

Tools of the Imagination

FOR MOST PEOPLE, THE WORD “ARCHITECTURE” connotes a physical product—a building or perhaps a group of buildings representing a particular culture or historical period. But **architecture is also a process.** Designing a building requires **frequent testing of specific ideas, followed by adjustments to the design, followed by more testing.** Through a combination of logic, intuition, application of technical knowledge, occasional visionary leaps, and old-fashioned trial and error, architects gradually develop plans that lead to the physical manifestation of their creative work.

Like many other processes, **architecture requires tools,** and throughout the history of design, specialized tools have been developed to address those needs, while other, common tools have been appropriated and sometimes adapted for architectural purposes. In the National Building Museum’s current exhibition, ***Tools of the Imagination*,** we explore the somewhat hidden history of the **various devices that allow architects to express their ideas to the general public, to clients, to review agencies, and ultimately to the people who will build the structures.** Featuring hand drawings, drafting tools, computer renderings, and animated demonstrations of computer-aided design software, the exhibition appeals to many different audiences.

The curatorial team for the exhibition tracked down a number of fascinating artifacts, such as a volutor—a remarkably specialized device from the mid-19th century that enabled architects to draw the spiral “volute” on the capital of an Ionic column. There is also an early 19th-century brass ellipsograph, which is notable not only for its mechanical ingenuity

(it was used to draw accurate elliptical shapes), but also for its delicate beauty. Complementing these practical but elegant instruments are computer monitors running astonishingly complex design software, revealing how contemporary architects are exploiting electronic technology to produce evermore sophisticated representations of their ideas.

This issue of *Blueprints* features two articles inspired by the *Tools of the Imagination* exhibition. Susan Piedmont-Palladino, who served as guest curator for the exhibition in cooperation with curatorial associate Reed Haslach, offers an entertaining history of erasing, a vital but easily overlooked aspect of the design process. Kevin Klinger describes how cutting-edge architects are already exploring the next step in digital design, using programs that feed design information directly into the manufacturing and construction processes. Both articles illuminate the fact that, **while tools are a means to an end, they also often entail interesting stories in themselves.**



Chase W. Rynd

Executive Director
National Building Museum

P.S. I am also pleased to report that, thanks to the financial support of Autodesk, Inc., the Museum and Princeton Architectural Press will be co-publishing a book based on *Tools of the Imagination*. The book, which is expected to be published in spring 2006, will be available in the Museum Shop and elsewhere.

The Invisible History of Erasing

by Susan Piedmont-Palladino

Susan Piedmont-Palladino is an architect and associate professor of architecture at Virginia Tech's Washington/Alexandria Architecture Consortium. She served as guest curator for the National Building Museum's exhibition *Tools of the Imagination*.

THE VIRTUAL WORLD IS ALL ABOUT SECOND CHANCES. Even the most casual computer user has become accustomed to being able to undo, backspace, and even retrieve things from the recycle bin, all with a keystroke or two. Changing one's mind has become very easy... at least inside the electronic world. Even Humpty Dumpty can be put back together again. All the king's horses and all the king's men could not do it in the nursery rhyme, but there are websites where you can "shake the screen" to make him fall, and then move his pieces around until he becomes the familiar egg once more. Had the royal staff used a computer simulation prior to his great fall, they might have realized there was a problematic relationship between the egg and the wall. Designers know that it's best to solve these problems before construction, because the real world has no "undo" command.

The activity of design is a long process of doing, undoing, and redoing in the media of drawing and modeling, because that is where things can be taken apart and put back together again. That simple "undo/redo" action is at the root of all computer commands pertaining to modifications, but architects had been correcting and reconsidering for a long time before the undo/redo command ever appeared on a computer screen. The history of design is told through the pencils, pens, compasses, straight-edges, and software that bring the architect's ideas into



above / An array of erasers used by architect Paul Rudolph. At top are chucks used in electric erasers. At right, just above the bottom row of erasers, is a metal eraser holder shaped like a classic Volkswagen Beetle. Photo by Reed Haslach, items courtesy of the Library of Congress

"Stale crumb of bread is better, if you are making a delicate drawing, than India-rubber, for it disturbs the surface of the paper less; but it crumbles about the room and makes a mess; and, besides, you waste the good bread, which is wrong..."

Ruskin's *Elements of Drawing*



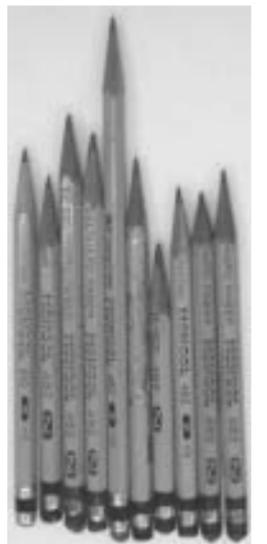
the realm of the visible. But another set of tools does just the opposite; they make things disappear, either permanently or provisionally. It has not always been easy to remove a line from a sheet of paper, and the quest for a better eraser has involved an unlikely cast of characters. Joseph Priestley, Edward Nairne, Charles Goodyear, Arthur Dremel, and Bette Nesmith Graham are among the scientists and inventors from the last two centuries who have contributed to the invisible history of erasing.

