A Noble Diagram

Architect Daniel Burnham famously advised, "Make no little plans," and went on to urge, "aim high in hope and work, remembering that a noble, logical diagram once recorded will never die."

At its most recent meeting, the Board of Trustees adopted what we believe is a noble and logical diagram for the Museum's future, in the form of a new strategic plan. Ambitious but practical, this plan articulates a range of short- and long-term goals for the institution, with an eye toward enhancing our stature and influence both in the museum world and in the design and construction disciplines.

A key component of the plan is a roster of "core values" that inform our institutional culture. One of these fundamental values is a strong belief in the importance of the built environment, and in the Museum's vital advocacy role regarding this issue. We are uniquely positioned not only to educate the public, but also to inspire and empower people to create better buildings and communities. This value, of course, is at the very heart of our mission.

Other core values include a commitment to maintaining the balance between our role as a national museum, compellingly addressing issues of interest and importance to all Americans, and as a local institution serving the educational and cultural needs of the Washington area. The strategic plan also articulates our commitment to the interests of the visitor, and to ensuring that his/her experience is as enjoyable and edifying as possible. In fact, many of the plan's elements revolve around this goal, and we envision an array of gradual improvements to our physical plant and innovative new approaches to exhibitions and programs reflecting this critical focus.

The strategic plan proposes a number of broad initiatives, the most important of which is a concerted, ongoing effort to enhance the institution's ability to generate "intellectual capital." The Museum has come a long way in the nearly 20 years since it opened to the public, and already has a solid reputation for producing unique and often highly influential exhibitions, offering engaging education programs for children and adults, and serving as a valued resource for the design and building industries. Nonetheless, given the institution's relative youth and still-modest financial resources, we have tremendous room for growth. Our skilled and dedicated staff has already formed a series of working groups to begin the implementation of these initiatives and other specific aspects of the strategic plan.

I wish to thank all of the trustees who served on the Strategic Planning Committee, and especially its able chair, Will Miller, who masterfully encouraged input from all parties while gently but firmly guiding the group to consensus. The Museum—and you, our members and visitors—will enjoy the fruits of their effort.

Executive Director
National Building Museum

Chase W. Rynd

Concrete
A History of Experimentation

by Martin Moeller

The National Building Museum's exhibition *Liquid Stone: New Architecture in Concrete*, reveals a material that is, in many ways, paradoxical—synonymous with hardness, but always liquid when first mixed; closely associated with modernism, but having an ancient history; widely regarded as inevitably gray and plain, but actually capable of assuming almost any color, texture, and form. The exhibition features more than 30 projects that demonstrate how contemporary architects are using concrete to create beautiful and increasingly innovative buildings.

CONCRETE IS SECOND ONLY TO WATER AS THE MOST WIDELY CONSUMED SUBSTANCE ON EARTH. Produced at an estimated rate of some five billion cubic yards annually, it is virtually everywhere around us—in roads, sidewalks, dams, and other works of infrastructure, as well as in foundations or other basic structural components of the vast majority of buildings constructed over the past century. Concrete is therefore easily taken for granted as the generic "stuff" comprising the most mundane elements of the built environment.

This is a pity. Despite its common employment in background structures, concrete also has a long history as a vital medium for architectural innovation. Many of the great monuments of modern architecture would have been inconceivable without reinforced concrete, and to this day, inventive designers are continuing to experiment with this versatile material, creating beautiful buildings that challenge fundamental conceptions of architectural form. Currently on the horizon are various new technologies that suggest the possibility of even more astonishing applications in the future.

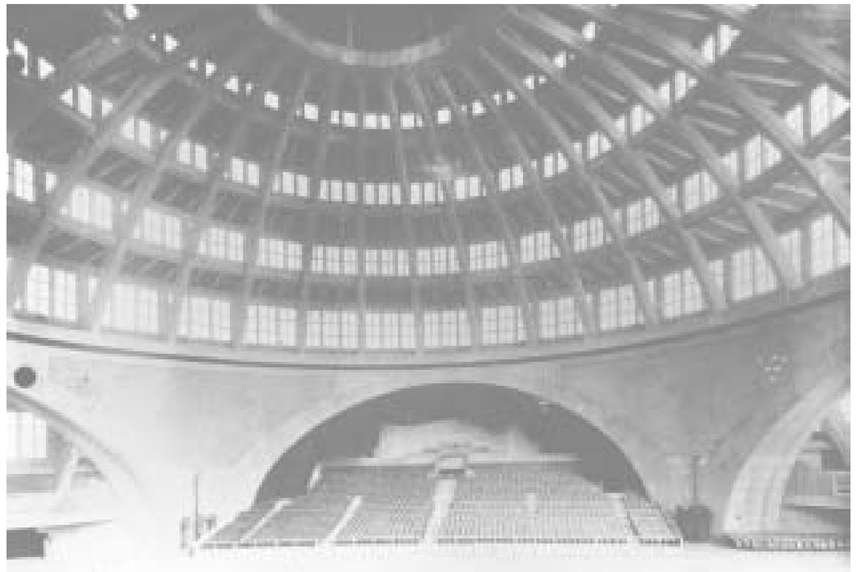
Early History

Though it is widely regarded as a quintessentially modern material, concrete actually has a 2,000-year history. The ancient Romans, who already knew how to make mortar from moistened lime and Pozzolana (volcanic ash from Pozzuoli, near Mt. Vesuvius), were the first to use true concrete—a combination of cement, water, and any of various mineral "aggregates" such as gravel or crushed rock—as a structural material in its own right. Concrete was used in some of the great buildings of classical antiquity, including the Pantheon (c. 126 C.E.), whose magnificent, 142-foot-diameter dome was made of a lightweight concrete with pumice as the primary aggregate.

