demonstration of poetic political justice, Tweed was tried, convicted and sentenced in his own unfinished courthouse. He died in jail in 1878.

John Kellum, the original architect, produced a fashionable neoclassical design, including a monumental Corinthian portico. Kellum’s death in 1871 necessitated a new project leader, and Leopold Eidlitz carried forward, adding architectural elements of the newly favored Romanesque style. Thomas Little, a member of the New York

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Historical Feature

Photograph by John G. Waite Associates, Architects



ABOVE: The Georgia Marble Company quarry in Tate, Ga., supplied the replacement stone for the restoration.

City Board of Supervisors (as was Tweed), also is credited in the design.

New York City's Web site describes Tweed Courthouse as "Anglo-Italianate," an apt label for the Neo-classic/Romanesque stew that characterized American civic architecture after the Civil War. Others simply call the style "American Victorian." Whatever the label, the results were impressive.

Eidlitz made major changes, including changing an intended dome into a soaring octagonal rotunda topped by skylights. The rotunda extends from the first

floor to the roof. Its east and west sides feature cast iron stairs from the first to the third floors. The "marble" pillars on these floors are really painted plaster and the "wood" railings are actually cast iron. "The Guide to New York City Landmarks" describes the building's mid-19th century interiors as "some of the finest ... in New York" and 20th century moviemakers evidently agree. Tweed Courthouse has starred in films, including "The Verdict," "Dressed to Kill," and "Kramer versus Kramer."

A century of use, pollution, remodeling and neglect dimmed the grand dame. Street widening in the 1940s demolished the original entry. The entire building almost fell prey to urban-renewal rubble in the 1970s, but a reprieve from the National Register of Historic Places dubbed the courthouse a National Historic Landmark in 1976.

Even so, Tweed Courthouse's shabby grandeur stood in muted molder until restoration began in 1989. New York City commissioned a feasibility study by Mesick-Cohen-Waite Architects in 1989. Now John G. Waite Associates, Architects, the firm both completed the study and served as architect of record for the decades-long restoration. So complex and demanding was the project that both the architects and construction managers, Bovis Lend Lease LMB, established full-time offices on the site in 1999, Rankin says. First in a trailer on the site and then, in 2001, inside the building.

The exemplary restoration of Tweed Courthouse, now the new headquarters of New York City's Department of Education, took almost as long as the original construction and cost about 10 times more. A \$90-million appropriation in 1999 financed the massive final push. Restoration culminated in 2003.

Cleaning and restoring the marble facades emerged as an early restoration complication. Key issues were cleaning, stabilization and repair of nearly 10,000 pieces of marble cladding.

Marbles from Tuckahoe, N.Y., and Sheffield, Mass., originally graced the temple-like exterior (the base of the

Photograph by John G. Waite Associates, Architects

building is granite). But exposure to a 100-year spectrum of atmospheric pollutants had veneered the marbles with thick, black gypsum (calcium sulfate). Marble reacts with sulfuric acid in the presence of heavy metals, according to the book "Tweed Courthouse: A Model Restoration."

New York's notoriously heavy industrial and vehicle emissions were key pollutants, even though many of these originated hundreds of miles from the building. The toxic crust was an amalgam of magnesium, nickel, vanadium and iron with lesser doses of chromium, aluminum, potassium, titanium and copper.

Although the entire building suffered, the black crust was worst on the north and east faces. To make matters worse, the crust became a corrosive poultice, holding pollutants to the stone and promoting further damage. As deterioration progressed, stone chunks began to fall from the building, prompting officials to remove vulnerable elements such as Icanthus leaves in hopes of preventing accidents.

Even less obviously damaged stone displayed "sugaring," in which the stone's surface simply falls away like dissolving sugar. And then there was the staining caused by bird-proofing agents – and the bird guano left as those chemicals lost their effectiveness. What a mess!

Even before cleaning began, Gianetti Studios, Brentwood, Md., spent five months making molds of decorative trims from the now fragile building ranging from simple modillions to a frieze panel. Preserving the decorative continuity was tricky in part because some building elements simply were gone.