Erasing the Old-Fashioned Way

An architect in the 1720's who wanted to make changes to his sketch would have had limited options. Had he drawn in ink, he would have picked up a sharp knife and scraped away the lines, being careful not to damage the paper. Had he drawn in pencil, he would have crumbled some bread and gently ground the graphite away. Not only was this a waste of bread, as the ever-frugal architect and writer John Ruskin pointed out a century later, but it must have made for a messy drafting room. The 18th century was a restless time, full of discovery and invention, so it is not sur-

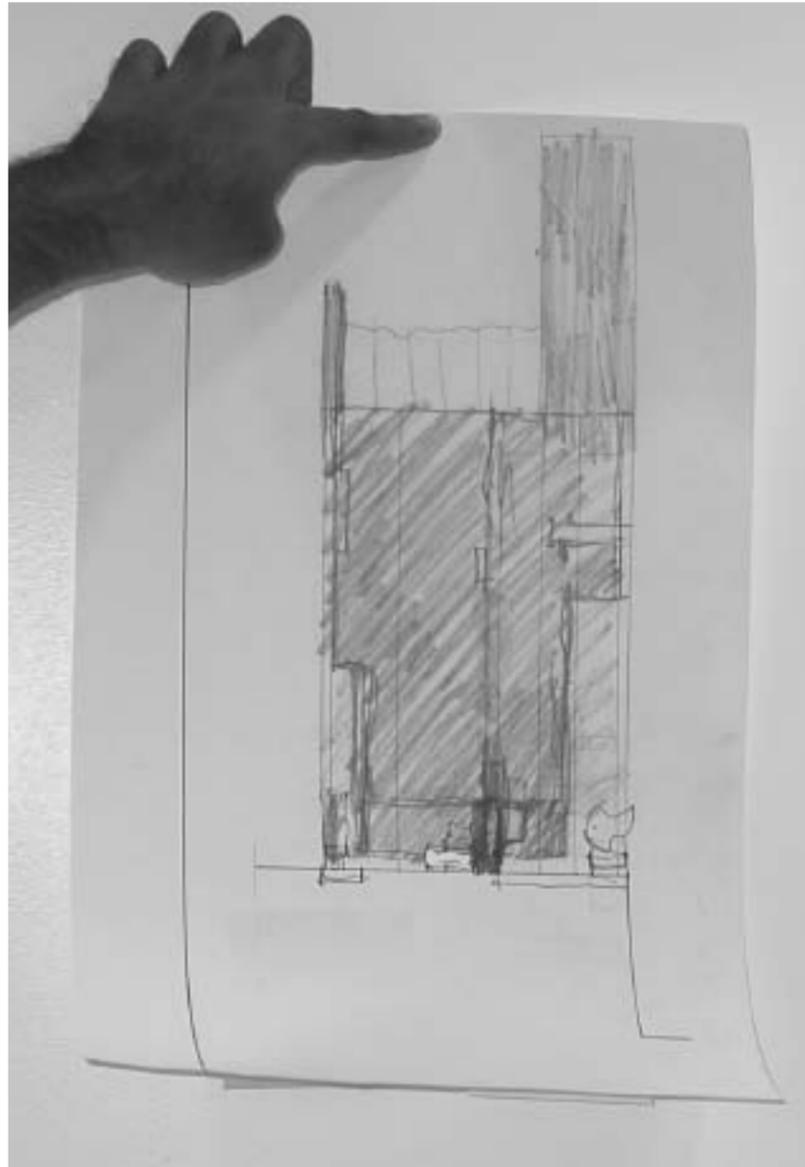
prising that the Age of Enlightenment also gave us a better eraser. Joseph Priestley, better known for identifying the element oxygen, is credited with discovering that what was then known as *caoutchouc*, the material that actually comes from the rubber tree, could be used as an eraser. While writing a version of his *History of the Present State of Electricity* around 1767, Priestley had to draw his own illustrations, and while teaching himself the principles of drawing, realized he needed to know something about erasing. Allegedly grabbing a block of *caoutchouc* instead of a piece of bread, he found he could use it to "rub out" his mistakes. Calling the substance "rubber," he gave drafters everywhere an indispensable tool, and saved future generations from having to devise verb forms of *caoutchouc*.

