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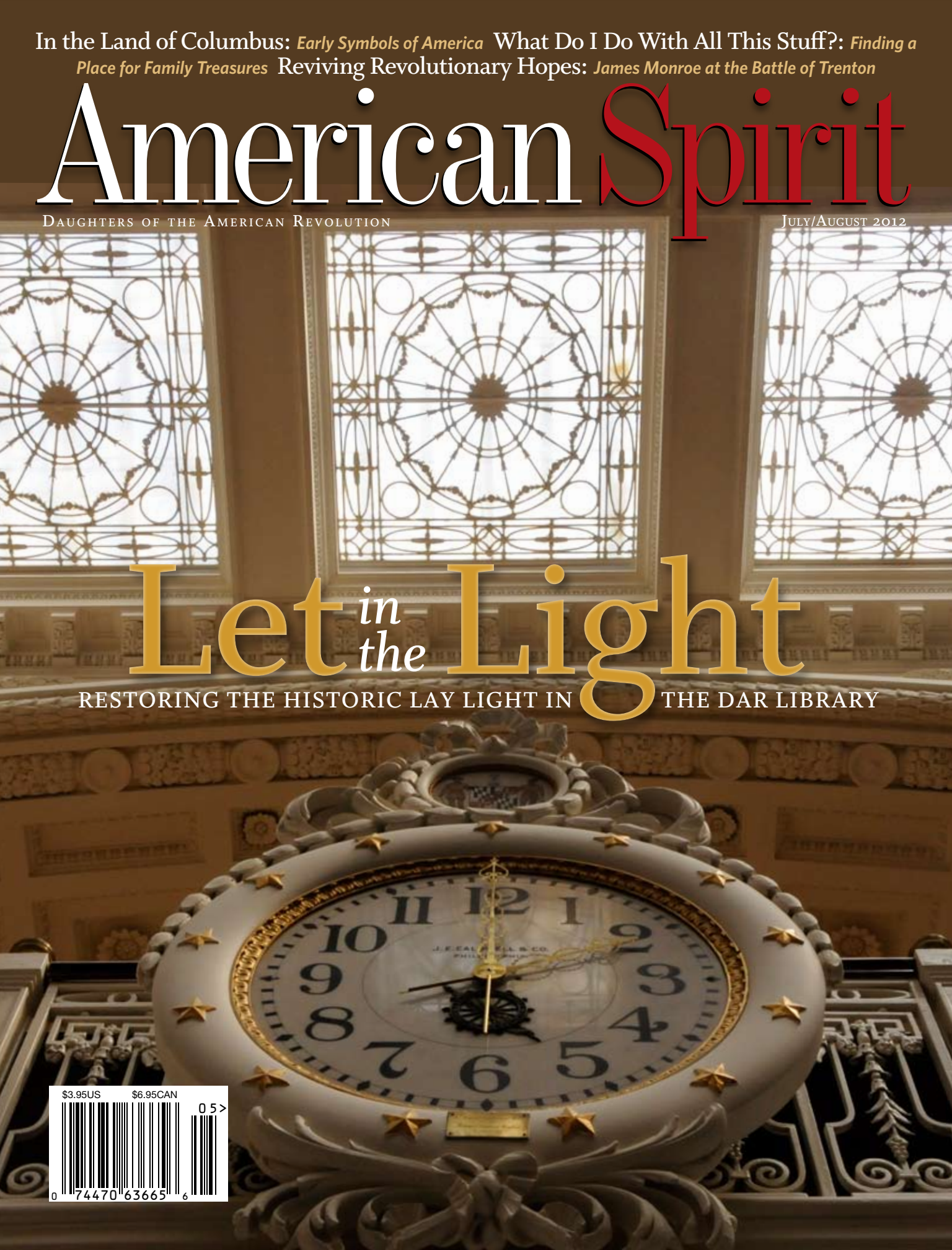
Daughters of the American Revolution

