

“The Magic Lantern”

by Steven Zacks

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As designers become more aware of sustainability issues, daylighting has become an increasingly important aspect of the beautiful and sustainable interior. Through materials and their placement the quality of sunlight can be manipulated in extraordinary ways that serve the specific needs and uses of a given project. In the case of the Bloch Building, a contemporary addition to the bulky, neoclassical, 1933 Nelson-Atkins Museum in Kansas City, Steven Holl Architects is pushing the envelope on daylighting in order to create magical light-spaces while controlling for the specific amounts of light that display artwork beautifully without harming it. In this feature article from the March 2007 issue of *Metropolis* magazine daylighting issues are explored through the lens of the Bloch Building including innovative use of materials, process, and the importance of the end-user.

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Roland Halbe/courtesy the Nelson-Atkins Museum of Art


A photograph of the Bloch Building at the Nelson-Atkins Museum. The building's facade is composed of vertical, translucent glass panels that glow from within. A woman in a red shirt and blue pants is walking on a wooden ramp with a metal railing in the foreground. The sky is a deep blue, and the ground is a grassy hillside.

A masterful addition to the Nelson-Atkins Museum by Steven Holl Architects brightens the landscape of midtown Kansas City and pushes the limits for daylighting exhibition spaces.

A series of translucent glass pavilions cascades down a hillside in the Country Club Plaza district of Kansas City, brightening the evening landscape with the pale blue glow of refracted fluorescent light. From the outside they appear to be separate buildings, minimalist ice blocks popping up out of the Kansas City Sculpture Park with no purpose except to stand there and look pretty. It's not until you get inside, especially during the day, that you understand their real magic: everything that happens on the outside for the sake of spectacle has a functional equivalent in the daylight pouring through the subterranean galleries, bringing the interior spaces to life and producing as many different experiences for viewing art as there are qualities of natural light. The interplay between the interior and exterior—the blocks rising above the surface are fundamentally vehicles for light, and the landscape flows into and on top of the exhibition spaces—makes this one of the most captivating contemporary museum experiences since the opening of the Tate Modern.

Designed by Steven Holl Architects (SHA) as a contemporary addition to the bulky 1933 neoclassical Nelson-Atkins Museum, the Bloch Building's elegance and apparent simplicity disguise the enormous technical complexity and careful material composition required to produce its light- and land-art

The Bloch Building lights up and glows on the outside at night, and during the day it shines on the inside, changing dynamically as the sun moves across the sky.



Holl and McVoy describe the addition as “built of volumes of light,” and with Renfro’s help, the building is a rare instance when the hyperbole of architectural rhetoric is actually surpassed by the reality of the experience.

Five glass boxes rise from grass rooftops above the museum’s galleries and cascade down the hillside, merging with the Kansas City Sculpture Park. “If you stand there at dusk when the lights go on, you get this thrill,” Holl says. “The building is reversing itself in front of you.”



An aerial view of the new addition (above) shows its fusion of landscape and architecture. The pavilion containing the lobby (right) is mostly situated aboveground.

“From the start we said, ‘Rather than make a building, let’s make an architecture fused with the landscape that extends into the sculpture garden,’” says McVoy.