It was instrument maker and inventor Edward Nairne, however, who saw a business opportunity. He surmised that it was not only amateurs like Priestley, but professional drafters, as well, who might like an easy way to reconsider their lines. Nairne, whose discoveries and inventions rivaled his contemporary Priestley's, began selling rubber erasers. While better



above / A sampling of #2 pencils used by architect Paul Rudolph. Photo by Reed Haslach, items courtesy of the Library of Congress

top / A historic advertisement for the Dremel® electric eraser. Courtesy of the Dremel Company



Autodesk's new software, Revit, takes a different approach to the graphics on the screen. Referred to as Building Information Modeling software, Revit produces **not so much a drawing of a building as a virtual construction**. An architect working in Revit still needs to be able to modify or eliminate elements, but since it is not really a drawing, an eraser does not seem to be quite right. Modifying a virtual construction requires a virtual sledgehammer so Revit has a hammer as its icon for virtual demolitions. A click on the "demolish" icon converts the cursor itself into a hammer, and any element touched by the hammer turns into dotted lines. Or is it virtual dust? A click on the "undo" icon restores the element to solidity, which neither the king's horses nor his men could accomplish for Humpty Dumpty.

Operating systems often have a desktop icon for "trashcan" or "recycle bin," yet most CAD software does not include a similar location within the program for elements that may be interesting but are not immediately useful. What can an architect do with a beautiful staircase that doesn't fit in a newly downsized room? Or a stone fireplace too expensive for the current project, but too thoroughly detailed to delete? Some architects have developed their own techniques for this: making "junkyard" files where those items can be stored. Veteran users of Bentley Systems' Microstation all know about "Level 63," the truth of which is less mysterious than it sounds. "Levels" refers not to the floors of a building, but to the levels of information that can be layered onto a drawing. There are 63 levels, but only 62 of them contain information that will appear on a printed drawing. Thus, the enigmatic

Level 63 is where those items in a project go that have been revised, moved, and otherwise exiled, but that the design team may not want to delete just yet.

Faster, easier, more accurately... these have been the guiding values driving innovation in both drawing and erasing technologies. Even retracing earlier design decisions has been made more efficient; Microstation lets users revisit the design history of an element, with each version listed in chronological order. But speed and accuracy are more important in some phases of design than in others and the design history of an element can sometimes be represented on a single drawing. Billie Tsien, of TWBTA, warns that trouble can hide in a computer drawing. The clean screen never shows the distress that paper shows when it has been scraped, erased, and drawn over. Borrowing a tool more common to pre-computer office work, TWBTA regularly uses correction fluid not so much to erase elements, but to draw attention to the areas that need work. Correction fluid was developed to be invisible, but architects have a long tradition of appropriating tools made for one purpose and putting them to use for another. In this case, Bette Nesmith Graham, better known as the mother of musician Mike Nesmith (yes, the one from the 1960s pop group The Monkees), was also the proverbial mother of invention as a post-war secretary. Thinking like a painter who wants to redo a section of a canvas, she was hoping to conceal her mistakes, but there are architects who use the substance for precisely the opposite reason. Now, correction fluid comes in a pen-like tool, which is more in keeping with the way architects draw than the painterly fluid. The BIC cor-



poration, makers of Wite-Out, proudly boasts that their product "holds like a pen" for a "comfortable correcting experience."

Yet, the correcting experience is rarely comfortable. Deciding which ideas can stay and which must go is at the core of architectural judgment, and one is never comfortable doing it. **Architects' studios are stuffed with sketches of designs that never found their way into built form, but nonetheless had enough value to save them from the electric eraser**, or the delete button. The eraser—along with all of its digital descendents—is the tool of re-design, as the pencil is a tool of design, letting the architect draw and re-draw toward the solution. The drawing paper or the refreshed screen may appear to be blank, **but the imagination of the architect, the ultimate external storage device, is filled with all of those ideas that have been moved to the "junkyard," "saved-as," whited-out, exiled to Level 63, rolled up in a tube, but never entirely erased...**



top / An electric eraser used by Tod Williams Billie Tsien Architects. Photo by Evan Ripley

above / An eraser shield used by Tod Williams Billie Tsien Architects. Photo by Evan Ripley



top / A sketch of the façade of the American Folk Art Museum by Tod Williams Billie Tsien Architects, showing marks with Wite-Out near the bottom. Photo by Evan Ripley

above / A Wite-Out pen used by Tod Williams Billie Tsien Architects. Photo by Evan Ripley

"I have rewritten—often several times—every word I have ever written. My pencils outlast their erasers."

Vladimir Nabokov

Retooling the Architecture Machine

Innovations of Digitally-Driven Architecture

by Kevin R. Klinger

Kevin R. Klinger is associate professor of architecture and fellow of the Center for Media Design at Ball State University, and currently serves as president of ACADIA, the Association for Computer Aided Design in Architecture.

