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The Cruise is a just-released documentary film that architects are bound to talk about. It's the story—or performance—of Timothy "Speed" Levitch, a tour guide who loves New York obsessively: its streets, its buildings, its grunge, its detail. Day after day he mounts a double-decker Gray Line bus and spills out a verbal rhapsody, a riff that celebrates the power of the city, breaking down the whole urban fabric into a wealth of history and rationale for ordinary and sometimes bemused folks, weaving architectural and social history into a nonstop monologue. Levitch is funny and blindingly articulate, and although apparently emotionally troubled, he is an arch, ironic, yet passionate lover of buildings and streets, a kind of Jane Jacobs on speed.

While we may never reach Levitch's manic level, he's a freewheeling brother of sorts to architects. Any time we travel, our sketchbooks are tucked into the briefcase, whipped out to catch polyphonic skylines or single, simple tones. We photograph incessantly, to capture or isolate reality and to relate the larger world to our own experience. As tourists, we walk with fervor, burning the physical world into our consciousness, where it can be revisited in the future to inform our own designs. Free time for us means time to love architecture.

I felt a kinship with Levitch when he interrupted a walk across the Brooklyn Bridge to hug the stones—and meant it. While I have never embraced those granite blocks, I have grazed them with my hands and traced the outline of the bridge's massive Gothic arches with my eyes. In another scene, he stands transfixed by Louis Sullivan's Condict Building and groans with comic abandon. This guy really loves architecture.

Levitch hits on a singular term that sums up his highest admiration. Michael Sorkin, writing in the pages of this magazine, talked about the "urban vibe" as an ineffable, but discernible, spirit that inhabits whole cities. Levitch's descriptive, kin to Sorkin's, is "cruise," which primarily refers to products of human design that promote the flow of energy, of freedom and individual creative potential; unlike vibe, "cruise" encompasses individual buildings and streets, as well as ensembles of architectural elements, big or tiny. In New York, the canyons of Wall Street, the Brooklyn Bridge, Greenwich Village, as well as a rusted floret on a cast-iron storefront all qualify as "cruise." For Levitch, it is a way of life. The urban grid, by contrast, represents imposed order, an arbitrary pattern that stifles creativity. Again he has a term, "anti-cruise," that is epitomized in the city's police headquarters, a monolithic, hierarchical structure. Lockup stops the flow.

The movie, directed in a gritty style by Bennett Miller, was very "cruise" for me. I noticed that the architects in the audience laughed louder and clapped longer during the credits than the rest of the crowd. Perhaps others found Levitch's idiosyncratic life disquieting; perhaps he was too over-the-top for a public unaccustomed to such displays of ardor for inanimate objects. I left smiling, making my own list of contemporary places outside New York that qualify as "cruise." Here are a few:

London's high-tech transportation buildings, like Nicholas Grimshaw's Waterloo Station, that erupt from the city's ancient stones. They are jolts of energy, light-filled and paper-thin, reinvigorating layers of history.

Frank Gehry's office in Santa Monica, a factory-like warren of humming talent, where cardboard models with swooping roofs litter the tabletops and an armlike laser converts the actual into the virtual.

Boston's Central Artery, a churning mass of tunnels and highway construction transforming the waterfront for people. The cruise in action.

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LETTERS

An engineer for design-build
Robert Ivy’s October editorial on design-build [page 15] and the article “Listening to Engineers” [page 108] are two excellent examples of stories that promote stronger relationships between architects and engineers.

As an engineer working alongside architects, I find that the evolution of project delivery methods is both exciting and necessary. True project teamwork involving owners, design professionals, and contractors can mean successful projects, delivered on time and within budget guidelines. While new project delivery methods, as well as the faster pace of projects, may be unsettling, we all need to adapt to these changes. One of the biggest challenges we face is how to maintain our professionalism as we adapt. Thank you for making us think about the new relationships and changes going on around us.

—Michael Cunningham, PE
State Farm Insurance Co.
Bloomington, Ill.

Owners, at least, like PMs
“Listening to Engineers” in the October issue was very enlightening.

Engineers and architects are concerned that their responsibilities have been eroded by project managers and construction managers. Did it ever occur to the design industry that it has itself to blame? While designers feel that project managers are, as Norman Kurtz put it, “unnecessary and don’t help the process,” owners feel otherwise. More project management firms are thriving in today’s market despite the supposed competition of lower fee options, and more owners are developing internal project management departments. These people are better paid than most architects and engineers.

Despite Froumz Narov’s claim that project managers “have no technical ability, no knowledge of owner needs,” most project managers have architectural, engineering, or construction backgrounds and degrees, and many are licensed. In fact, they are often the only licensed professionals in the room, considering that on many projects, the active members of the design team are young and unlicensed.