Despite such auspicious beginnings, the fundamental technology of concrete was largely forgotten after the fall of the Roman Empire. New developments were nonexistent until the 18th century, when several European inventors secured patents for cement-based materials. Then, in 1824, Englishman Joseph Aspdin heated ground limestone and clay to make Portland cement—so called because it was similar in color to the stone quarried on the Isle of Portland. It was a high-quality cement that could be mass-produced with relative ease. Just four years later, mortar based on the new cement was finding prominent engineering applications, such as when it was used to fill a breach in a tunnel under the River Thames.

opposite / The Pantheon, Rome, Italy, with its great concrete dome.
Photograph © Kelly/Mooney Photography/CORBIS

above / Unity Temple, Oak Park, Illinois, by Frank Lloyd Wright, one of the first prominent buildings to have a façade of unadorned concrete.
Photograph by the Historic American Buildings Survey, copyright 2004, courtesy of Unity Temple Restoration Foundation



above / Jahrhunderthalle (Centenary Hall), in what is now Wroclaw, Poland, by Max Berg, featuring a ribbed concrete dome and clerestory windows. Photograph courtesy of Dr. Jerzy Ilkosz, Director, The Museum of Architecture in Wroclaw

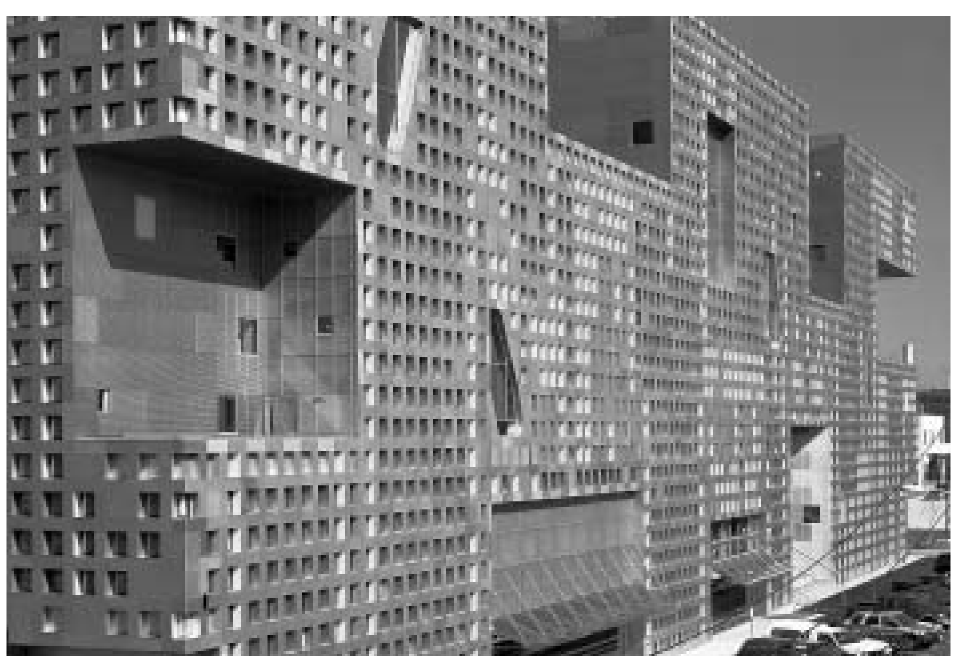
below right / Simmons Hall at MIT, Cambridge, Massachusetts, by Steven Holl Architects, showing its "perforated concrete" structural frame. Photograph © Paul Warchol

The Origins of Reinforced Concrete

In the 1860s came a pair of apparently humble innovations that, in fact, lay the groundwork for much of modern architecture. A Frenchman, François Coignet, introduced the concept of strengthening concrete with metal mesh to compensate for the material's weakness in tension (a force tending to tear a material apart). Working under the direction of Baron von Haussmann, the famously powerful prefect of Paris, Coignet used this reinforced concrete in a number of infrastructure projects. At about the same time, Joseph Monier, a French nurseryman, received several patents for concrete flowerpots strengthened by wire mesh.

Yet another Frenchman, engineer François Hennebique, built upon these innovations and patented a comprehensive system for reinforced concrete construction. Hennebique figured out, among other things, that steel reinforcement bars could be bent and hooked together at critical connection points—say, between columns and beams—to create an immensely strong concrete structural frame.

Ernest L. Ransome, a British-American engineer, patented various techniques that facilitated large-scale concrete construction, including twisted steel reinforcing bars, which improved the cohesion between the bars and the surrounding concrete. His methods were put to the test in 1902, when the New Jersey plant he designed for the Pacific Coast Borax Company (1898) caught fire. Iron and steel elements in the building melted and warped from the intense heat, but the concrete structure remained intact. This event helped to make reinforced concrete the preferred material for industrial construction.



above / Detail of the photoengraved concrete panels on the façade of the Eberswalde Technical School Library, by Herzog & de Meuron. Photography © Margherita Spiluttini

Concrete and the Early Modernists

Inventive architects soon began to exploit the new hybrid material—sometimes called "ferroconcrete," with the prefix derived from the Latin word for "iron"—for non-industrial buildings. Auguste Perret's apartment block on the rue Franklin in Paris (1903), for example, took advantage of the great flexibility afforded by the concrete structural frame to allow large expanses of windows and open interior spaces. Perret's apartment house came as a revelation in an era in which most urban buildings had heavy façades and dense interior structures.