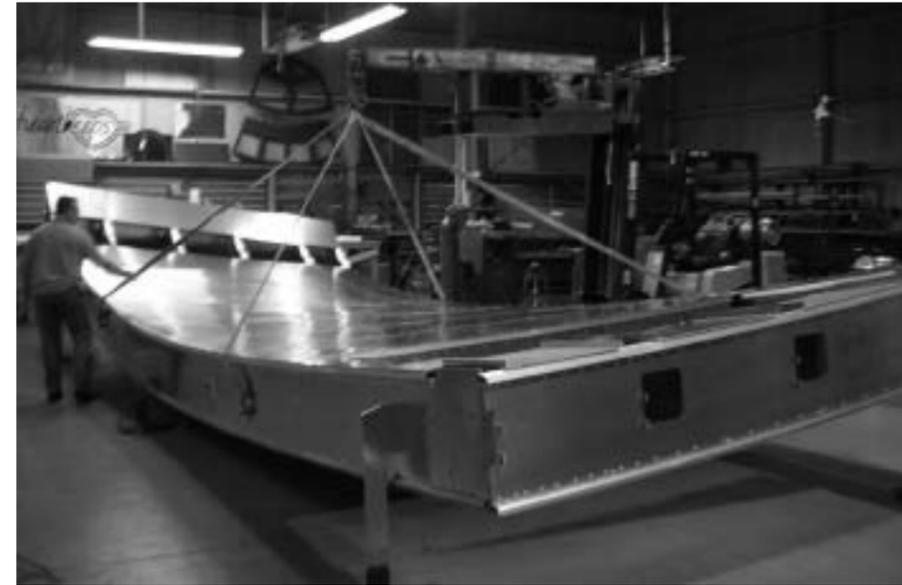


right / Communication and collaboration exchange between Professor Kevin Klinger, Ball State University students, and stone fabricators. Courtesy of Kevin Klinger

In the years which have been devoted in my own life to working out in stubborn materials a feeling for the beautiful... a hope has grown stronger with the experience of each year, amounting now to a gradually deepening conviction that in the Machine lies the only future of art and craft — as I believe, a glorious future; that the Machine is, in fact, the metamorphosis of ancient art and craft; that we are at last face to face with the machine — the modern Sphinx — whose riddle the artist must solve if he would that art live.

Frank Lloyd Wright,
“The Art and Craft of the Machine.”
Address to the Chicago Arts and Crafts Society,
at Hull House, March 6, 1901.

DIGITAL TECHNOLOGY IS RAPIDLY SHIFTING the way architecture is designed and made. With a raft of software now at their disposal, architects can create a digital model of a building and all of its elements, and in turn use this three-dimensional information to construct actual building components using machines driven by CNC (computer numerical control) and other advanced manufacturing techniques. Increasingly, buildings are being prefabricated within factory settings reminiscent of the automobile-, airplane-, and ship-building industries. Both the ways in which we think about architecture and the instruments and techniques we use to measure, observe, envision, represent, and fabricate architecture, are changing dramatically as we retool all of the mechanisms for



developing and producing a built work. We have perhaps arrived at a new “Architecture Machine,” slightly different from the one suggested by Nicholas Negroponte in his 1970 book by the same title.

In the recent book *Architecture in the Digital Age: Design and Manufacturing*, editor and author Branko Kolarevic asserts, “Digital technologies are enabling a direct correlation between what can be designed and what can be built, thus bringing to the forefront the issue of the significance of information, i.e. the issues of production, communication, application, and control of information in the building industry. By integrating design, analysis, manufacture, and the assembly of buildings around digital technologies, architects, engineers, and builders have an opportunity to fundamentally redefine the relationships between conception and production. The currently separate professional realms of architecture, engineering, and construction can be integrated into a relatively seamless digital collaborative enterprise...”

Technologically driven change has always been a catalyst for new ideas in architecture, and today, digital technology is a key agent for innovation in design and construction. The central requirement is the clear, reliable, and consistent exchange of information among all parties involved in creating a given project.

Retooling Fabrication

Innovative building fabrication techniques (i.e., the processes of manufacturing the various physical components of buildings) that were once considered at the experimental edge are becoming commonplace and are changing the definition and organization of architectural practice. Increasingly, the design process entails a kind of “conversation” between digital visualization and digital production. The project is developed digitally and enters multiple feedback loops from conception through final construction.

Once the design information is ready for translation into physical form, the digital files used to generate the project are then prepared so as to drive the fabrication process. The cladding of the Porter House Condominium, a recent project in New York by SHoP Architects, is an innovative example of this in practice. Digital information was fed directly into a digitally controlled two-dimensional cutter to produce the zinc panels that line the building’s façades, creating a smooth transition between the design and the fabrication process, and eliminating the need for typical “shop drawings” (drawings prepared by the fabricator to confirm that a given product will be consistent with the architect’s intentions).