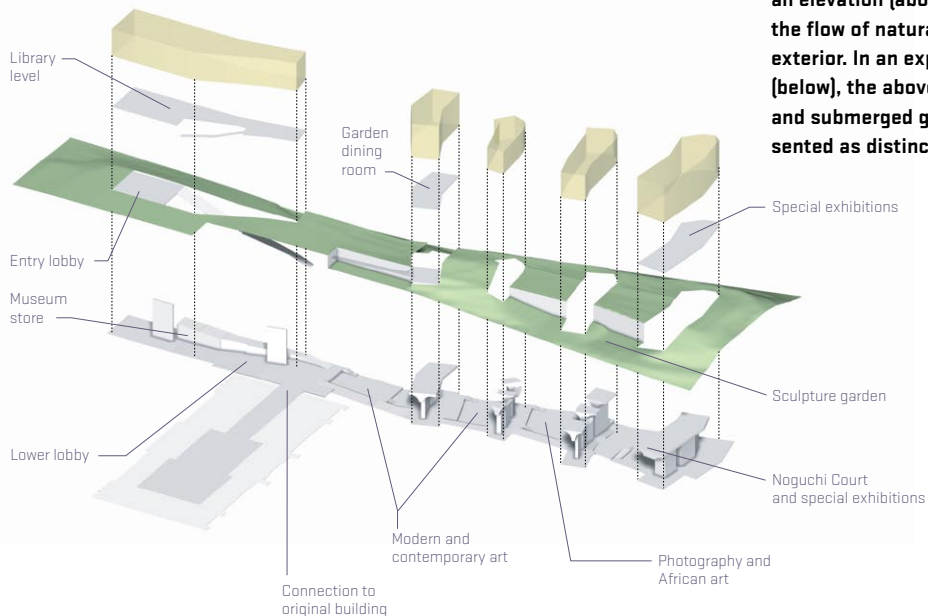
effects. With exterior surfaces composed almost entirely of translucent glass, the addition required some major thinking to calibrate the sunlight pouring into the galleries; and because the amount of light varies from season to season and during the course of the day, it had to be balanced with electric light that would consistently display the art to its greatest advantage. The museum hired Richard Renfro, of Renfro Design Group, to do the mock-ups and calculations, and to work with SHA senior partner Chris McVoy and museum staff to find architectural and technical solutions for controlling daylight on the interior. Holl and McVoy describe the addition as “built of volumes of light,” and with Renfro’s help, the building is a rare instance when the hyperbole of architectural rhetoric is actually surpassed by the reality of the experience.

“The whole model of the museum has changed, and as part of the brief they said they wanted a building that made the museum more a part of the everyday life of the city,” says McVoy, who collaborated with Holl on the design and managed the project. “From the start we said, ‘Rather than make a building, let’s make an architecture fused with the landscape that extends into the sculpture garden.’ Because the building is a fusion of landscape and architecture, the body of the building is folded into the landscape. The external expression of it—its physical presence—is in the pieces that come through, which gather light for the spaces below, as well as serving as lanterns for lighting the garden at night and giving an overall impression for the city.”

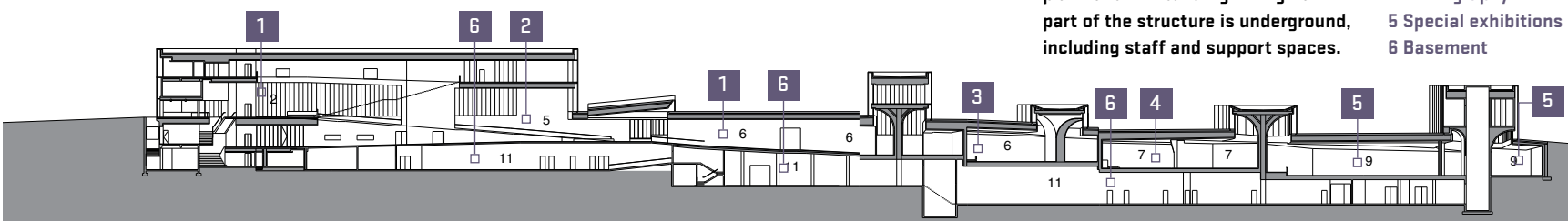
There are eight different entrances to the Bloch



Holl’s early conceptual drawing of an elevation (above) sketches out the flow of natural light through the exterior. In an exploded axonometric (below), the aboveground “lenses” and submerged galleries are represented as distinct layers.



The west elevation gives an idea of the relation between the ground plane and the building. The greater part of the structure is underground, including staff and support spaces.