Meanwhile, concrete grain elevators and factories began to dot the American landscape. With their simple, powerful forms and "honest" expression of structure, such buildings attracted the attention of early modernist architects eager to overturn historical design and construction methods. Soon, in the hands of architects like Le Corbusier, reinforced concrete became virtually synonymous with modernism. Le Corbusier's prototypical Maison Dom-ino (1915) was a diagrammatic design for a mass-produced housing structure, reduced to the most basic structural elements of concrete columns and floor slabs. This basic scheme resurfaced in some of the architect's later works, such as the Villa Savoye (1930), which is perched on "pilotis," slender concrete columns that lift the main structure off of the ground.

The early modernists did not limit their experimentation in concrete to structural systems. Frank Lloyd Wright was among the first architects to appreciate the possibilities of concrete as a surface material. The plain concrete walls of his Unity Temple in Oak Park, Illinois (1908) were shocking at the time, but the building's sculpted concrete columns prefigured some of the architect's later, more overtly decorative work. For instance, Wright developed concrete "textile block," used in such works as the Ennis-Brown House in Los Angeles (1924), which carried finely honed sculptural motifs.

Explorations in Sculptural Form

As early as the 1910s, architects were exploring the potential of concrete as a truly sculptural medium. In 1913, the ancient Pantheon was finally outdone by Max Berg's huge, domed Centenary Hall in Breslau, Germany (now Wroclaw, Poland), whose great concrete ribs allowed for clerestory windows that flooded the space with natural light. By the 1930s, significant refinements of technique were evident. Wright's Fallingwater (1937), for example, considered by many to be the greatest achievement of the architect's long career, relied on concrete for the famous cantilevered balconies that float so elegantly above the landscape.

As the construction industry recovered from the tumult of World War II, designers once again turned to concrete as a vehicle for experimental form. Le Corbusier was influential once again, but now in a more expressionistic mode, designing his highly evocative chapel at Ronchamp, France (1955). Expressionism reached new heights in the work of Eero Saarinen, whose two airport terminals—Dulles International (1962) and the TWA Terminal at Kennedy International (1962)—both masterfully exploited concrete forms to suggest the idea of flight.

top / Rendering of the Vail-Grant Residence, Los Angeles, by Pugh + Scarpa. Image courtesy of Pugh + Scarpa

above / View of LiTraCon, a translucent concrete product. Image courtesy of LiTraCon® GmbH

By the mid-20th century, however, concrete was also becoming closely associated with less spectacular applications. As cities became filled with mundane skyscrapers lining what some called "concrete canyons" (even though many of the towers were primarily made of steel), and poorly maintained housing blocks were degrading the quality of life in urban neighborhoods, the public became disheartened with concrete's role in the "modern" city.

The Contemporary Era

More recently, sophisticated manufacturing technologies and lessons learned from past experimentation have enabled architects to employ concrete with an unprecedented degree of finesse and skill. Combined with new chemical additives, casting techniques, and construction methods, such advances have solidified concrete's role as the single most versatile building material. In the hands of talented architects, concrete is once again becoming synonymous with beauty and innovation.

Simmons Hall, for example, a new dormitory at the Massachusetts Institute of Technology, takes advantage of the flexibility of the concrete structural frame to address two challenges. Concerned that the large building would become a barrier between the campus and the community, the architect, Steven Holl, sought to make it visually "porous." He was also eager to provide large, flexible common areas within the structure to encourage informal interaction among residents. Working with engineer Guy Nordenson, Holl devised a complex, three-dimensional concrete grid to carry structural loads at the perimeter, thereby making possible a variety of free-form openings and spaces throughout the building.

The architecture firm of Herzog & de Meuron employed a relatively new technology to lend visual depth to the façades of the Eberswalde Technical School Library in Germany. The building is lined with photoengraved concrete panels, which bear images that are integral to the material's surface. The technique involves placing a chemical in a fine dot pattern (replicating the tonal patterns in the original photograph) on a plastic sheet, which is then placed inside the concrete formwork. The concrete is poured in and allowed to set, and then the formwork and plastic are removed. As the panel is powerwashed, the photographic image emerges.

The proposed Vail-Grant House, by Pugh + Scarpa Architects, derives its unusual form both from its steep site in the Hollywood Hills and from zoning restrictions intended to preserve views from a revered early modernist house by Richard Neutra next door. The design calls for a twisted, rectangular tube made of Structural Concrete Insulating Panels (SCIPs)—blocks of plastic insulation and wire mesh to which a concrete surface is applied. Despite the difficult site and the structural contortions dictated by the zoning regulations, the house is being built for a relatively modest budget.

Concrete and the Future

Since the advent of large-scale reinforced concrete construction roughly a century ago, fundamental assumptions about the material's properties and limitations have remained largely unquestioned. Now in development, however, are various concrete products and technologies that challenge such preconceptions. On the following pages are examples of three projects, two of which were commissioned by the National Building Museum for the exhibition *Liquid Stone: New Architecture in Concrete*, that explore the potential applications of these astounding new materials.

Liquid Stone: New Architecture in Concrete *is made possible by the generous support of Lafarge, the world leader in building materials.*

The Future of Concrete

Ultra-High-Performance Concrete

Old Assumptions:

Concrete must be reinforced with steel bars or mesh in order to resist tensile, or pulling, forces. Finished concrete is brittle.

