



Photos: Curt Clayton

Prior to the restoration, the room's dirty ceiling and dusty antique fixtures resulted in poor lighting.

# GOTHIC REVIVAL

A library at the University of Michigan was dark and dismal before a lighting renovation brought back its grandeur

BY ELIZABETH HALL

According to an AIA study, the Cook Legal Research Library at the University of Michigan Law School ranks among the top 150 most admired architectural works in the country. But prior to January 2009, visitors wouldn't have been able to tell by looking at its reading room. Built in 1931, the room had undergone only one renovation in the 1950s, when downlights were installed in the ceiling. Over the years, the room's nearly 50-ft-high ornate decorative ceiling had turned brown with dirt



After the restoration, the ceiling's reflectance doubled. Uplights and newly restored and relamped fixtures add light and life to the space.



The bare-bulb, bronze chandeliers were relamped with 30-W 130V frosted incandescent lamps linked to dimmed 120V circuits.

and grime and its antique lighting fixtures were hidden under layers of dust. What had once been a masterpiece of Collegiate Gothic-style architecture had become “a dark and dingy space,” says Rob Yallop, project manager and preservation planner, Lord, Aeck & Sargent, Ann Arbor, MI.

That all changed when the school received a \$5 million donation from Charles T. Munger, vice chairman of Berkshire Hathaway, Inc., with instructions to relight the library, which is listed on the National Register of Historic Places. After visiting the space, Munger had been struck by the poor quality of the lighting and its effect on the ambiance. He wasn't alone. Students from the university had reported symptoms of eyestrain after long hours of studying in the room, notes lighting designer Gary Steffy, principal, Gary Steffy Lighting Design, Ann Arbor. What had begun as a problem of aesthetics had grown into a literal eyesore.

To return the room to its former glory and make it more comfortable for users, Steffy focused on key quality-of-light

aspects like balancing luminance levels, increasing light uniformity at the task level, and improving color temperature and color rendering. At the same time, the university was concerned about ease of maintenance, saving energy, sustainability and budget. Most of all “the client was very clear that the space should exude the same degree of landmark status and credibility it started with. That meant we weren't coming in with a modern-day reinterpretation of lights,” explains Steffy. From an architectural standpoint, the goal was similar: “Leave the room much like you found it; tread lightly on the existing architecture,” claims Yallop. Along with historic lighting vendor, Crenshaw Lighting, and electrical contractor, A.F. Smith, Steffy and Yallop worked with the original architecture and lighting to create a dramatic transformation that maintains the historic character of the original space, but leaves it looking better than before.

#### FROM DARK TO LIGHT

Central to the transformation of the reading room was the restoration of the ceiling, which was so dark that “we couldn't tell if it was due to the finishes and decoration of the ceiling or whether it was just dirt,” says Steffy. When combined with “luminance ratios from the task areas and windows to the ceiling that were quite extreme,” the ceiling's nearly non-existent reflectance resulted in a dearth of brightness. After running calculations, Steffy realized that a 100 percent increase of light could be gained by increasing the ceiling's reflectance from 5 to 10 percent. Since the ceiling offered a potentially significant increase in luminance, the team began the process of restoring it to find out what lay underneath.

The first step of the restoration was cleaning. To clean the ceiling without damaging sensitive paints and finishes, the conservator worked with a solution made from 5 percent citric acid and de-ionized water, often used in fine art restoration. After the cleaning was complete, the ceiling's composition was revealed. Though it “resembles a large timber roof structure,” says Yallop, it is actually made of plaster with faux-painted details. The team also found that their estimations about the reflectance had been correct; it had doubled from the cleaning.

The second step of the restoration included repairing water-damaged areas and retouching areas with miss-

ing paint or discoloration from leaks. Additionally, the downlights that had been installed in the 1950s were removed. Having offered little functional light on the floor plane, the downlights were also fitted with short-life halogen lamps that required frequent relamping—a major maintenance concern given their hard-to-reach location. Decorative plaster medallions that had been taken down to accommodate the downlights were recreated and replaced.