Professor Norman Weiss of Columbia University came up with the chemical recipe for cleaning without harming the building's exterior. It took nearly 30 test panels to find the best method. Most effective and least damaging was a custom-designed alkaline gel (pH of 14) followed by an acidic after-wash (pH of 1.2), the Tweed Courthouse book reports. Even so, working through summer into New York's winter of 1990 required continuing modifications.

Archaeological-level inspection began after the initial cleaning. Consulting structural engineers Robert Silman Associates inspected, identified and referenced every stone block in the entire building with a unique alphanumeric code while noting every block's appearance and condition. One letter in the code represented a building side, the other a specific building section followed by the number of each block.

Restorers also sought to retain a bit of the patina of age while replacing heavily damaged and unsound stone. Structurally sound stone that showed age stayed; weathered decorative stone with missing edges stayed, too. "Dutchmen" from new and salvaged stone replaced missing parts and made repairs.

Finding replacement stone presented another challenge. Some played out quarries had been filled in and built over – but not the Sheffield quarry. Though it had been closed 125 years and the quarry equipment was gone, it had not been filled in. Moreover, more



ABOVE: Window and wall details before restoration. Many of the marble decorative elements had been converted to gypsum by exposure to atmospheric pollutants and needed to be replaced by new stone.

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Historical Feature

Photograph by John G. Waite Associates, Architects

than 50 marble blocks lay scattered about the site. These abandoned blocks had been quarried for use in the Washington Monument, but the quarry operator was enmeshed in Boss Tweed's kickback scheme; Tweed's rising notoriety made the blocks politically unacceptable. The Monument order was canceled. The quarry land was now a farm. Rankin says the farmer was happy to sell the blocks, which were removed to Georgia for cutting.

Size was another issue. The Tuckahoe quarry had been known for very large blocks. Some original Tweed Courthouse cornice stones are 18 feet long. Today's stone cutting practices produce finished blocks between six and seven feet long.

Then, of course, came the challenge of color matching new marble to the remaining weathered original. Weathering samples from many quarries sat on the building's roof for nearly a decade to decide which would work best. Ultimately, Georgia White Cherokee won the weather test.

But by now it was 1999, and time to clean the building again. Brisk Waterproofing, Bridgefield, N.J., cleaned and restored, which included complete mortar removal and repointing.

"More than 1,500 pieces of stone were repaired or replaced. ...The entire 1,220-foot-long cornice, along with 335 modillions, was replaced," the Tweed Courthouse book reports. Replacement work included replicating the original entry staircase removed for the 1940s street widening. Today, 17 new Vermont granite steps lead to the Corinthian portico.

Inserting new stone utilized modern installation techniques. The cornice blocks, for example, are anchored to the building with $\frac{3}{4}$ -inch diameter, six-foot-long stainless steel threaded rods. Rods fitted with plates, washers and nuts at both ends connect from the mid-point of each block through the building to its attic. Stone adhesives attach old and new stones. A new roof replicates the original metal roof.

Just because a building is old doesn't mean it never had ventilation. Ventilation shafts in the walls circulated cool air from the courthouse basement throughout the building. Restorers used these shafts to route modern heating, ventilation and air conditioning systems.



The courthouse renovation included its 30 monumental courtrooms. Stripping 100 years of paint – up to 18 layers – revealed unexpected detailing in the ornamental cast iron and multi-colored patterns on the brick walls. Original paint schemes and marble and glass-tile floors popped into view throughout the building. New York has added the Tweed Courthouse interiors to its own list of historic landmarks.

Tweed may have raised political corruption to the status of art, but his love of massive public works schemes left some good in its wake. He improved water, sewage treatment and streets. And it is clear he loved stone buildings. His legacy includes other New York City landmarks, such as the Metropolitan Museum of Art, the American Museum of Natural History and the Brooklyn Bridge. ♦

Christina B. Farnsworth is a freelance writer.