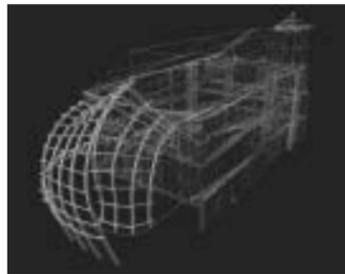
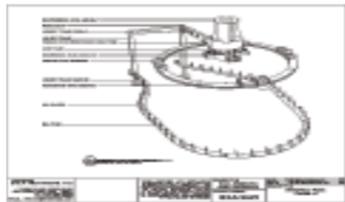


top left / An assembled building skin “panel” at A. Zahner’s fabrication facility in Kansas City is hoisted and ready to be loaded on a truck for site delivery. Courtesy of Kevin Klinger and Zahner

top / Digital tools (CNC milling machines and laser cutters) at Ball State University College of Architecture and Planning Fab Lab Director, Josh Vermillion digitally fabricates prototypes of design work. Courtesy of Ball State University

above / SHoP Architects’ Porter House renovation and addition with zinc panel skin. The computer numerical control (CNC) cutter used to fabricate the zinc panels allowed each panel to be unique in shape. Courtesy of SHoP Architects

Varying degrees of digital fabrication are employed in SHoP's innovative practice. The recently completed *Camera Obscura* is an example of a 100 percent digitally fabricated project. Rather than using the traditional plans, elevations, and cross-sections to explain how to assemble the building, SHoP used three-dimensional diagrams directly generated from the computer model to explain where each assemblage was located in the completed structure. At the 2003 ACADIA conference at Ball State University, SHoP partner Chris Sharples likened this innovative process of assembly to a "very large model airplane kit, just like when you were a kid."



top / SHoP architects' completed *Camera Obscura*: 100% of the components were digitally fabricated. Courtesy of SHoP Architects

center / Representation for fabrication and assembly of "sectioned" rib structure and panels for *Camera Obscura* by SHoP Architects. Courtesy of SHoP Architects

bottom / Wireframe of Apse-Traction project (a collaboration between Dean Marchetto Architects and the Product Architecture Lab at Stevens Institute of Technology, directed by John Nastasi). Courtesy of John Nastasi

top right / Engineer from Zahner using CATIA and ProEngineer softwares to design a titanium building skin. Courtesy of Kevin Klinger and Zahner



ing, Skanska International for the construction, A. Zahner for fabrication of the metal skins, CAPCO for the structural steel, John A. Martin for the structural engineering, and others. The digital master model was at the center of this exchange with all of the participants weighing in at various stages.

Retooling Software

SmartGeometry, Revit, Digital Project, CATIA, Solidworks, Rhinoceros, Maya, Pro Engineer, FormZ, SurfCAM, MasterCAM are just some of the new modeling and machining software products that are quickly becoming part of a standard toolkit for digital practices. Over the years, various software programs have become much more mutually transparent, thus facilitating the import/export of data. In fact, most serious digitally-driven architects end up developing their own particular software and/or code.

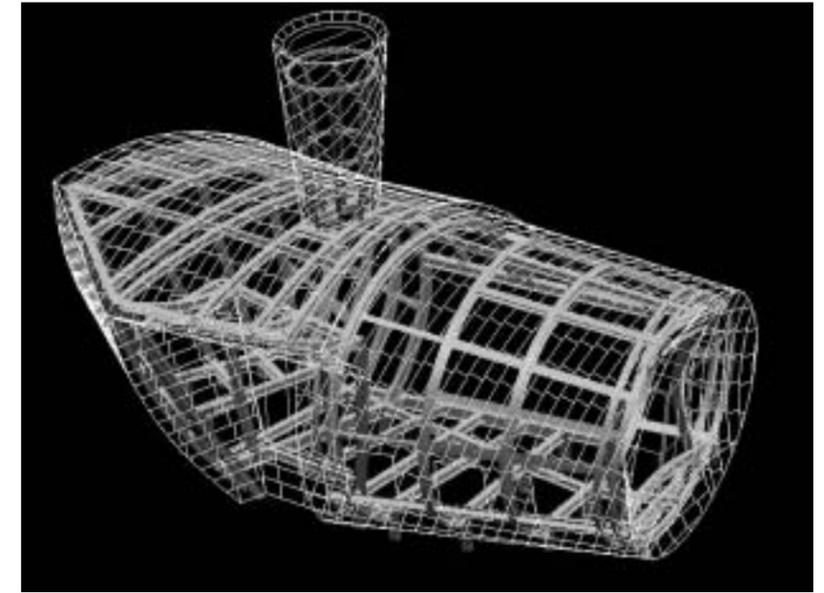
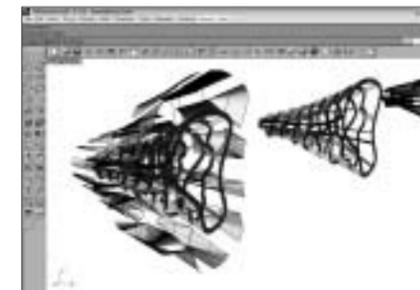
Retooling Representation

In the late 20th century, prominent "paper architects"—those known primarily for their ideas and proposals, rather than completed buildings—relied heavily upon experimentations in representation. A number of these "paper architects" (such as Daniel Libeskind, Zaha Hadid, Rem Koolhaas, Peter Eisenman, Thom Mayne, and Bernard Tschumi, et al.) are now actively engaged in building, leading the profession, and demonstrating that experimental representation methods they used in the past are today directly informing the design processes in their built work.