FLUORESCENT COVE

TUNGSTEN-HALOGEN WALL WASHER

STITCH TRACK

SHADED WINDOWS WITH LAYERS OF DIFFUSED GLASS

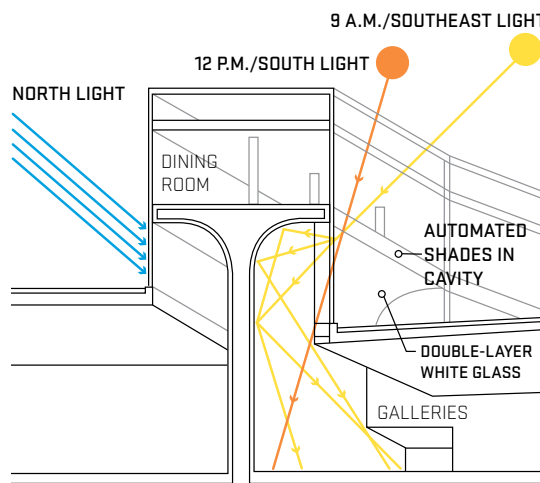
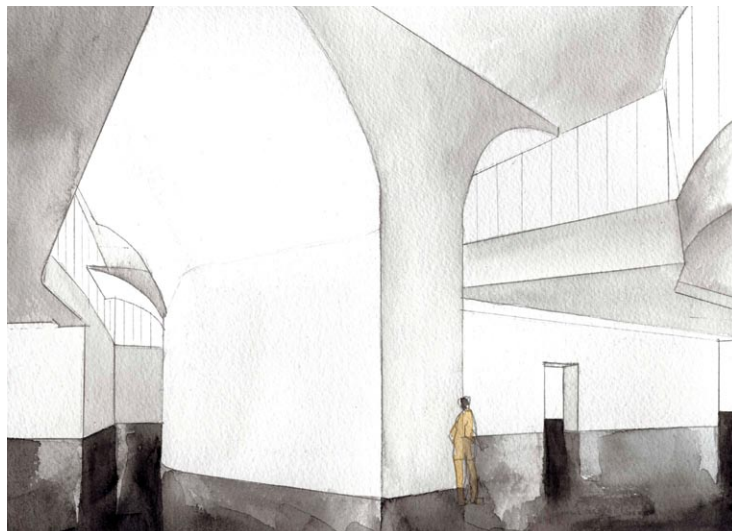
FLUTTERING T-WALL



A view of one of the Modern- and contemporary-art galleries during the afternoon (left), when exposure to sunlight from the west is limited. In the morning, daylight pours through the windows on the east side and filters down the curving T-wall (above).

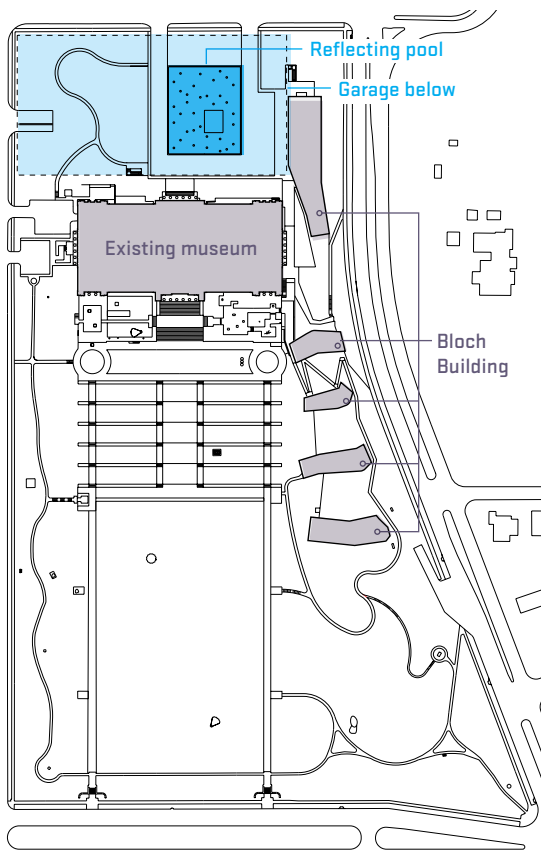
Building—the museum is free to the public and accessible in several places from the sculpture park—but none of them prepares you fully for the dynamic experience of light and space inside. The building is like a magic light box, casting projections through shaded windows that shift as the sun moves through the sky and opening up focused views of the sculpture park and the Nelson-Atkins building between the galleries. “For an architect whose passion has been light from the beginning,” Holl says, “it’s really a rare opportunity to get to work with the sequence of natural light in a gallery and then have the building itself be kind of made out of light. As you move, you get a different view all the time, opening and closing—the movement of the body shifts the perspective. You can’t just

A watercolor by Holl (right) shows a T-wall suffused with light drawn into the building through one of the glass pavilions. A section diagrammed by Renfro Design Group (far right) plots the trajectories of daylight passing through another pavilion.