Most project managers are very talented architects and engineers who were disillusioned with the low pay, long hours, lack of respect, and internal politics that come with working in design firms. Design firms have spent the last two or three decades cutting their fees in an effort to get jobs. By doing this, they have undermined their credibility with owners, reduced their responsibilities, and staffed projects with low-paid, inexperienced professionals. Often the result is poor documentation, more liability, and damaged reputations. Perhaps design and engineering firms should spend less time griping and making disparaging remarks about project managers and others who have the respect of the owners, and instead work to fix the problems inside their respective professions.

—Charles S. Maggio, AIA
Project Director
Granary Associates
via E-mail

Keep in touch
My experience is evidence that Judson Kline gives good advice when he encourages architects to “promote interest at the high school level” [Speak Out, October, page 24]. As a sophomore in high school I had an interest in architecture and wrote letters to HOK, Richard Meier, and Helmut Jahn, and included photos of some of my renderings. Much to my surprise, I received letters from all three. Mr. Meier wrote, “It is a true gift to be so focused and directed so early in life. Keep up the good work.” My enthusiasm grew.

Other letters followed to Cesar Pelli, Michael Graves, Dirk Lohan, Herbert Beckhard, and Eugene Kohn. All of them responded, many sending monographs.

I realized that the only real way to judge whether or not architecture was for me was to test the waters. Murphy/Jahn was far beyond even what Mr. Kline suggests and gave me, a 16-year-old aspiring architect, a job at the firm.

Three years and a few gray hairs later, I have completed my third internship with Murphy/Jahn. I am now an architecture student at the University of Cincinnati, and I look forward to interning at other offices around the world, continuing to test the waters. The experiences and skills I gained as a high school student at Murphy/Jahn will be with me the rest of my career. I thank all the architects who responded to my letters. The few minutes it takes to respond to a letter from a student of any age can change a career, a life, forever.

—Tom Lee
Glenview, Ill.

Glass performance questioned

In the August article “Improving Glass Performance” [page 131], Stephen Daniels writes that, according to the head of building technologies at Lawrence Berkeley National Lab, “a building with a properly glazed facade that includes these new coatings can have a lower annual heating and cooling load than one with an R-19 insulated opaque wall.” Is the writer comparing the glazed facade with a totally unglazed wall or with an R-19 wall that has less efficient windows? The highest performing commercial window I’ve seen will, according to its manufacturer, do no better than R-6 overall. Much of this performance is due to a very large thermal break.

—Ian Van Driel
via E-mail

Technology editor Wendy Talarico responds:
The term “properly glazed” means that not only are windows with the best R-values utilized, but that the glazing is designed to interact with internal and external conditions. For example, solar gain can be maximized on cold days, actually adding heat to the building. Shading devices on warm days keep radiation at a minimum but permit natural light to enter, reducing the need for artificial lighting (which consumes energy and adds heat). Low-e glazings actually prevent heat loss during heating season by reflecting radiation back into the building. Certainly a wall that is fully glazed has a lower thermal value than one that is properly insulated to R-19, but well-placed glazing in a well-insulated wall is the best choice and will improve a building’s overall energy performance.

Credits/corrections

In the October coverage of the Gap office building (page 94), William McDonough + Partners should have been identified as the design architect and Gensler as the architect of record and interior designer. Ove Arup & Partners was the mechanical/electrical/plumbing engineer. The key player on the project for Gap Inc. was Eugene Torchia.

Also in the October issue, the credits for the Praxair Distribution Center (page 98) incorrectly gave Stephen Knowles, AIA, an FAIA designation.

The architects for the Telenor headquarters in Oslo (October, page 49) are NBBJ, HUS Sivilarkitekter MNL, and Per Knudsen Arkitekten as joint venture partners. The project executive is Bjarn C. Sarn.

The Zumtobel Staff product on page 168 of the November issue is the company’s curved track with Solar (not Dancer) track heads.

The Sigma Sigma Commons Tower mentioned in the November Correspondent’s File (page 38) was designed by Machado and Silvetti Associates; Rodolfo Machado was the partner-in-charge of the project.

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MENTORS  Maintaining a dual career in teaching and architecture requires a well-disciplined balancing act.

Lawrence Scarpa is a partner in the architectural firm Pugh + Scarpa, based in Santa Monica, California. He has taught at numerous schools, including UCLA, the University of Florida, and Mississippi State University.

Many practicing architects enjoy and thrive on teaching, while many academics want to maintain an architectural practice—but achieving the right balance between the two professions can be elusive. RECORD asked architect Lawrence Scarpa to offer his perspective on getting the best of both worlds.

I've been practicing architecture since 1986 and have taught and lectured part-time at the university level since 1985 at numerous schools. In that time, I've learned that maintaining a career in both fields is no easy task. Only the most extraordinary people under extraordinary circumstances can keep a successful full-time practice alongside a full-time teaching career.

To start with, don't overcommit. Clients and, especially, students know when you are overworked and when they are not getting the attention they need. Neither clients nor students will accept less than 100 percent dedication, and perception of less than 100 percent means failure. But how to maintain that 100 percent level in multiple endeavors?