Innovation:

Ductal®, an ultra-high-performance concrete developed by Lafarge, contains extremely strong fibers that, in effect, make the material self-reinforcing. Ductal is dense and resistant to cracking and chipping, and can therefore be used to create very thin structural members—even spanning long distances—without conventional steel reinforcement.

Featured Project

Musée des civilisations de l'Europe et de la Méditerranée (Mucem)

Marseilles, France

Architects:

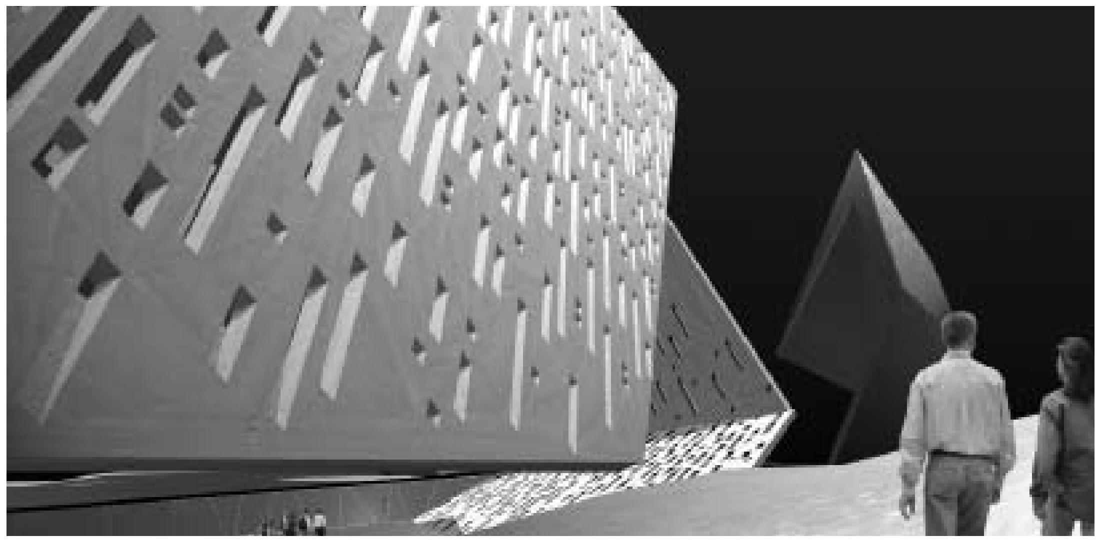
Rudy Ricciotti with RCT Architectes

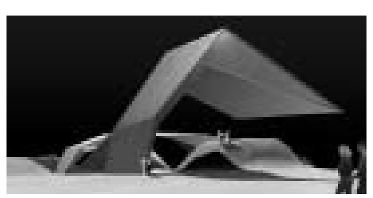
Winner of an invited competition that included several of the world's most famous architects, Rudy Ricciotti's design for a museum of European and Mediterranean culture would be covered in a delicate, free-form lattice made of Ductal. The intricate concrete web has a somewhat biomorphic character, but also evokes the complex geometric patterns of Islamic decorative motifs.

above / The Ductal lattice is visible beyond the edges of the floor slabs in this rendering of the proposed Mucem building.

below / A historic fort adjacent to the project is seen beyond the concrete lattice in this rendering. Images by Rudy Ricciotti

Self-Consolidating Concrete





above and top / Renderings of the hypothetical Mound Builders Museum, with its thin, perforated slabs of concrete. Images by Building Studio

Old Assumption:

A proper mix for structural concrete must be quite thick when poured, and must be mechanically vibrated once it is in place to eliminate air pockets and ensure even distribution of the aggregate.

Innovation:

Self-consolidating concrete is made possible by a system of optimized aggregates, cements, and additives including a "superplasticizer," which keeps the mix exceptionally fluid during the pouring process without compromising the material's ultimate strength. It requires no vibration, and can therefore be used for difficult or constrained pours, such as those involving unusually dense reinforcing steel or narrow channels through which the concrete must flow.

Featured Project

Mound Builders Museum
Memphis, Tennessee

Architects:

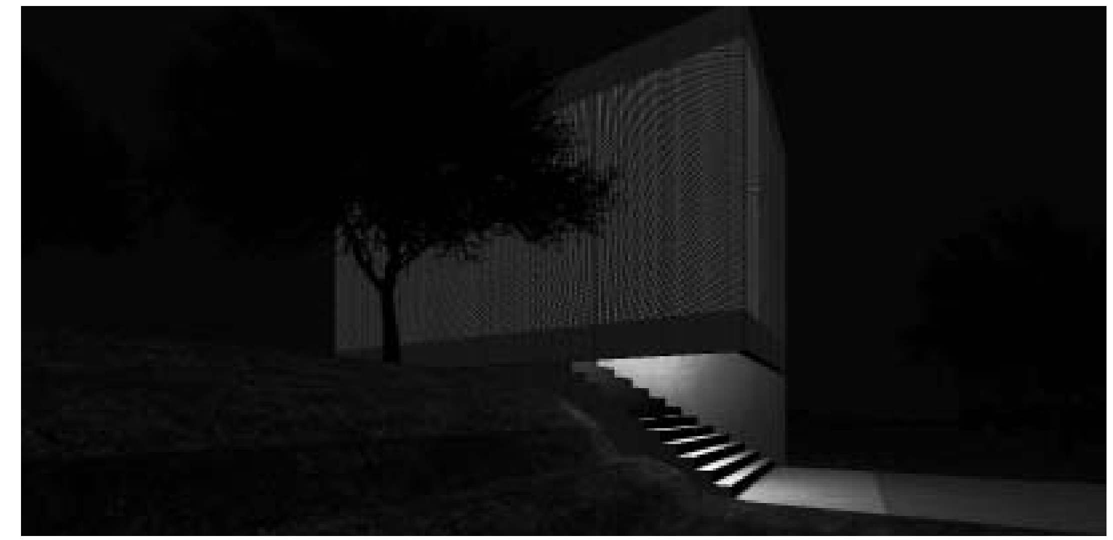
Building Studio

(Project leaders: Coleman Coker, Jonathan Tate, and David Dieckhoff)