Brass table lights (left) are fitted with 28-W T5 lamps and linked to a daylight control system for reduced energy output. Now fitted with dedicated-socket, 18-W CFLs, the stack lights have a 20,000-hour life and better light distribution.



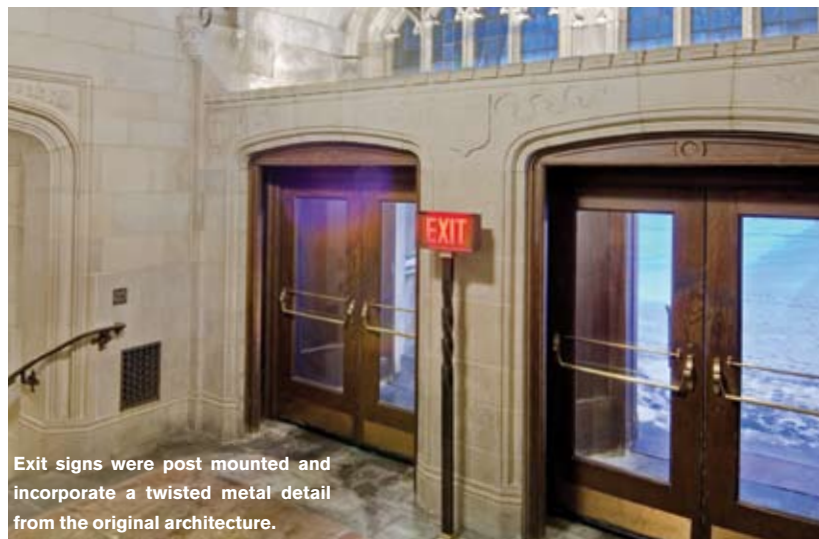
Even with the reflectance added from the cleaning, Steffy didn't feel the ceiling was bright enough: “We thought that more light on the ceiling would further help balance the luminances.” After considering several possibilities that involved adding extra hardware and visible wiring to the antique chandeliers suspended from the ceiling, the team came up with a solution that would blend seamlessly into the existing architecture. Uplights placed on the window sills are hidden by valance-like metal screens. The valances are faux-painted to match the limestone walls, so “you don't know where the limestone ends and the valance starts,” notes Steffy. Additionally, the arrangement hides snoots placed on the lamps to eliminate spill light and incorporates new HVAC diffusers, which replaced simple but visible quarter-round sheet metal deflectors. A.F. Smith performed minimally destructive testing to find voids in the limestone veneer walls where conduit could be routed behind the 13-ft-high oak wainscot.

To provide “a significant punch of light given the distance of throw from the sills to the ceiling,” Steffy looked for a lamp with 3,000K color temperature, more than 80 CRI and a relatively long lamp life, which “pushed us right to ceramic metal halide.” The uplights pair 39-W PAR20 CMH lamps (GE) with theater footlights from RSA Lighting to achieve the desired punch. After several mock-ups, the lights were installed and the ceiling transformation was complete.

#### HISTORIC FIXTURES

Like the ceiling, the antique fixtures had been dulled by age. “The original fixtures had developed patina and looked dirty,” explains Yallop. “We wanted to bring back their original luster.” The room's three types of historic fixtures—chandeliers, reading table lights and stack lights—were cleaned, rewired and refinished by Crenshaw Lighting. They were then relamped to meet current electrical codes and lighting standards, followed by mock-ups of the newly restored fixtures.