July/August 2012



Let in the Light

RESTORING THE HISTORIC LAY LIGHT IN THE DAR LIBRARY

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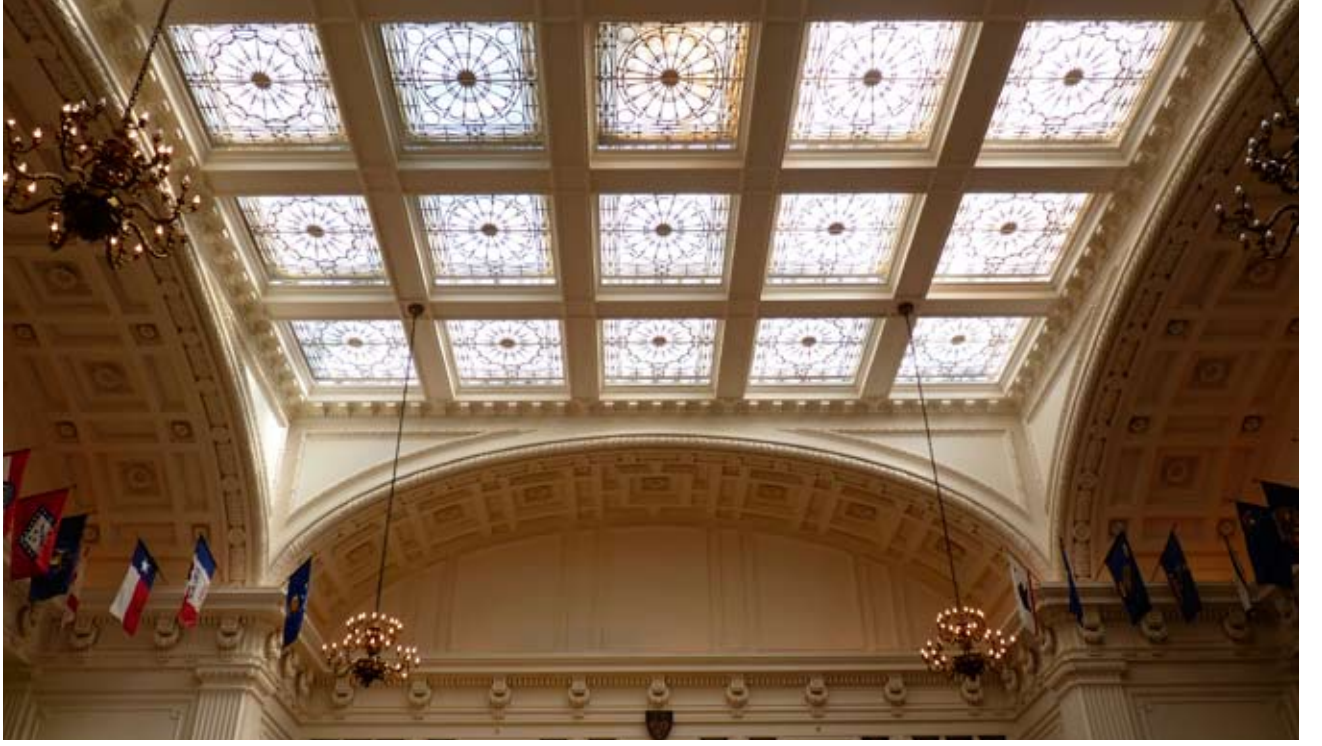
LET IN THE LIGHT

Restoring the Historic Lay Light in the DAR Library

By Courtney Peter

When natural light filters into a building from above, undulations in intensity highlight the interplay between sun, wind and clouds, drawing an element of the outdoors inside. Any skylight can be a capable conduit of natural light. But in some historic buildings—including Memorial Continental Hall, the oldest of the three buildings in the DAR Headquarters complex in Washington, D.C.—a skylight merely shields from the elements a decorative leaded-glass feature beneath it, called a lay light.



MEMORIAL CONTINENTAL HALL'S 25-paneled, leaded-glass lay light floats nearly 50 feet above a space that first served as an auditorium and now houses the DAR Library, a renowned genealogical research center. While Daughters, staff and the public have admired its brilliance for more than a century, few considered the historic fixture's provenance or its ability to withstand the effects of time—until recently.

Last fall, searches for the source of a water leak in the DAR Library and possible damage caused by the Virginia earthquake led upward, to the lay light. The comprehensive structural assessment that followed, performed by Quinn Evans Architects, revealed that the lay light had reached a state of advanced deterioration. The effects of temperature fluctuation, gravity, water leaks and dust accumulation left its metal framework weakened and its glass panes marred by cracks and stains.