ABOVE: The Chambers Street portico columns capitals during restoration. Craftsman anchored the newly carved sections to the original capitals using stainless-steel pins and epoxy adhesive.

RESOURCES

New York City Web site
www.nyc.gov/html/dcas/html/resources/man_tweed.shtml

"Tweed Courthouse: A Model Restoration," by John G. Waite with Nancy A. Rankin and Diana S. Waite. 170 pages, Norton, 2006.



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Survey Finds Architects Designing Green to Address Demand for Lower Building Operating Costs

Autodesk, Inc. and the American Institute of Architects (AIA) announced the results of the 2007 Autodesk/AIA Green Index, an annual survey that measures how AIA member architects in the United States are practicing sustainable design, as well as their opinions about the green building movement. The index shows that green building has taken a firm hold on the industry and has captured the attention of both architects and their clients. The 2007 Autodesk/AIA Green Index survey reports 70 percent of architects say client demand is the leading driver of green building and that the primary reason these owners and developers are demanding greener buildings is for reduced operating costs. Architects are responding by significantly increasing their use of sustainable elements such as high-efficiency HVAC systems, recycled building materials and using software to model energy usage.

Today's Green Building Landscape

According to the Autodesk/AIA Green Index, less than half of architects were incorporating sustainable design practices into their projects five years ago. However, this number is quickly rising with 90 percent of architects expecting to incorporate some sustainable elements by 2012. This rapidly growing adoption of sustainable design is in direct response to a strong client demand for green building, with 70 percent of this year's respondents citing client demand as the main driver pushing architects to go green. When asked to cite a reason behind clients' push toward green building, 64 percent of respondents cited the reduced operating costs that can be obtained through sustainable design as the cause.

"Buildings are the leading provider of greenhouse emissions, and in 2005 the AIA set a goal to reduce carbon emissions from buildings by 50 percent by 2010 and to achieve carbon neutrality by 2030," said AIA EVP/CEO Christine McEntee. "The results of the survey are encouraging, but there

needs to be a greater sense of urgency to make sustainable design the norm in the profession. To that end, we will be releasing additional resources in 2008 to better educate both architects and clients on best practices and benefits of green buildings."

The survey also shows that architects are making significant strides to meet their client demand for green building. Working to develop their sustainable design skills, 88 percent of respondents have received training or continuing education focused on green building. This year's Green Index also shows a significant increase in the practice of sustainable design since 2002. According to this year's survey, the industry has seen a 25 percent increase in the number of architects utilizing high-efficiency HVAC systems in their projects over the past five years. Other areas of growth include the use of highly reflective roofing materials, which has jumped 18 percent since 2002, and the adoption of energy modeling and baseline analysis, which has seen a 17 percent increase in that same period.

Moving the Industry Forward

While almost 75 percent of Green Index respondents believe that the building industry is headed in the right direction regarding climate change, and 54 percent believe architects are responsible for developing and implementing solutions to this issue, the survey also shows that there is still significant opportunity for architects to deliver on green building practices. Although 50 percent of architects reported having clients inquire about green building on the majority of their projects, only 30 percent of architects actually implemented green building elements in their projects. In addition, only 10 percent of architects are currently measuring the carbon footprint of their projects.

"We are encouraged that the 2007 Green Index shows a growing number of architects practicing green building," said Phil Bernstein, FAIA, LEED AP, Autodesk Vice President of AEC Industry Strategy and Relations. "Since only 10 percent of architects are currently measuring the carbon footprint of their projects, Autodesk recognizes a need to make this an easier and more efficient process using new and existing technology solutions. We look forward to continued cooperation with the AIA to help architects

use technology to design more environmentally responsible buildings."

When asked what green building efforts they expect to adopt in the next five years, over half the respondents said they will be using tools to enable the prediction and evaluation of the environmental impact and life-cycle of the building materials used in their projects, a 36 percent increase from today. Fifty-six percent of respondents also stated that they will be using design software to evaluate and explore alternative building materials to maximize energy performance and minimize their environmental footprint.