Inspired by the unique properties of Agilia®, a self-consolidating concrete produced by Lafarge, Building Studio designed a hypothetical museum dedicated to the earthen mounds built by ancient native Americans. The museum is organized around a remarkably thin, spiral ribbon of concrete, punctuated by hundreds of rectangular openings. The use of Agilia would facilitate thorough distribution of wet concrete amid the dense reinforcement the structure would require. This project was commissioned by the Museum expressly for *Liquid Stone: New Architecture in Concrete*.

THE FUTURE OF CONCRETE

Translucent Concrete

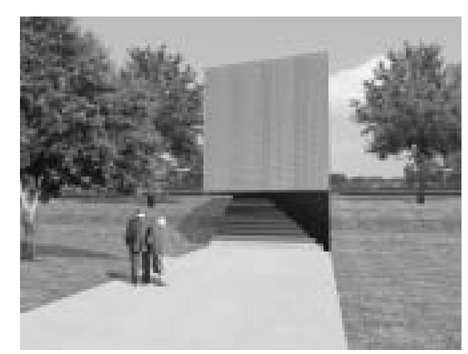


Old Assumption:

Finished concrete is always solid and opaque.

Innovation:

Researchers are now developing various types of concrete that transmit light. As the technology of translucent concrete progresses, basic conceptions of structure and building skins may change dramatically, leading to new forms of architectural expression that challenge the imagination.



Featured Project

Pixel Chapel
Houston, Texas

Architects:

Bill Price Inc.

Developed by Bill Price, of the University of Houston, Pixel Panels© are made of concrete with embedded plastic fibers that transmit light from one face of the wall to the other. Depicted here is a hypothetical chapel, designed by Price and Scott McGhee, with walls made of these panels. By day, the interior of the small chapel would appear as if lit by thousands of tiny stars, while at night, the effect is reversed, with artificial internal illumination yielding an array of bright dots visible from outside. This project was commissioned by the Museum expressly for *Liquid Stone: New Architecture in Concrete*.

top / Rendering of the Pixel Chapel at night, with light emanating from within.

above / Interior rendering of the chapel.

left / Rendering of the approach to the chapel. Images courtesy of Bill Price

Paris and Washington
A Tale of Two (Concrete) Cities

above / Façades on the Chaussée d'Antin, Paris, made of indigenous stone that is easily carved. All images accompanying this article are by the author

In this article, Amy E. Gardner, AIA, associate professor at the University of Maryland School of Architecture, Planning, and Preservation, explores the role of concrete as a determinant of architectural and urban form in Paris and Washington. She argues that the modern use of concrete in Paris reinterprets the city's historic stone-based building culture, while Washington's contemporary concrete buildings reflect the American tradition of structural frames based on regular, rational grids.

Paris and Washington, DC, invite comparison. While Pierre Charles L'Enfant's plan for Washington preceded by a half-century Baron Haussmann's famous web of Parisian boulevards, both cities are national capitals laid out according to French baroque urban design principles. The two also share a monumental presence, low skylines, broad honorific avenues, and substantial urban green spaces. It is, however, the "everyday stuff" of which these cities are made, rather than simply their monuments and institutions, that tells the tale of each city's building culture. This tale is not so much about the style of the buildings or the cities themselves, but rather the hidden structure that shapes our experience of them.

Concrete plays an essential supporting role, literally and figuratively, in the making of both places. We typically think of concrete simply as a ubiquitous building material. Less commonly is concrete understood as an actor, shaping the city, and as a telling reflection of the other forces that shape it. In Paris and Washington, concrete is an instrument of architectural and urban form-making, and a lens through which we may see and understand each place.

Paris: Stone into Concrete

The original physical organization of Paris followed the site's natural features, yielding a medieval pattern of streets and buildings that was both idiosyncratic and dense. Though the French post-Renaissance architectural culture valued the creation of axially organized, geometrically pure spaces, circumstance and happenstance made this ideal difficult to achieve. From the scale of the building to that of the city, the compositional strategy that evolved strove for idealized spatial sequences, "carved" from a dense, irregular background.

Because the timber frame is better suited to a rational grid, the soft stone of Paris thus became the preferred structural medium. A rich, skilled, and inventive stone masonry culture grew. Resistant as stone structures are to the perils of a "great fire," they largely survived, unlike those of the pre-industrial fabric of many other great European cities.

Beginning in the 1850s, Paris underwent series of radical interventions, guided by Haussmann at the direction of Napoleon III. Broad sweeping avenues were cut through the dense stone building fabric, creating a new literal and figurative order. These controversial changes displaced great numbers of people, and forever altered—but did not suppress—the stone character of the city. Individual houses yielded to apartment buildings, each with its own solid stone sidewalls to which the floors, stone facade and back walls were attached. This construction type came to dominate the complex, dense matrix that was and is Paris.