According to Baird M. Smith, director of preservation for Quinn Evans and principal on the Library lay light project, it is not unusual to make such a discovery by accident. "Nonprofits, churches and governments can't do maintenance as often as they want to," says Smith, who adds that evidence indicates the Library lay light has been repaired at least twice.

Limited accessibility also can deter regular upkeep. "Much of the nation's stained glass and leaded glass has recently passed, or is quickly approaching, its 100th anniversary—yet much of this glass has not been cleaned or repaired since the day it was installed," write Neal A. Vogel and Rolf Achilles in their brief, "The Preservation and Repair of Historic Stained and Leaded Glass."

In recent months, with its critical condition exposed and a $1.6 million restoration looming, the lay light has been examined in exhaustive detail. Gaining a greater understanding of the lay light's composition and environment is an essential step toward the creation of a customized restoration plan that can produce lasting results.

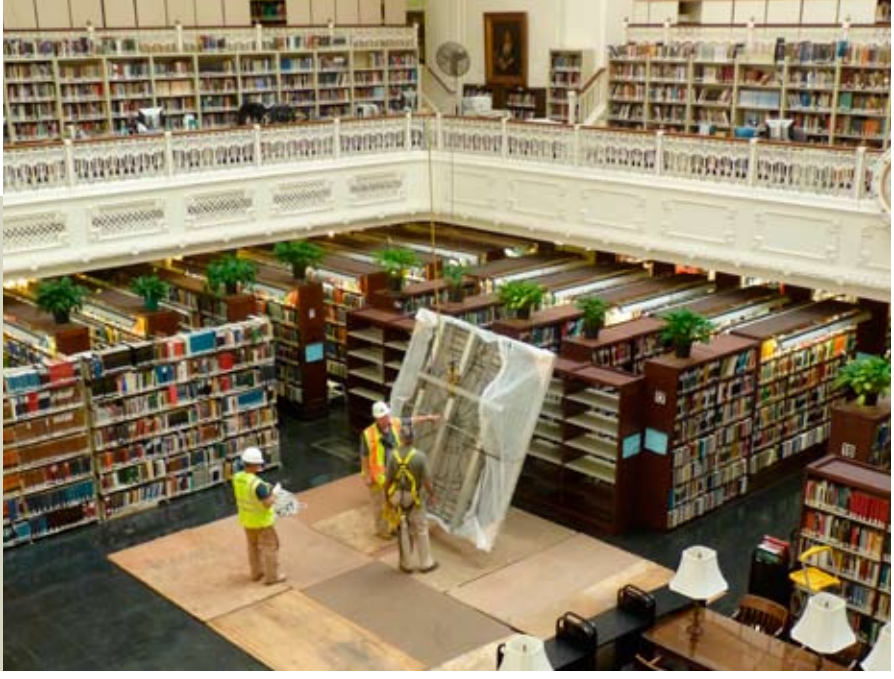
'Our Temple of Patriotism'

In terms of design, Memorial Continental Hall is a product of its era. As the 19th century waned, the White City that Chicago constructed for the World's Columbian Exposition of 1893 impressed the nation with buildings faced in brilliant white stone. The resulting City Beautiful movement propelled Beaux Arts Classical architecture to popularity. French for "fine arts," the style mined inspiration from ancient Greece and Rome, as well as 18th-century England and France. Every available surface presented an opportunity for embellishment.

Also during the late 19th century, the domestic glass manufacturing industry boomed. Freed of the cost concerns and Puritan design sensibilities that had guided the use of glass toward functional rather than ornamental applications, decorative windows, transoms, sidelights, skylights and lay lights became more prevalent. "Stained glass domes and ceilings were very popular throughout the Victorian and Classical Revival periods. They are often principal interior features of churches, hotels, restaurants, railway stations and civic buildings," write Vogel and Achilles.