Research Methods

The Autodesk/AIA Green Index was conducted online by StrategyOne Research in October 2007 among 347 practicing architects in the United States. The architects were questioned on their use of 14 green design practices: five years ago, over the previous 12 months, and their expected use five years from now. The design practices were based on the U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) standards.

The architects who responded to the survey come from a mix of design practices. Forty-four percent are predominantly involved with commercial projects, 32 percent with institutional, 20 percent with single family homes, and 4 percent with industrial projects. Sixty-two percent of the architects have 15 or more years of experience. Additionally, 88 percent of the architects have received training or continuing education on the subject of green buildings. The full report is available on the Autodesk Web site at <http://www.autodesk.com/green>.

Entrepreneur of the Year Named

On Nov. 17, Manu Shah, chairman and chief executive officer of M S International Inc. (MSI), a leading distributor of natural stone, was named the Ernst & Young Entrepreneur of the Year 2007 national award winner in the Distribution, Manufacturing and Security category. Now in its 21st year, these awards recognize leaders and visionaries who demonstrate innovation, financial success, personal dedication and a commit-

ment to the community as they create and build world-class businesses.

Shah was recognized for turning a small business that he started in his basement into one of the largest distributors of natural stone in North America. Shah was honored at a black-tie gala in Palm Springs hosted by Jay Leno. Awards were given in nine other categories. All Ernst & Young Entrepreneur of the Year national winners were selected from approximately 400 regional award recipients by an independent panel of judges. Shah's national award follows being named the Ernst & Young Entrepreneur of the Year regional winner for the distribution category in Orange County, Calif.

In receiving the award, Mr. Shah noted, "...for a man who came to this country with \$210 in his pocket and \$3,000 of debt, this is a humbling experience..." He continued, "Natural stone has been for ages and remains an incredible job creation machine. It is one of the few industries today that continues to support the population in the rural regions of the world. I would like to dedicate this award to the millions of people belonging to the non-glamorous stone trade. They have brought us and continue to bring to us vivid, stunning, exquisite and affordable natural stones from far corners of the planet to our homes and businesses."

Shah further stated, "this award is truly a reflection of the ingenuity, hard work and consistent innovation of the entire MSI Team, which includes dedicated employees, our suppliers in over 33 countries, and devoted customers across the world. We continue to look forward to bringing growth, innovation and efficiency to the natural stone industry."

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Small Start Grows Large

After emigrating from Bombay, India, Manu Shah and his wife, Rika, started MSI in their Fort Wayne, Ind., home with a modest goal – to bring in some extra income to supplement Shah's earnings as a mechanical engineer. Shah had a brother in India who worked in the natural stone business, and Shah saw the possibilities of importing stone for use in monuments. Being a meticulous planner, Shah kept redefining those business possibilities and positioned the company to expand. And expand they did. A key milestone came in 1981, when MSI won the contract to provide black granite for the Vietnam Veterans Memorial in Washington, D.C.

After the company was awarded the contract, Shah left his position as a project engineer for International Harvester and joined the family business full-time. Three years later, he relocated the company to Southern California, believing it would be the ideal location for distribu-

tion. Shah positioned the company to expand into commercial and residential markets, just as demand for granite and other stone surfaces in homes began to grow. Since then, the company has opened seven natural stone super-centers nationwide and has amassed more than 2,000 recurring customers in all 50 states as well as Canada and Mexico.

The company has experienced strong growth each year since its inception 32 years ago. Despite the slowing housing market, MSI has seen growth of more than 100 percent since 2004. The family business now includes Shah's two sons and more than 400 employees.

MSI was founded in 1975 and is headquartered in Orange, Calif. MSI's product lines include granite, slate, marble, travertine, sandstone, limestone and other natural stone products from more than 33 countries on six continents. MSI maintains distribution centers in New Jersey, Atlanta, Chicago, Phoenix, Dallas and Boston with three additional branches scheduled for 2008. MSI also maintains purchasing offices in India, Brazil, Turkey and China. The company services a nationwide customer base, which includes more than 3,000 retailers, wholesalers and fabricators of natural stone. For additional information, visit www.msistone.com.