Modern Concrete Paris

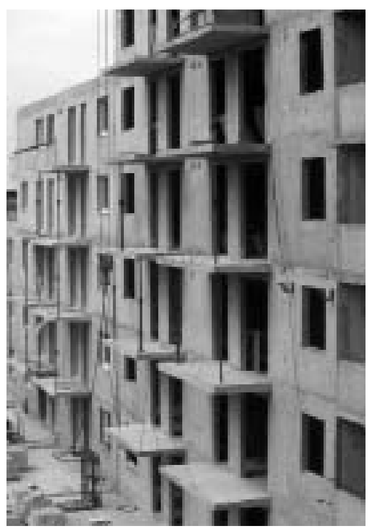
The typical modern building in Paris is supported by a rather heavy structure consisting of cast-in-place concrete walls and floors. The basic choice of concrete is not surprising, given the relative availability of various materials—the region lacks major forests for wood and high-quality iron ore for steel—and for a city with a height limit, concrete offers the advantage of more floors within the available volume, as the floor assemblies are thinner than they would be in steel. Concrete is also more fire-resistant than steel, and has an inherent compactness, advantageous in a densely developed city.

But why in Paris do concrete *bearing walls* persist alongside concrete *structural frames*, when a lighter concrete frame would seemingly suffice? Here, the "cultural weight" of earlier building cultures makes a contribution. The irregular medieval urban landscape, formed in masonry, could readily be reconceived in concrete. The complex shapes and character of Parisian spaces, once carved in stone, could logically be rendered in concrete—itself a continuous, moldable material. Builders used *coffrage-tunnels*, or concrete tunnel forms, to meet pressing post-WWII housing needs, eschewing the modernist concrete frame. Economical and efficient in construction, this system reinforced the role of concrete walls in French apartment buildings. Even today, internal separating walls in apartments are commonly of concrete, and only rarely of unit masonry.

Is there a cultural dimension to the use of concrete? Several intellectual debates involving architecture and engineering molded Parisian concrete building traditions. One debate involved the role of structure—was a durable structure simply a necessity of construction, or did it have a central formative role in the very concept of a building? Given the latter, a desire to gain the maximum possible clarity of expression with minimal use of materials—i.e., to allow the structure to be the

top / Siège Social de la Société Hennebique, Paris. The evolution of building and zoning codes in Paris reinforced the stone masonry culture. Internal cast iron frames could not be revealed at the first three floors; cladding had to be in stone. This building obeys the 1902 code, which required sculptural relief on façades.

above / Elementary school on the rue Kuss, Paris, an early modernist work in reinforced concrete.



above / Typical concrete bearing wall buildings under construction in France in the 1990s. Notice the relatively small, distinct openings corresponding exactly to the locations of windows and doors.

top right / A typical concrete frame building under construction in Washington in the 1980s. Notice the open, rational grid of columns and floor slabs.

architecture—formed the basis of another debate. Concrete gave voice in built form to these as well as other questions.

The architect Auguste Perret, for one, believed that concrete construction allowed the continuation and transformation of previous building cultures into modern technology. Perret saw concrete as stone incarnate—the inheritor of the French masonry tradition executed in modern technical terms. For Perret, concrete-as-modern-stone was the means to a French modern architecture, while his adversaries such as Le Corbusier espoused an International Style. Perret's position proposed a system that would sustain, extend, and yet transform the lineage of the stone master craftsman that existed in France.

Framing the Question at Home

American inventions and experiments in concrete have been often overlooked in comparison to those in Europe. Notable among the underrepresented are the contributions of engineer Ernest Ransome. Beginning in the 1870s, Ransome introduced and eventually patented a concrete framing system. Structural frame systems were the mainstay of the US building culture—initially of wood, then cast iron and steel, and, with Ransome, finally concrete.

Frame systems, no matter the material, were valued for their material economy and spatial efficiency. The concrete frame extended the utility of frame systems, particularly in the industrial arena. Ransome's technical inventions yielded large, gridded, flat-roofed buildings with four predominantly glass façades. They tended to be rational, ordered, fireproof, with an abundance of daylight—characteristics later found in the work of Albert Kahn. Together, Ransome and Kahn share significant authorship for the development of concrete industrial buildings.

Young Washington

Washington's building culture evolved from its own set of conditions, very different from those of Paris. The city was conceived and planned by L'Enfant amid a shared national sense of the landscape as a broad resource to be exalted and exploited. A regular street grid, which would become the hallmark of American cities, was combined with a system of diagonal avenues and circles to create a highly geometrical urban pattern that contrasted with the original, free-form layout of Paris.

In the late 19th century, Washington did experience its own Haussmann-like program of street, infrastructure, and landscape improvements, under the direction of Alexander Robey ("Boss") Shepherd, territorial governor of the District of Columbia. Many of the larger civic and monumental institutions that were built in the post-Shepherd era incorporated cast iron or steel frame systems, which were then becoming increasingly common.

Early 20th-century DC saw the gradual incorporation of structural concrete building systems for a range of building types. Between 1900 and 1920, these included apartment buildings, bridges over Rock Creek Park, and some office and utilitarian buildings. The use of concrete in that era was modest in its expressiveness, decorative aspirations, and structural virtuosity. Lay newspaper clippings of the époque focus on the utility of the system—spatially efficient, fireproof, and sturdy, providing for the rapid growth of the turn-of-the-century city.

Modern Concrete Washington

Why, in the present day, do we build in concrete in Washington when, nationally, steel is more common for many building types? Washington, of course, shares with Paris the difficulties of maximizing space given a height limit. Concrete allows for more floors within the available limit, especially useful as the number of elements within the floor sandwich—such as sprinkler systems, data systems, and ductwork—multiplies.