Similarly, digitally-driven architecture today entails many experiments that suggest promising new directions for the future of design. Innovative representational devices are evolving which allow new forms of organizing and visualizing complex data—a necessity for directing machines to follow multiple levels of operations during the fabrication process. These representational devices reveal relationships unable to be considered in the original conception of the project, and provide visual feedback during a dynamic design process. Concepts of efficiency, nesting, unfolding, surface optimization, and material tolerances all grow out of the need to direct machines to cut, bend, and fold precise physical shapes. However, these representations also inform the design process as feedback for new design iterations before final fabrication.

Retooling Observation

Observations of existing places can be recorded visually through sketches, constructed perspectives, *camera obscura* renderings, photography, and video, with dramatically different results. Today, when we observe the natural world through a digital lens, it can alter our perception of a place, and can even augment our understanding of it. Digital devices reveal layers of information concealed within the captured scene. To see a place clearly, one must open one's eyes, ask oneself questions, and distill what the eyes see. To know a place truly, one must explore and analyze what the eye doesn't see. Digitally augmented observation techniques—such as motion capture, serial digital photography, filtered video/images, digital collage, and multimedia imaging—can be used to



reveal hidden layers and produce analytical narratives of our visual observations.

As William Mitchell outlined during the nascency of digital image production in his book *The Reconfigured Eye: Visual Truth in the Post-Photographic Era*, [digital images] can be used to yield new forms of understanding, but they can also disturb and disorient by blurring comfortable boundaries and by encouraging transgression of rules on which we have come to rely." Augmented visions render observation of the world in new terms, and represent new techniques for digitally attuned practices.

Retooling the Future: A New Architecture Machine

The Association for Computer Aided Design in Architecture (ACADIA) was formed in the early 1980s for the purpose of facilitating communication and critical thinking regarding the use of computers in architecture, planning, and building science. To understand how digital tools have evolved, it is informative to examine the shifts of topics discussed in ACADIA's conferences and publications as computing shifted from mainframes to PCs and software programs became ubiquitous. ACADIA themes today are about Smart Architecture (buildings that use electronics, for example, to maximize occupant comfort and minimize

bottom left / Screen capture of a Ball State University master's thesis student project demonstrating a "sectioning" technique to develop a three-dimensional product from two-dimensional sheet material. Courtesy of Ball State University

above / Ray and Maria Stata Center at MIT, CATIA model, 2001, Gehry Partners, LLP. Courtesy Gehry Partners, LLP, Los Angeles

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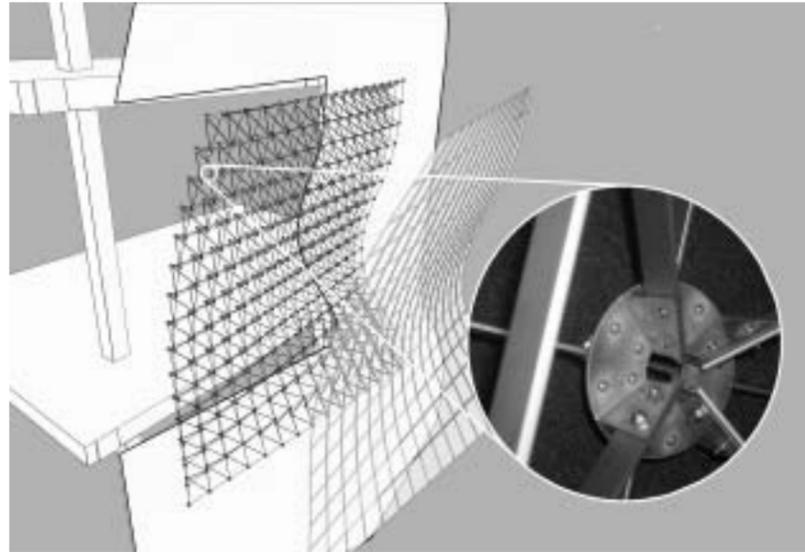
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above / Algorithmically derived "Trusset," a gusset plate space-truss structural system designed and fabricated by Cory Clarke and Phillip Anzalone, co-directors, Avery Fabrication and Material Conservation Lab, Columbia University.
Courtesy of Cory Clarke and Philip Anzalone

bottom right / Designers and fabricators digitally recording fabrication processes.
Courtesy of Kevin Klingner

energy consumption) (2005), Digital Fabrication (2004, in partnership with the AIA Technology in Architectural Practice group), and Digital Discourse (2003).

Scholarship ranges from computational tools to visualization, representation, observation, theory, pedagogy, and practice.