International Apprentice Contest a Success

On Sept. 21-22, 2007, the International Apprentice Contest was hosted by the International Union of Bricklayers and Allied Craftworkers (BAC) and the International Masonry Institute (IMI) at the John J. Flynn BAC/IMI International Training Center in Bowie, Md. The official dedication of the Training Center included the official naming of the new facility in honor of BAC president and IMI co-chair John J. Flynn.

Twenty-four winners, selected from 107 talented BAC apprentices who competed in eight craft categories including marble and stone, were announced at the contest banquet at the National Building Museum, where BAC and IMI attendees and contestants warmly welcomed guest speaker Senator Hillary Clinton. In addi-



Photo courtesy of the BAC/IMI

ABOVE: The John J. Flynn BAC/IMI International Training Center in Bowie, Md., was dedicated in September.

tion to congratulating the BAC contestants, Sen. Clinton accepted the International Union's endorsement for president.

"The Apprentice Contest shows how dedicated to their careers these young craftworkers are, and the new Training Center clearly demonstrates our union's and our contractors' commitment to the future," Flynn said.

The new \$30 million training center offers training on an international level to BAC members at all stages of their careers, along with education programs for contractors, designers and others. The 25-acre campus has an approved site plan of more than 240,000 square feet of training, classroom and office space.

For details on the International Apprentice Contest or to learn more about the John J. Flynn BAC/IMI International Training Center, go to www.bacweb.org or www.imiweb.org.

MIA 2007 Award Winners Announced

MIA Natural Stone Scholarship Award Winner

The Marble Institute of America, Inc. (MIA) announces the winner of its Natural Stone Scholarship Award: Alberto Garcia, a maintenance mechanic and fabricator for Castle Rock Marble and Granite Inc. of Bronx, N.Y.

Garcia's selection was based on a 500-word essay explaining his commitment to the natural stone industry and why he desires to continue his career in the industry.

The education scholarship covered travel expenses to StonExpo 2007, in Las Vegas, Nev., the natural stone industry's premier exhibition and educational event. "There is so much more I can learn," Garcia wrote in his essay. "I can

and want to continue to grow in the natural stone industry, promoting our products and motivating consumers through the sheer beauty of natural stone. I want to participate more and see where this career can take me."

"The Marble Institute of America is excited to recognize Mr. Garcia's commitment to the natural stone industry," stated Gary Distelhorst, executive vice president of MIA. "The intent of the MIA Natural Stone Scholarship Award is to provide educational opportunities for aspiring natural stone professionals, and the opportunity to expand one's knowledge."

Garcia was recognized at the MIA Awards luncheon in Las Vegas on Oct. 19.

2007 Pinnacle Award Winners

MIA's Pinnacle Awards honor projects that demonstrate exceptional beauty, creativity, ingenuity and craftsmanship in the use of granite, marble, travertine, limestone and other natural stones. The competition is open to MIA members around the world.

The winners were announced at the MIA's Annual Awards Luncheon in Las Vegas on Oct. 19, 2007, during the industry's trade show, StonExpo.

The 2007 Pinnacle Awards winners are:

- Commercial Interior Award of Excellence to Carnevale and Lohr of Bell Gardens, Calif., for the Creative Artists Agency in Los Angeles.
- Commercial Exterior Awards of Excellence to Intrepid Stone Contractors of Harvey, La., for the Schermerhorn Symphony Center in Nashville, Tenn., and to Henraux S.p.a. of Querceta (Lucca), Italy for First Citizens Bank Headquarters in Columbia, S.C.
- Renovation/Restoration Award of Excellence to Rugo Stone of Lorton, Va., for the renovation of the Basilica of the Assumption in Baltimore, Md.
- Residential Interior/Exterior Award of Excellence to Millennium Stone Ltd. of Port Chester, N.Y. for a master bath at the Signorelli home in Port Chester.