As these trends converged, members of the Daughters of the American Revolution, formed in 1890, dreamed of building a home of their own. They compiled a list of requirements: Its main feature should be an auditorium with a maximum seating capacity of 2,000; it must serve as both a monument to the heroic men and women of the Revolution and as an administration building for the National Society; and it must be fireproof, to safeguard the organization's relics and documents. From the early planning stages, it was determined that the building also should contain a lay light.

> The Stars of Liberty are above us; beyond them stretch the eternal years of God in which we may rejoice for the work done within these sacred walls, our Temple of Patriotism.
>
> – Harriet M. Lothrop, DAR member and C.A.R. founder



The first lay light panel was lowered to the Library floor April 20, 2012, in preparation for disassembly, restoration and reconstruction by consulting historic glass experts at Femenella & Associates of Branchburg, N.J.

With encouragement from Senator James McMillan, leader of a Senate committee charged with reviving and expanding Pierre L'Enfant's original city design, DAR purchased land in Northwest Washington, D.C., bound by 17th, 18th, C and D streets. Having secured a site, the National Society held an architectural competition to solicit designs. The winning entry was submitted by architect Edward Pearce Casey, who studied at the École des Beaux-Arts in Paris and supervised the interior work on the Library of Congress following the dismissal of the original architects. Casey's Beaux Arts design aligned perfectly with the McMillan Commission's vision for 17th Street as "one of the great park approaches, and a thoroughfare of importance."

The cornerstone of Memorial Continental Hall was laid on April 19, 1904, during the National Society's 13th Continental Congress. By 1910, the building was complete. In offering greetings to the Continental Congress that year, DAR member and Children of the American Revolution founder Harriet M. Lothrop directed gazes toward the lay light when she said, "The Stars of Liberty are above us; beyond them stretch the eternal years of God in which we may rejoice for the work done within these sacred walls, our Temple of Patriotism."

Uniting Form and Function

In Casey's blueprints, the lay light is easy to locate. Each of the 25 panels measures approximately 9 feet by 8 feet and weighs about 400 pounds. One of three slightly different stylized scrollwork motifs rendered in metal and affixed to the underside of the glass decorates each unit. The 16 panels in the outer ring share the same design, as do the middle eight panels, while the center panel features a unique ornamental pattern.

DAR Museum Curator Patrick Sheary explains that the Neoclassical design of the panel ornaments is of British origin. "We often call the lay light 'Adam-esque' after 18th-century British architect Robert Adam. You'll see skylights that look similar in English country architecture, particularly with ovals and pointed squares."

The panels themselves are made of rolled glass and a matrix of zinc cames, grooved metal rods that hold the panes of glass together. Machine-rolled glass, first seen in 1888, is relatively rare, according to Smith, who says that only a small number of manufacturers produced it. Fabrication involved pouring molten glass onto a flat surface, and then passing it between two rollers. This method yields textured, translucent glass that is useful in applications that do not require transparency—for example, to obscure the structural framework in the attic between a skylight and a lay light.

A pyramid-shaped, modern skylight above the lay light protects the intricate glass configuration. "Leaded glass cannot be sufficiently weatherproofed in a horizontal (or arched) position," Vogel and Achilles explain. "It must always be protected by skylights or 'diffusers'—rooftop features that diffuse the natural daylight and protect the leaded-glass ceiling or dome from the elements." A network of metal supports gives the attic space between the lay light and the skylight an industrial look that contrasts sharply with the view from below. In tandem, the skylight and the rolled glass, which allows between 50 percent and 80 percent light transmission, achieve the desired gentle glow. As a passage from the April 1911 issue of *American Monthly Magazine* describing Memorial Continental Hall explains, "The ground glass in the ceiling … softly admits the daylight."