So why the concrete *structural frame's* prevalence in Washington? Material, formwork, and labor are reduced in concrete frame construction, and coordination can be simpler, as building trades may come and go in sequence. In a climate that sustains below-freezing temperatures, the sequence and timing of construction are critical. A system of structural frames with infill finish materials is better suited to this climate than would be the continuous concrete pours we see in Paris. Moreover, the concrete structural frame offers the possibility of a flexible plan within a columnar grid, a requirement of the speculative office buildings that populate central Washington. Over time, typical planning modules for parking garages, offices, and systems furniture have been coaxed into agreement with a conventional range of ideal column grid dimensions. The façades of buildings in central Washington articulate these internal rhythms, lending a consistent—at times insistent— texture to the city.

The concrete frame also reflects certain local precedents. The identity of pre-WWII steel framed buildings in DC had staying power, and concrete frames were generally proposed as successors to steel. Concrete frame design was valued in Washington for its straightforward, problem-solving characteristics. Perhaps the ascent of the concrete frame in Washington also parallels the developing country's larger cultural context, which favored a traditional additive framework, instead of enduring monolithic walls. The fundamental notion of the structural frame—be it the balloon frame, the platform frame, or the Chicago frame—was something that the US could, after all, claim as its own.

continued on page 17

top / AFL-CIO Headquarters, Washington, DC, 1954, a commercial building based on the open, rational concrete frame, here obscured by a façade with separate door and window openings.

above / International Finance Corporation Headquarters, Washington, DC, by Michael Graves and Associates. Even buildings with neo-classical façades such as this tend to be built on open concrete frames in Washington.

In Celebration of Concrete

by Ed Worthy

above / Students from the University of Minnesota test their concrete canoe in the flotation tank.

right / The team from Cal State Poly Pomona carries its canoe to the tank for testing.

below / A young visitor tries his hand at finishing concrete. Photos by F.T. Eyre

On June 18 and 19, the Museum presented a "Celebration of Concrete" to coincide with the opening of the exhibition *Liquid Stone: New Architecture in Concrete*. During this truly unique event, more than 2,000 visitors viewed concrete canoes at a national competition, sampled mix-'n'-eat "concrete" at a family festival, and saw translucent concrete in the *Liquid Stone* exhibition.

The Museum hosted two days of the 17th annual National Concrete Canoe Competition organized by the American Society of Civil Engineers (ASCE) and Master Builders, Inc. Twenty-two teams of engineering students from around the United States and Canada brought canoes they designed and fabricated out of concrete. The canoes were displayed in the Great Hall. Three-quarters of each team's score was based on engineering design and construction principles, a written report, and oratory skills. Races held on June 20 at Lake Fairfax in Reston, Virginia, determined the remainder of the score. The top teams were the University of Wisconsin at Madison, Université Laval in Canada, and the University of Alabama in Huntsville.

On Saturday, June 19, in the midst of the canoe competition, the Museum, in collaboration with ASCE and Master Builders, organized the *Concrete Carnival* family festival. Festival participants engaged in more than a dozen hands-on activities. These included the creation and decoration of photo stands made out of quick-drying concrete provided by Quikrete; a chance to climb aboard a concrete mixing truck provided courtesy of Lafarge, a sponsor of the festival; and mixing a batch of edible "concrete" made from Graham crackers (representing the aggregate), powdered sugar (representing the cement) and a combination of orange juice and corn syrup (representing the water). •

A New Museum Gallery

by Eileen Langholtz

The Museum opened its Building Learners Gallery in spring 2004. It features an ongoing series of exhibitions that attract the general public and, in particular, young visitors ranging in age from six to sixteen. To date, the projects exhibited in the gallery relate closely to the content in the Museum's school, family, and outreach programs.

All of the Museum's programs for youth are based on common principles of design education and involve learning by doing. Young people, grades K-12, engage in the design process as they investigate a specific topic such as city planning or bridge building. In keeping with this educational approach, each exhibition in the Building Learners Gallery incorporates hands-on activities complementing the themes and objects on display. In addition, visitors can enjoy a thematically developed take-away activity that they can do after viewing an exhibition. Prior to establishing the Building Learners Gallery, the Museum had no permanent space to exhibit its youth-related projects. This recent change provides young designers with a continuing opportunity to display their work.

above and left / Images of the origami architecture exhibition in the new Building Learners Gallery. Photos by F.T. Eyre

The opening exhibition in the Building Learners Gallery was *Origami as Architecture*, which showcased traditional origami and new Japanese paper art forms inspired by origami and depicting architecture. It featured works by origami masters and paper artists from the United States and Japan. This show was followed by *Kids' View of the City*, a project created by students at John Eaton Elementary School in Washington and motivated by the Museum's *City by Design* school program. The third exhibition, in which teenagers photographically document Washington neighborhoods, also arises from a Museum program, *Investigating Where We Live*.

The Building Learners Gallery represents an early step in the implementation of the Museum's new strategic plan, which includes a call for providing more "drop-in" educational experiences for visitors of all ages. Located on the second floor, the gallery will continue to present two to three exhibitions each year. •

Remembering Bates Lowry

by Jane C. Loeffler

above / Bates Lowry.

Jane C. Loeffler, Ph.D., is an architectural historian and the author of The Architecture of Diplomacy: Building America's Embassies (1998). *She has also written introductory essays for* The United Nations (1999), Embassy Residences in Washington, D.C. (2003) *and* Building Diplomacy (2004). *She teaches at the University of Maryland, College Park.*

Bates Lowry, founding director of the National Building Museum, died on March 12, 2004 in Brooklyn, NY, leaving a legacy of projects and publications that have significantly furthered public understanding of architecture, folk art, and photography. Many of us first encountered Dr. Lowry through his volume on Renaissance architecture, part of the Braziller series that was so popular among art history students in the late 1960s.