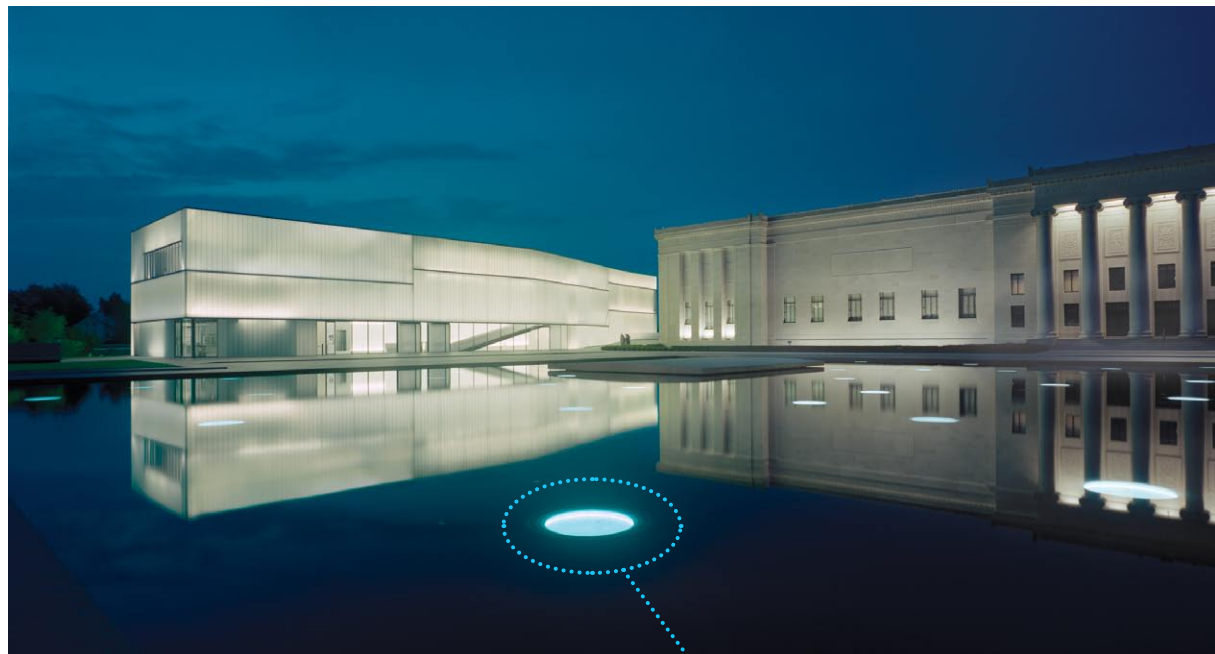


BREATHING T DIAGRAM

This page: photos, Roland Halbe/courtesy the Nelson-Atkins Museum of Art; drawing and section, courtesy Steven Holl Architects. Opposite page: site plan, and garage and pool-detail photos, courtesy Steven Holl Architects; other photos, Timothy Hursley/courtesy the Nelson-Atkins Museum of Art



In the aerial site plan (left), the Bloch Building appears as five individual structures completely separated from the existing building. In fact, the entire complex is connected by the lobby, below-grade galleries, corridors, and a parking lot under the reflecting pool.



The most entrancing aspect of the building is the way it pushes the current ideal of drawing natural light into exhibition spaces to its limit.

look at the building: it's not an object, it's a field." If you try to relate the exterior form to the experience of moving through the interior, however, it's a profoundly mysterious building. "There's a continual shifting of the ground plane relative to the interior," McVoy says. "The building cascades down into the landscape, and the landscape grade moves up and down, so that you think you're going down into the ground but then you find yourself above the ground." A pedestrian entryway near the front of the first "lens"—one of the five translucent glass pavilions rising above the landscape—offers the closest thing to a transparent progression through the space. From there the building begins its gentle roll down the hillside and through the galleries, with sloping pathways and light guiding you

A view from a special-events space in the first "lens" looks out over the grass roof and the second pavilion, with the Nelson-Atkins Building on the right.