It is obvious that well-developed digital skills will be absolutely necessary for future innovative design, construction, and architectural practice. To develop a digital acumen for innovative design, construction, and architecture, one needs a strong and broad skill set. We can no longer think about CAD-related software in the simple terms we have known; rather, we must learn a fleet of software, coupled with an armada of digital skills, and still retain critical objectivity regarding each program's value and limitations. The list of digital skills necessary to operate these "tools of the imagination" continues to grow: two-dimensional composition, vector graphics, image manipulation, three-dimensional modeling, surface modeling, solid modeling, parametric modeling, video editing, motion graphics, rendering, animation, VRML (Virtual Reality Modeling Language), three-dimensional printing, stereolithography, database development, scripting, GIS (geographic information systems), web interface, fabrication, performance analysis, and lighting simulation are a just few areas that may

require proficiencies. It would be impossible to elaborate on all of these techniques in the limited space of this article, but the list gives the reader a sense of the broad range of distinct skills that now comprise true digital literacy.

New non-traditional programs are emerging, such as the Product-Architecture Lab at Stevens Institute of Technology, directed by John Nastasi. Traditional architecture programs as well are evolving such as illustrated in this article. Significant research is occurring at places like Columbia University with Cory Clarke and Phillip Anzalone. Ball State University is exploring the potential for a post-professional degree in digital fabrication as well as a digital fabrication Master of Architecture concentration linked to other concentrations in sustainability, etc. Countless other programs are presently exploring potentials of digital fabrication within the architecture curriculum. We are just beginning to scratch the surface.

We have embarked upon a great new age of architectural exploration brought on by critically examining the affects of digital tools, and the machines they control; as Wright suggested a century prior: "whose riddle the artist must solve if he would that art live." This new age of exploration will significantly transform both the practice of and the thinking about architecture—indeed, digital technology has already significantly launched a retooling of the way architecture is conceived and buildings are created. •



Construction Watch Tours

Stepping into the Building Process by Paul Killmer

THE NATIONAL BUILDING MUSEUM puts its mission to "explore the world we build for ourselves" into literal practice with its distinctive and popular Construction Watch Tours. A hallmark of the Museum's programming since the institution's beginning, these tours provide members an up-close understanding of the construction and design of many of Washington's fascinating building projects—from bridges and embassies to museums and condominiums. Few institutions in the U.S. offer such a regular and varied array of construction tours.

Usually offered twice a month, Construction Watch Tours normally last between two and three hours. Each tour is limited to approximately 25 Museum members. Often, the projects visited aren't open to the public even after they are completed. Because the tours are led by developers, architects, and contractors, they offer direct access to key figures who are shaping our built environment.

Construction Watch Tours highlight special construction methods and innovative technologies used in the building process. Participants touring the Music Center at Strathmore in Bethesda, Maryland, for instance, learned about that building's huge glass curtain wall. Some tours have focused on "green" building strategies, while others have examined preservation of historic buildings. Early this year, the Museum organized an all-day bus tour to James Madison's Montpelier, in Virginia, for a look at the complicated preservation efforts underway there. This summer, members toured the restoration of the historic residence of the Turkish ambassador.



Tours have included visits to the new embassies of Nigeria, Slovenia, Ethiopia, Switzerland, and Ivory Coast. Members have received special access to the National Museum of the American Indian and the U.S. Botanic Garden on the Mall and to the National Museum of the Marine Corps in Quantico, Virginia. Other tours have focused on sustainable design projects, including the Greenpeace USA headquarters and the offices for Environmental Defense. The Museum also chartered a boat for a river tour of the massive Woodrow Wilson Bridge, now under construction in Virginia.

Construction Watch Tours are a valuable benefit of membership in the National Building Museum. If you are not already a member, join today, so that you can enjoy these ongoing opportunities to get behind the scenes at major construction projects in the Washington area. •



top / A Construction Watch Tour of the new Katzen Arts Center at American University.
Photo by National Building Museum staff

above / Members tour the National Park Seminary in Silver Spring, Maryland.
Photo by National Building Museum staff

2005 Honor Award Gala a Big Success

Nearly 900 people filled the National Building Museum's elegant Great Hall on June 1 to celebrate Forest City Enterprises, recipient of the Museum's Honor Award for 2005. Forest City, a major real estate development firm headquartered in Cleveland, earned the award for its long-standing commitment to revitalizing American cities, its growing focus on sustainable design and planning, and its track record in developing successful public-private partnerships to create thriving communities across the United States. Remarkably, since its founding in 1921 as a lumber company, Forest City has remained under the leadership of the interrelated Ratner, Shafran, and Miller families, who have been widely recognized not only for their business acumen, but also for their philanthropic endeavors.

While the Honor Award presents an opportunity for the Museum to pay tribute to those who have made significant contributions to the built environment, it is also the centerpiece of the Museum's annual fundraising activities. This year, the gala brought in \$1,000,000, breaking the seven-figure threshold for only the second time in the award's 19-year history. These funds help to make the Museum's exhibitions and education programs possible, and the board and staff express their deep gratitude to all who contributed to this year's event.