The building utilized electrical light from the beginning; the four gilded, cast-bronze chandeliers suspended from the DAR Library ceiling are original to Memorial Continental Hall. But in the early 1900s, when "electricity wasn't expected to do as much as it is today," as Sheary says, the sunlight was a helpful supplement. Casey exploited this benefit elsewhere

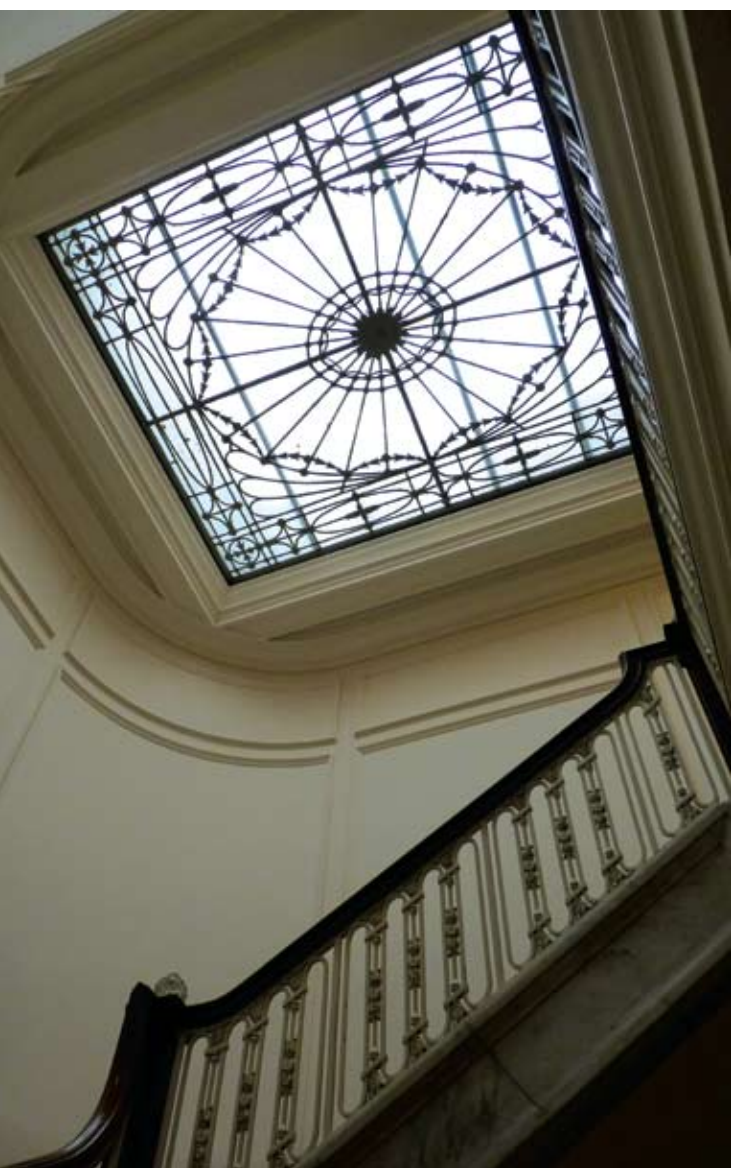
SCOTT BRAMAN AND BREN LANDON

too, boosting visibility in the building's two main stairwells by including an additional lay light panel above each one.

Initially, the National Society planned to replace the rolled glass with stained-glass renderings of the various coats of arms of the states and chapters that sponsored the cost of the panels. The idea was later abandoned.

"Last Congress referred the matter of leaving these squares of glass as they are, white, to the Continental Hall Committee for action, and a motion to that effect was adopted at the Committee meeting in October," note the minutes of a Memorial Continental Hall Committee meeting held February 3, 1910.

The role the lay light once played in the building's ventilation system is less obvious. Pathways for ventilation were incorporated into the design of the building. The decorative, plaster-encased steel beams between the panels appear to form a solid grid. But a booklet on Memorial Continental Hall dating to 1915 explains that, "A narrow opening around this glass roof, with large windows on the north and south sides of the galleries, provides ample ventilation." Pocket doors on either side of the Library open to long, narrow galleries in



Above: The attic between the lay light and the skylight houses a network of structural supports.

Near left: Some panels, such as this one, exhibit severe staining.

Far left: A single lay light panel helps illuminate each of the two main stairwells in Memorial Continental Hall.

which French doors, each topped by a transom, access the building's North and South Porticos. Opening the transoms and pocket doors allowed air to circulate into the attic above the lay light and, finally, to an exhaust fan inside the wooden cupola that sits at the peak of the skylight. "The transoms acted like a chimney," says DAR Museum Director Diane Dunkley. "Air would escape through the lay light and the cupola."