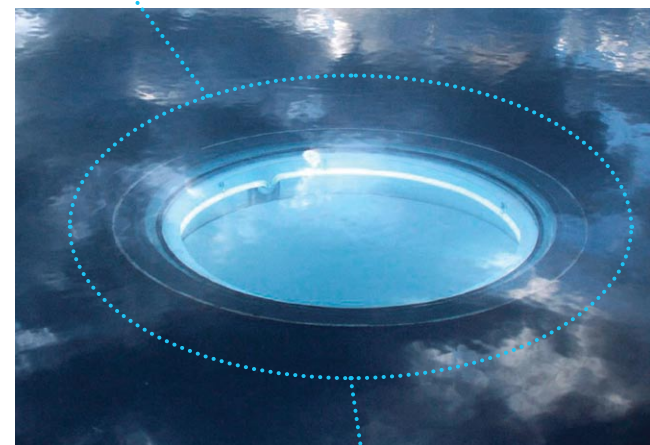


so intuitively that signage would be redundant. It's not until you look at the building again from the outside that you realize the trickery: intermediate "lenses" poking through the grass rooftops and strategically placed lookout points belie the fact that the galleries are mostly submerged below the surface.

But the most delicate and entrancing aspect of the building is the way it pushes the current ideal of drawing natural light into exhibition spaces to its limit. "We looked at this as a possible new way to bring light into gallery environments," McVoy says, referring to the glazed pavilions. "When you illuminate the art with natural light, you have to even it out to such an extent that it loses a lot of its inherent variation. We bring it in a way that's very high up in these zones, above the art, where the dynamics of natural light can play with the architecture and give you a vibrant environment. The light shapes the volume of the spaces as it moves across the lenses."

The secret to the practical realization of this effect—what Holl calls a "parallax," which applies both to the way the movement of the sun shifts perception of space and to how the changing position of the viewer creates different perspectives—is contained in a series of lighting studies by Renfro Design Group plotting out the exact exposure of every part of the building to sunlight and specifying the degrees of shade necessary to meet the basic conditions for displaying works of art. "One of the most important components is that we bring all of this daylight in, but we don't want to bring in too much because we need to protect the art," Renfro says. "There are certain general museum guidelines that conservators use for how much light is available on an art piece, and their curatorial department also gave us the parameters that they wanted. A maximum of twenty-five foot-candles could fall onto most of the art, except for some of the more sensitive pieces in photography and African art, which were limited to seven."

Through half-scale physical **continued on page 147**



A specially commissioned reflecting pool and land-art installation by Walter de Maria, *One Sun / 34 Moons* (top), has round windows in its base, accented by fluorescent lights (middle) that glow at night and during the day project sunlight through the ceiling of the garage below (above) like a series of moons.

continued from page 103 models and computer renderings, Renfro and project manager Rebecca Malkin measured the amount of light the building's form allowed into the space and tested ways of reducing it. The glass pavilions are supported by "fluttering T-walls," innovative structural elements conceived by SHA for the project that are curved at the top to allow light from the north and south to pass above and below the beams, projecting it deep into the galleries. Renfro built a scale model of a gallery containing a T-wall in his backyard in Brooklyn and rolled it down the street, positioning it in the sunlight to find out how the form interacted with light. On a warm day when the sun is at a certain angle in the sky, he found that left unfiltered it could expose certain exhibition spaces to between 10,000 and 100,000 foot-candles of visible light. That meant they had to find ways of eliminating the vast excess and adding focused display lights without destroying the role the sun needed to play in activating the architecture. "When you're in a gallery you can sense when a cloud goes by," Renfro says. "And more importantly, daylight comes through the lenses and gives shape to the space in a soft way that doesn't overwhelm the art. That's what's really spectacular about it—daylight is the form-giver for most of the spaces."

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Renfro and McVoy were able to preserve this effect by using two fused sheets of sandblasted channel glass for the exterior walls, filled with an insulating material called Okalux that works as a louver to move light through small strawlike capillaries, which reduced the light and heat gain by 68 percent. A one-meter cavity with a catwalk that functions as a service space is enclosed by two sheets of acid-etched, insulated diffuse glass laminated on the inside with polyvinyl butyl, removing another 60 percent of the daylight. Three different degrees of shades are hung within the cavity to control the remaining 18 percent.