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above / Museum chair Carolyn Brody and executive director Chase W. Rynd congratulate Albert Ratner on his acceptance of the 2005 Honor Award. Photo by F.T. Eyre

below / The Great Hall, elegantly decorated for the award gala. Photo by F.T. Eyre



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The following distinguished professionals and business leaders have recently been elected to the National Building Museum's Board of Trustees:

WILLIAM B. ALSUP III joined Hines in 1979, and is now a senior vice president of the company, with responsibility for the development, acquisition, leasing, and management of properties in Washington, DC and along the East Coast. An active participant in Museum programs for several years, Alsup holds a Bachelor of Science in economics from Hampden-Sydney College, and an MBA from the University of North Carolina.



Frank Anton

FRANK ANTON is president of Hanley Wood, LLC, which produces a variety of magazines, trade shows, conferences, websites, and information resources serving the residential and commercial construction markets. He formerly served as editor and publisher of *Builder* magazine, the company's flagship publication. Anton is a member of the board of American Business Media and serves on the executive committee of Harvard University's Joint Center for Housing Studies. He is a graduate of Dartmouth College and holds a master's degree in journalism from Northwestern University.



Joan Baggett Calambokidis

JOAN BAGGETT CALAMBOKIDIS is president of the International Masonry Institute (IMI), a labor-management trust fund that oversees training and promotion for the union masonry industry. Before joining IMI, she had a varied career in governmental affairs and public service, having served as assistant to the president and director of political affairs under President Bill Clinton and chief of staff of the Democratic National Committee. She is currently on the board of the National Democratic Institute for International Affairs, and was a member of the US delegation observing the national elections in Bosnia-Herzegovina in 1999. Calambokidis is a graduate of the University of Alabama.

MELISSA A. MOSS is senior vice president and personal investment counselor for Capital Guardian Trust Company's Personal Investment Management division. She was previously the president and CEO of Women's Consumer Network, a direct marketing and Internet company that she founded after a 20-year career in politics and government, including a stint as director of the Office of Business Liaison at the US Department of Commerce. One of the founders of the Democratic Leadership Council, Moss now serves on the boards of Wolf Trap and the National Partnership for Women and Families. She holds an undergraduate degree from UCLA and a master's degree from Harvard University.



Melissa A. Moss

Returning to the Board of Trustees after a three-year hiatus is **WHAYNE S. QUIN**, a partner in the law firm of Holland & Knight. Quin's areas of expertise include land use, zoning, urban planning, building and housing codes, preservation, transportation, and other real estate matters. He recently served as chairman of Children's National Medical Center and has been on the boards of Jubilee Enterprise of Greater Washington and the Free the Children Trust. A graduate of Vanderbilt University, he received his law degree from the University of Virginia.

PHILIPPE ROLLIER is president and CEO of Lafarge North America, the largest producer of cement and concrete in the United States and Canada and a major supplier of mineral aggregates and gypsum. He went to work at Lafarge's Paris headquarters in 1969, and subsequently held senior executive positions with the company in the United Kingdom and Canada. In 1999, he was appointed an executive vice president of Lafarge Group. Rollier holds both an engineering degree in agronomy and an MBA from the Institut d'Etudes Politiques in Paris.



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STEPHEN E. SANDHERR, chief executive officer of the Associated General Contractors of America (AGC), first joined the organization's staff in 1984. After a brief stint in private practice with the law firm of Thompson, Mann & Hudson and as a staff attorney for the National Association of Home Builders, he returned to AGC in 1991 and was promoted to his current position in 1997. Sandherr received a B.S. in political science from the University of Scranton and a law degree from The Catholic University of America.

Mystery Building

Several different buildings have borne the same name as this structure over time. Can you identify the building, its location, and its architect? Send responses to:

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Correct responders will be credited in the next issue of *Blueprints*.



Celebrating 25 Years

We've been talking about it for months, and now it's finally here—the Museum's 25th Anniversary Bash! So grab your party hat for this silver-themed celebration sure to knock your socks off! The party on Saturday, October 29, 2005, begins at 8:00 pm with a full night of live entertainment, dancing, gourmet munchies, neon cocktails, a luxury auction and raffle, celebrity guests, noted architects and designers, and more. When the revelry ends at midnight—complete with fireworks!—you could be going home with a raffle or auction win, like a vacation package, a private dinner with foreign ambassadors, a weekend getaway, items from noted architects, or even a new set of wheels! For an extra treat, support the Museum at the Minaret level and join the VIP reception, or sign on as a Tower or Spire and gain access to private lounges, get a great view from an exclusive fourth-floor balcony celebration, and take home special gifts for your guests.

Single tickets start at \$75 for members (\$95 for nonmembers). Higher support levels include multiple tickets and a myriad of extra benefits: Pinnacles (\$125; \$150 nonmembers), Minarets (\$425; \$500 nonmembers), Domes (\$1,275; \$1,500 nonmembers), Towers (\$4,500; \$5,000 nonmembers), and Spires (\$9,000; \$10,000 nonmembers). All proceeds support the Museum's exhibitions and education programs. For more information on support levels and benefits, or to purchase tickets, call 202.272.2448, x3559 or visit www.nbm.org.

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