Just after that book was published, he joined the faculty at Brown University and became chair of the art department there in 1967. Prior to that, he had taught at the University of California, Riverside, New York University, and Cal Poly Pomona, where he chaired the art department. A graduate of the University of Chicago—B.A., A.M., and Ph.D.—he served in the Army during World War II and as assistant to Justice Robert Jackson at the war crimes tribunal in Paris after the war.

While Dr. Lowry was at Brown, floods ravaged Florence and, as chairman of the Committee to Rescue Italian Art, he raised funds for the clean-up of landmarks such as Brunelleschi's Pazzi Chapel. This work brought him national prominence. In 1968 he was named director of the Museum of Modern Art, succeeding René D'Harnoncourt. It was a turbulent time at MoMA and he became a victim of the labor unrest that paralyzed the museum at that time. He moved on to a teaching position at the University of Massachusetts, Boston, and then to Washington, where, doing research at the National Archives, he became fascinated there by the treasure trove of drawings of America's public buildings.

In the 1970s, together with his wife Isabel Barrett Lowry, Dr. Lowry created the Dunlap Society to produce top-quality visual documentation of major American architecture. It was easy enough to find slides of the Pazzi Chapel or Rheims Cathedral, as he noted then, but next to impossible to find good shots of important buildings in the very middle of the U.S. capital—Thornton's Octagon House (1801), for example, or Meigs' Pension Building (1887), now the National Building Museum. It was on that project that I first worked with him. Those were the days long before *Great Buildings Online*, before databases, before the Internet—when microfiche images represented state-of-the-art storage and distribution technology. In focusing attention on architecture in the United States instead of Europe, he helped make it possible for scholars to study material that had been ignored for too long.

Dr. Lowry took charge as director of the new entity that came to be known as the National Building Museum in 1980, and putting his own expertise and that of his friends and board members to use, oversaw the transformation of the distinguished building. He expanded the staff rapidly to befit the needs of a growing educational and cultural institution. After retiring as director in 1987, Dr. Lowry returned to scholarship and published his final book, an extensive overview of the Getty Museum's collection of European and American daguerreotypes (1998).

When Dr. Lowry called me to ask if I would be interested in working with him as curator of an exhibition featuring U.S. embassies, I said yes, but not without protesting that I knew nothing about embassy architecture. Neither did he, he noted, but the material promised to be important, the State Department was all for it, and the exhibition would inaugurate the new museum devoted to America's building arts. It was an exciting moment and he brought a special sense of wonder and enthusiasm to the challenge. I am sure I speak for scores of others when I say that it was a pleasure working with him and a privilege knowing him. •

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Frame of Reference

A cautionary note must be offered. We risk leaving out significant nuances of technical, economic, or cultural import. For example, we cannot compare the everyday fabric of these two cities and the role of concrete without noting the difference between apartment and office buildings, the former being much more prevalent in Paris, and the latter more so in Washington. Nonetheless, we can still pose the question: how is concrete an instrument of architectural and urban form?

Concrete tells a tale of two cities—of the "deep structure" of buildings, rather than the surface or style per se. In Paris, the use of concrete retains and amplifies the sculptural architectural qualities, highly particularized spaces, and compact urban forms. It renders the pre-20th-century skyline in modern concrete form. It recreates the earthbound quality of stone, yet reinterprets the ineffable and contradictory qualities of Parisian stone buildings—of massive yet porous façades, of heaviness and lightness, of symmetry and asymmetry.

Solidity, simplicity and homogeneity characterize Washington's concrete presence. With its modulated efficiency, it creates elemental volumes with regular rhythms lining the streets of downtown DC. Concrete frames help to create monumental buildings with a dignified presence. The frame would logically find voice in Washington, expressed in concrete—it gave rise to a monumental, robust, classically-ordered architecture appropriate for the aspirations of a capital city. •

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Mystery Building

above / Asbury Park Convention Hall.

"GREETINGS FROM ASBURY PARK, N.J.," proclaimed the cover of Bruce Springsteen's 1973 debut album. The title was a tribute to the Boss's hometown, a once-glamorous seaside community that had fallen into a steep economic decline in the decades preceding the record's release. If you were to look closely at the images on the album cover, you would find glimpses of the Spring 2004 Mystery Building, the Asbury Park Convention Hall.

Finished just before the Great Depression, the Convention Hall was built as a pier jutting out audaciously over the lapping waves. Part of a complex including the Paramount Theatre and an arcade spanning a portion of the town's boardwalk, the hall was designed by Warren & Wetmore, architects of Grand Central Terminal in New York. In recent years, Asbury Park has experienced something of a renaissance, and the fanciful structure figures prominently in current plans for a comprehensive revitalization of the waterfront.

Congratulations to the four readers who correctly identified the Convention Hall: Larry Levine, of Forest Hills, NY; Jeff

Meck, of New Holland, PA, who thoughtfully sent his response on a historic postcard picturing the building; Scott Opis, of Washington, DC; and Shawn Glen Pierson, of McLean, VA, who provided an interesting summary of facts about the building and its architects.

This issue's Mystery Building is a fascinating geometric exercise. Can you identify the building, its architect, and its location? Send responses to: Mystery Building, National Building Museum, 401 F Street NW, Washington, DC 20001.

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