Given the age and condition of the fixtures, great care was taken during the restoration process, starting with their removal from the reading room. “The business of taking down and packaging up a historic fixture and moving it to the factory is a significant chore,” explains Steffy, “I've seen this done poorly and you end up with a pile of parts and pieces. These must be rebuilt, and a fair amount of the historic sensibility of the equipment is lost.” To ensure this didn't happen to the reading



Exit signs were post mounted and incorporate a twisted metal detail from the original architecture.

a problem when looking for an alternate source. “As of when we specified the project in late 2007, there were no close equivalents to incandescent lamps for a bare lamp situation. LEDs and CFLs were just not there yet,” says Steffy. To maintain the original look while cutting down on the energy output, 30-W 130V frosted incandescent lamps (GE) are linked to dimmed 120V circuits for a connected load of 15 watts each. With the dimming, the lamps now have close to a 20,000-hour life, significantly reducing maintenance time and cost.

room, historic lighting vendor Crenshaw was onsite for the entire two-week process of dismantling, tagging, packaging and shipping the fixtures.

After arriving at Crenshaw’s factory in Virginia, the fixtures were photographed and imported into a computerized drawing program for dimensioning and labeling. From the digitalized drawings, Crenshaw worked with Steffy and the client to come up with restoration shop drawings, which included refinishing, rewiring, and relamping, as well as rebuilding the fixtures as necessary. Upon approval of the drawings, the restorations began. What follows is a look at the restoration of each type of historic fixture.

**Chandeliers:** When they arrived at the factory, the 24 bare-bulb, Gothic-style, bronze chandeliers were covered with “an enormous amount of dust, which had made a layer about ½-in. thick that was almost like carpeting,” notes Stefan Morikawa, principal, Crenshaw. Using a pH-neutral solution, Morikawa and his team rid the fixture of its coating. Underneath, they discovered gold-leaf highlights that had been hidden by dust and a unique Swedish iron-style finish over the bronze base. The highlights were retouched by hand, after which a UV-inhibiting lacquer and a clear top coat were applied for protection. Additionally, the fixtures underwent asbestos abatement and were rewired to UL and CSA standards.

The chandeliers were originally lighted by incandescents. Since saving energy was key, Steffy wanted to switch the lamp to a newer technology, but encountered

**Reading Table Lights:** Composed of solid brass with a satin finish and nickel-plated inset, the table lights are “some of the most nicely crafted fixtures I’ve ever seen,” says Morikawa. “The inset panel looks like a separate component that is applied on the inside of the frame, but it’s all one piece. The original craftsmen masterfully applied nickel plating to the recessed area, while at the same time maintaining a very crisp, satin finish on the rest of the fixture.” The effect looks seamless and is very hard to re-create, notes Morikawa, whose team was responsible for replicating several of the lamps. Similar to the chandeliers, the remaining antique luminaires were cleaned, refinished and rewired to meet current codes.

While eye-catching, the luminaires “are so close to the tables that they were over-lighting them,” says Steffy. Originally incandescent, the table lights were retrofitted in the 1950s with T12 lamps. Such efficiency contributed to the room’s luminance imbalance and, by today’s standards, the T12s consumed unnecessary energy. Replacing the T12s are energy-efficient 28-W T5s (Philips), which reduce light output. The new lamps also use a step dimming ballast on photocell that allows them to operate at 50 percent output with sufficient daylighting. The T5s “improve uniformity of light on the tables and reduce the overall light levels,” says Steffy.

**Stack Lights:** Produced by Frink, a turn-of-the-20<sup>th</sup>-century manufacturer, the brass stack lights were fitted with incandescent optics that were state-of-the-art in the 1930s. The “artfully constructed” fixtures feature

“shrouds in a very light gauge sheet brass and decorative brackets that were crafted with machined solid brass detailing and scrolled, extruded rectangular brass tubing,” says Morikawa. Crenshaw refinished the brass and reproduced several new fixtures to replace missing lights. In keeping with the original design, Crenshaw used “quite a bit of hand work to match the original directional fine satin finish,” notes Morikawa. “The only major difference was that we used welding techniques whereas the originals were soldered.”