- A special Pinnacle Award of Excellence for Craftsmanship was presented to Carrara Marble Company of America of Industry, Calif., for its work on a new 12-story office building at 2000 Avenue of the Stars in Los Angeles.
- Two Awards of Merit were presented in the Residential Interior/Exterior category to Columbia Stone of Tualatin, Ore., for the Broadway Residence in San Francisco, Calif., and to Twin City Tile & Marble Company of St. Paul, Minn., for a private residence in Minnetonka, Minn.
- Two Awards of Merit were presented in the Commercial Exterior category for work on the Sacramento Temple in Rancho Cordova, Calif. The awards went to Bestview International Company of Wood Dale, Ill., and to KEPCO+ of Salt Lake City, Utah.
- One Award of Merit in the Commercial Interior category went to Rugo Stone, LLC of Lorton, Va., for the Dewey Ballantine offices in Washington, D.C.
- A Restoration/Renovation Award of Merit was presented to Camarata Masonry Systems of Houston, Texas, for its work on the 919 Milam Building Garage Conversion in Houston.

To view a copy of the 2007 Pinnacle Awards brochure, which depicts the winning entries, or to see the actual awards presentation please go to www.marble-institute.com/awards.

AGI Announces 2008 President

The American Geological Institute (AGI) is pleased to announce Dr. Peter J. McCabe as its new president. He was inducted on Oct. 30 at the Geological Society of America annual meeting in Denver, Colo.

McCabe received a bachelor's in geology from the University of Hull and then his Ph.D. from the University of Keele,

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both in the United Kingdom. He has worked as an assistant professor at the University of Nebraska, as a research geologist for Exxon Production Research Company, and was manager of Coal Geology for the Alberta Research Council. From there, he spent 20 years at the U.S. Geological Survey in Denver where he directed a project to study Cretaceous strata of the Western United States and was active in assessing world oil and gas resources. Currently, McCabe is working for CSIRO in Sydney, Australia, where he is the theme leader for the Petroleum Resources Division and is studying the petroleum potential of frontier basins.

In addition to his involvement at AGI, he has been active in a number of geoscience organizations including, the Society for Sedimentary Geology (SEPM), Geological Society of America, and American Association of Petroleum Geologists.

Founded in 1948, AGI provides information services to geoscientists, serves as a voice of shared interests in the profession, plays a major role in strengthening geoscience education, and strives to increase public awareness of the vital role the geosciences play in society's use of resources, resiliency to natural hazards and interaction with the environment. ♦

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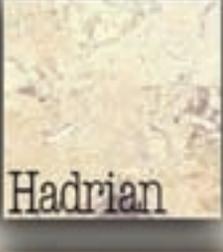
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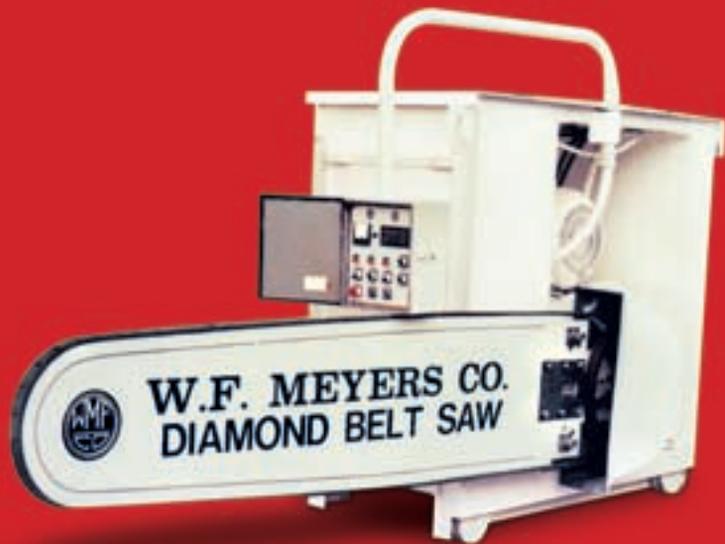
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