Preparing for a Critical Restoration

Protected as it is from the brunt of the elements, it may seem as if the lay light serenely rests within its framework, entirely free from agitation. In reality, "The lay light has been failing for a long time," says Baird Smith.

Gravity and thermal expansion and contraction stress the zinc cames, eventually leading to metal fatigue. The initial lay light evaluation provided by Quinn Evans explains, "Because this glass assembly is in the horizontal orientation, gravity forces on the glass are constantly pulling downward. When the cames are heated by the solar exposure from the skylight above, the whole assembly is strained."

Improperly placed support wires added during an attempted repair put even more pressure on the cames. As cames deteriorate, so does their ability to hold the pieces of glass in place. The metal warps and the glass shifts, causing deformation, or deviation from a true horizontal plane. In the worst spots, the lay

light exhibits a dangerous degree of deformation—more than 2 inches out of plane. "When bulges exceed 1 ½ inches," Vogel and Achilles write, "they cross into a precarious realm; at that point, glass pieces can crack from severe sagging and pressure." Panes of glass in the Library lay light have cracked, but fortunately they have remained in place.

A lay light's metal framework is more likely to fail than the glass itself. "Cames are intended to be a sacrificial element of a glass unit assembly, as mortar is to brick and paint is to wood," write Vogel and Achilles. "A came typically lasts 75 to 200 years, depending on quality, design and environment."

the fan when the attic air reaches a preset temperature. The cupola itself will be sealed to ensure that it is watertight.

Deliberation and analysis remain critically important as the restoration gets under way. On April 20, 2012, an initial panel was removed for testing purposes. The contractor used a pulley system to first raise the panel then tilt it, allowing it to pass through its own frame on its descent to the Library floor. Usually viewed from a distance, at ground level the panel's enormous size was evident, providing an appreciation for the physical scale of the restoration. Before it is complete, 26 additional panels must repeat the same journey and return to their ceiling settings. At



Left to right: Debris has accumulated on top of the lay light panels. It is possible that the shards of glass can be traced to previous skylight damage or repairs. • Improperly placed support wires installed during a repair decades ago put additional stress on the zinc cames. • The glass panels sit about 5 inches above their plaster-encased steel frames, allowing air to flow upward and escape through the cupola above.

In addition to its structural problems, the lay light also has suffered staining due to dust accumulation and water damage. The dust that has collected on the horizontal surface of the glass has darkened large areas, some severely. Water enters through the cupola, which is no longer able to block rain out completely, worsening the discoloration.

The restoration team developed a plan to repair the damage to the lay light and address the contributing causes. It will be an immense undertaking designed to yield lasting results, and this delicate work cannot be done hastily. The restoration is expected to extend to spring 2013. The team will strive to minimize the impact on normal Library operations, in part by working at night, which has the added benefit of reducing workers' exposure to the attic's brutal daytime temperatures.

Each lay light panel will be removed, shipped to the studio of a firm with expertise in lay light repair and conservation, disassembled and reconstructed using newly fabricated cames three times stronger than the originals. All viable, unbroken original glass will be reused.

The attic, skylight and cupola will receive upgrades too. Improved access to the attic is needed to enable easier maintenance and cleaning in the future. Currently, a small hatch in the skylight must be unsealed each time the attic is accessed. The exhaust fan in the cupola, which is currently nonoperational, will be repaired and connected to a thermostat that will activate

the time Memorial Continental Hall was constructed, the entire lay light cost $4,000. Today the cost of restoring a single panel is estimated at more than 10 times as much.

The disassembly, restoration and reconstruction of the first panel, estimated to take four weeks, will determine whether the team is on the right track, Smith says. At this point, some questions remain. For example, "Because the lay light glass is so dirty, you can only see shadows of the structure above," says Smith. "When the glass is cleaned, we're concerned that structural supports will be much more visible, perhaps disruptive." If that proves to be the case, translucent sheeting could be installed over each panel to soften the light and collect dirt.

As the trial panel reconstruction reveals the answers to lingering questions, the DAR and the restoration team prepare to proceed. The expense is substantial, but the restoration aligns closely with the three founding tenets of the DAR: historic preservation, education and patriotism. When the lay light is restored, a signature feature of the organization's historic home will be preserved, allowing researchers to continue to benefit from the educational resources of the DAR Library, located in the National Society's original Temple of Patriotism, in which generations of members have taken so much pride.