Steffy opted to swap the University-retrofitted, screw-base CFLs—which had replaced the original incandescents—with dedicated-socket, 18-W CFLs. The new CFLs have a longer life—20,000 hours—and “better efficiency of distributing light down the stacks,” says Steffy. Crenshaw fitted the fixtures with electronic ballasts to accommodate the new lamps, but kept the original optics intact.

## MODERN ADDITIONS

In addition to restoring the original character of the room, the team used modern technologies to improve the efficiency of the historic fixtures. Both the chandeliers and table lights are linked to a lighting control system with an astronomical time clock, photocells and presets (Lutron). Combined with the energy saved from switching the table lights from T12 lamps to T5s, the new control system “made a big contribution” to reducing energy in the room, says Steffy: “We’re estimating that anywhere between 30 and 50 percent of the energy savings will come back through the system.” Even with the addition of uplights, the room’s connected load was reduced by nine percent.

Though the project was exempt from ASHRAE/IES-NA 90.1 due to its status as a historic building, some additions were code-driven. For instance, though the overall objective was to keep the lighting historic, codes required that egress lighting be implemented. This presented Yallop with a challenge. “From the wainscoting around the perimeter of the room to the carved stone panels, there was no good place to mount an exit sign,” he notes. Instead of risking damage to the architecture, Yallop came up with an alternative solution: post-mounting the exit signs. “Inspired by the baluster on the entrance railing made of twisted metal,” the peri-

od-era-styled exit signs “were mounted on a decorative post that incorporated a twist in the middle,” explains Yallop. “We used subtle cues from the reading room to design the frame around the sign,” keeping the character of the space, while meeting code. Like the rest of the design, they bring the room’s rich history to life.

The project recently won the Preservation Project of the Year Award from the Ann Arbor Historic District Commission. 🏆

## METRICS THAT MATTER

### University of Michigan Cook Legal Research Library Reading Room

**Watts per square ft:** general lighting for reading room = 1.2 (complies with state code of 1.8 based on ASHRAE/IES 90.1-1999; complies with 90.1-2007); chandeliers at full output = 1.4; chandeliers dimmed to 70 percent (normal setting at all times) = 1.0 (complies with state code and 90.1-2007)

**Illuminance Levels:** table work area = 74 fc average (maintained) with Avg-to-Min of 4-to-1; entire table = 51 fc average (maintained) with Avg-to-Min of 12-to-1

**Lamp Types:** 6  
**Fixture Types:** 6

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**About the Designers:** Gary Steffy, LC, Fellow IALD, Member IES (1976), is principal designer and president of Gary Steffy Lighting Design Inc. His experience includes overseeing the lighting design for the Virginia Capitol restoration and expansion; the Ohio Supreme Court restoration and rehabilitation; the JW Marriott/Grand Rapids; the University of Michigan Hill Auditorium; and the Kennedy Center’s Eisenhower Theater house lighting. Mr. Steffy is an editor for the upcoming 10th edition of the IES *Lighting Handbook* and is a past president of the IALD. He received the IES Presidential Award and Distinguished Service Award in 2006. Mr. Steffy was named an Honorary Affiliate of the AIA of Michigan in 2008.



Gary Woodall, LC, IALD, Member IES (1984), is a senior designer with Gary Steffy Lighting Design Inc. He has managed architectural lighting design for projects including the restoration of the 1879 Michigan Capitol site and rotunda lighting; facade lighting of the Penobscot and Compuware buildings in Detroit; and the Depot Landmark in Kalamazoo.



Rob Yallop is a senior project manager in Lord, Aeck & Sargent’s Ann Arbor Michigan office. Mr. Yallop has been a key team member on several preservation projects recognized by the AIA, the Atlanta Urban Design Commission and the Georgia Trust for Historic Preservation.



Stefan Morikawa is a principal with Crenshaw Lighting, which specializes in hand-crafted decorative lighting fixtures.