Through computer modeling, Renfro and Malkin calculated the amount of light that would filter into each part of the museum and which combinations of shades were required in each season to avoid endangering the art, while still allowing the maximum level of illumination. "If you'd only solve for the worst day of the year, that means that in December it could be very dreary because there is so much less light," Renfro says. "The shade system gave us the opportunity to use fewer shades in the wintertime so more light could come in."

It was equally important to SHA that the quality of the light not be adversely affected by the layers of filtering. McVoy worked with Renfro to find treatments that would not only allow its color to complement the art and architecture but would also create textured surfaces to show the building in the best light during the day as well as at night, when fluorescent tubes within the wall cavities bounce light off the inner layer of glass and reflect it back through the exterior. Low-iron glass was used to reduce the amount of green in the light, resulting in a white color that doesn't alter the hue of the art, and a stippled satin texture on the exterior glass prevents specular reflections (bright spots of sun that would otherwise create a sharp glare on the surface of the building). "By the time the light is treated by all these layers of diffusion and diffraction from the various treatments of glass, it takes on this incredibly silky satin quality," McVoy says. "It has an almost ethereal mist-like quality. And then at night it does the reverse."

continued on page 148

continued from page 147 The galleries demanded a whole other set of calculations to position the electric lighting in an optimal relation to the art. Halogen fixtures in the ceiling are hung from stitch tracks—short bands of lighting track developed for the project in cooperation with manufacturer Edison-Price—which gave curators the flexibility they need for changing installations and exhibitions without disrupting the composition of the torqued ceilings with long slits. But the discontinuous strips and morphing surfaces, instead of straight lines and 90-degree angles, required Renfro to do complex math to project light evenly onto the gallery walls. “Our system of determining the right place for the track is based on a five-foot, four-inch eye height from the floor,” Renfro project manager Malkin says. “The track should be between thirty-three to thirty-eight degrees from that point. We used the sections to translate that onto the plan and create these bands that we called the ‘art-lighting zones,’ which is where our track needed to be. Because of the sloping ceilings, sometimes it wanted to be closer and sometimes it wanted to be farther away, so we tried to strike a line in between.”

“Fine-tuning these galleries will be an ongoing process,” lighting specialist Clint Paugh says. “In the old building, whether it’s day or night, the galleries are all the same. In this building things are always changing, depending on the time of the day, the time of year, how the daylight is acting, the color of it, the angle of it.”

Sets of three fluorescent lights in coves above the exhibition spaces add a final touch, creating a balance between the filtered daylight and the yellow-orange halogen wall washers. “The idea is that the daylight is very cool and very blue,” says Clint Paugh, the Nelson-Atkins museum’s staff lighting specialist, who was present throughout the planning process to make sure curatorial needs were met in every aspect of the gallery spaces. “The fluorescent cove is acting as a median between that and the warmer tungsten halogen. We’ve got three fluorescent fixtures, so we can have either one, two, or three on and control the amount of light coming from that cove.”

Paugh has been supervising the final phase with Malkin, adjusting the shades and lighting the galleries as the curators decide what pieces to install. It will be his job to monitor the light levels and move the shades from season to season. “Fine-tuning these galleries will be an ongoing process,” he says. “In the old building, whether it’s day or night, no matter what time of day, the galleries are all the same. In this building, things are always changing, depending on the time of the day, the time of year, how the daylight is acting, the color of it, the angle of it.”

At the moment, the lighting is still very much a work in progress—the Bloch Building doesn’t open until June—but the first contemporary-art gallery is already installed, and the results so far are sensational. A Franz Kline with slashing black lines jumps from the wall opposite the lobby, brought into relief by a rusted-steel David Smith sculpture; on the other side, the lush colors of a Richard Diebenkorn and the subtle shades of a gorgeous rural scene by Andrew Wyeth are suffused with daylight—although it is too much by curatorial standards, you get an idea of how the dynamic play of light not only animates the building but also transforms the experience of viewing art. The next morning, as sunlight pours in through the eastern walls, it’s an entirely new gallery. www.metropolismag.com +