For information and updates about the DAR Library lay light restoration, visit **www.dar.org/laylight**.

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LOOK UP

Many historic lay lights dating to the turn of the 20th century are still in place today. "Leaded-glass panels survived in uncommon numbers throughout the country, and are now once again appreciated as virtually irreplaceable features of historic buildings," Neal A. Vogel and Rolf Achilles observe in their brief "The Preservation and Repair of Historic Stained and Leaded Glass." Lay lights can be found in churches, museums, hotels, railway stations and civic buildings across the country, so the next time you find yourself in one, be sure to look up. The following list provides a small sampling of historic lay lights.

Baltimore Penn Station, Baltimore, Md.

A number of early 20th-century train stations glamorized rail travel with elaborate designs, some of which incorporated lay lights. The stained-glass lay light in Baltimore Penn Station's main entrance area is considered one of the most magnificent features of the building, which celebrated its centennial last year. Lattice-patterned rectangular mosaics separate large pieced circles, resulting in a long, narrow form. During World War II, the fixture was painted black due to the threat of air raids. It was restored in the early 1980s.

Bayonne Community Museum, Bayonne, N.J.

The original tenant of this Beaux Arts Classical structure, designed by architect Lansing C. Holden Sr. and opened November 8, 1913, was the Bayonne Trust Company. A succession of subsequent banking occupants followed before the building was sold to the city in 2001. Currently, the space is in the process of being converted into a museum. According to the Bayonne Community Museum, the interior lay light, which was restored in 2008, "features a garland of fruit and leaves, symbolizing wealth and abundance that is appropriate for a bank of its kind."

Unity Temple, Oak Park, Ill.

The linear design of Unity Temple's lay lights differs drastically from the other elaborate examples, but the deviation can be explained simply—they were designed by Frank Lloyd Wright. After a fire destroyed the church's original Gothic Revival building, Wright, whose mother was a friend of the church's pastor, volunteered to design its replacement. His nontraditional temple, dedicated September 26, 1909, employs a cubist design and is made of poured, exposed concrete. The sanctuary sits at the center of the building, away from exterior views. To forge the connection to nature central to Wright's Prairie School aesthetic, his lay lights use glass in shades of green, yellow and brown to conjure images of the outdoors.

The Library of Congress, Thomas Jefferson Building, Washington, D.C.

The design of the Library of Congress' Jefferson Building, opened to the public in 1897, was modeled after the Paris Opera House. The structure overflows with Classical detail to the point of near-sensory overload. In the Great Hall, the coordinating designs of the Italian marble floor and stained-glass lay light bookend the ornamentation between. A decorative scale pattern rendered in red and yellow marble on the floor is reflected by the six lay light panels, which introduce blue into the palette. (See below.)

The Plaza Hotel, New York City, N.Y.

New York City's iconic luxury hotel would not be complete without its own breathtaking lay light, yet for decades the signature feature of the Palm Court restaurant in the lobby was absent. When the hotel debuted in 1907, the Palm Court sat beneath a partially domed, stained-glass lay light decorated with a central medallion, twisting vines and a latticed outer frame. Its original glass and iron framework was removed about mid-century when air conditioning was installed. "The loss or unsympathetic alteration of leaded-glass ceilings and domes is a widespread problem," write Vogel and Achilles. The Plaza was just one example. As part of a restoration in the mid-2000s, a team consulted old photographs in order to recreate the Palm Court lay light, which once again floats above the dining area. (See below.)

The Hermitage Hotel, Nashville, Tenn.

Nashville's opulent Hermitage Hotel, designed by Tennessee architect John Edwin Ruethven Carpenter, opened in 1910. Named after Andrew Jackson's nearby estate, the hotel was a focal point of the city's social, political and musical scenes for decades. In the vaulted lobby, massive columns point attention toward the ceiling, where a frame of 16 panels surrounds a central nine-paneled, stained-glass lay light, forming a canopy above visitors. An attempt to control leaks left the light smothered in black tar, but a 1980 restoration uncovered the multicolored mosaic.