Be prepared to work harder. To teach and practice requires more than a 9-to-5 effort; to do both means working long hours. Also, you don't have to go it alone. On the practice side, consider a practice partnership if you haven't already—but be certain your partner is fully aware of the details of your professional and academic endeavors. He or she can sit in for you with a client or deal with other client needs if you have another obligation.

As for the clients, be sure they know about your teaching schedule and remind them of your commitments when you are scheduling meetings and presentations. Open communication is essential and will help reduce conflicts. I have found that if a client knows about my extracurricular duties, he or she will be accepting and not reluctant to continue working with me.

If you haven't been involved with education and are looking to start, talk with teachers and peers; consistent interaction can lead to abundant opportunities. Partnership can also help on the teaching side. Consider team teaching, especially with classes such as design studios, which require an extensive time commitment. Co-teaching will be credited the same on your resume as a solo teaching gig, but it will reduce your physical burden, as well as give you a chance to share ideas.

Most architects want to teach in the design studio, but keep in mind that studios require the most hours with students and have the most unpredictable schedules. Consider teaching a seminar; they are just as important as studio sessions. And though they require as much, if not more, planning, the instructors have better control of their time and can teach effectively within scheduled periods. Furthermore, leading a seminar allows you to choose a topic that greatly interests you. Schools and administrators are open to good ideas; if you present them with an issue you want to teach about, they will likely accept it as a course.

Good ideas and good teaching can result in a faculty appointment. But you should carefully evaluate this choice as well. Consider teaching as adjunct faculty. While you may not receive medical insurance or other benefits of full-time faculty, you probably won't have to attend school and faculty meetings that don't pertain to your course. Not having to serve on committees or deal with school politics and fund-raising will free up precious time.

Teaching and practice both move in cycles. Sometimes I teach out of state as a visiting faculty member, but only when my practice is slow or my partner and key staff won't be stressed by my absence. I consider myself a full-time practitioner, but I have found that when I don't have academic duties, I miss teaching. You don't get complacent when you teach. Working with students, who find excitement in the simplest things, is invigorating.

It is possible to succeed in both areas. But you must make a difficult choice: whether to be a full-time architect and part-time teacher, or vice versa. Be aware that your part-time role, whichever it is, will often be overlooked. But the fulfillment that comes from a variety of experience is well worth the effort.

Questions: If you have a question about your career, professional ethics, the law, or any other facet of architecture, design, and construction, please send submissions by mail to Mentors, Architectural Record, Two Penn Plaza, New York, N.Y. 10121; by fax to 212/904-4256; or by E-mail by visiting www.archrecord.com and clicking on News/Features/Dialogue. Submissions may be edited for space and clarity.
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PULSE RECORD readers were asked:

Are competitions a fair and effective way to hire architects?

No: A design competition is a great way to generate ideas for a potential client. However, I believe that the process lacks fairness and effectiveness for clients as well as architects. Clients should investigate architecture firms of interest based on previous work, and then select a firm that will fit well with the client's needs throughout the process. Architects' time, effort, and money would be saved for more viable projects.

—Robert Marshall
Cedarwood Architectural Inc.
Akron, Ohio

No: I think it is most fair and beneficial to owners if they hire architects based on their track record.

—Roberto B. Yumol, AIA
Honolulu

No: Unlimited architectural competitions are a legacy of the days of the gentleman architect, who didn't have to make a living from his work. An elite jury would premiate the most attention-getting entry, not always the best entry. That participants in one of these competitions should pay to enter and then give hundreds of hours of free services is a concept that no other profession would accept. In addition, the winning project is often abandoned when it does not prove buildable or functional. The winners of invited and paid competitions, however, have a better record of actually getting a project built, because the clients have a real financial commitment to it.

—Henrik Bull, FAIA
San Francisco

Yes: The spirit of competition helps to inflame the imagination of the participants. However, it is important to educate those who run competitions on the investment of energy and resources made by architects.

—Bob Cardello
Greenwich, Conn.

Yes: Competitions can be fair and effective if they are managed by an unbiased third party.

—Glenn Sweitzer
Assistant Professor of Architecture
Cornell University
Ithaca, N.Y.

---

This Month's Question

Can a new building that ignores principles of sustainable design be considered a success?

Architects are discovering new ways to design buildings that consume less energy. Such advances are prominent in the work of innovators like Norman Foster and Ken Yeang. In their buildings, passive devices such as double-pane glazing, naturally ventilated atria, and sun shields diminish the need for mechanical and electrical systems. In Europe, sustainability is considered a first priority of design, while in the United States it is often considered a luxury.

Can a new building that ignores principles of sustainable design be considered a success?  □ Yes  □ No

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Note: Pulse reflects individual responses to each month's question and is not meant to be construed as formal research.
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BOOKS  Everyday matters: What the little things can tell us about the big picture.

BY DAVID SIMON MORTON


A body of literature has emerged in the past three decades, most noticeably in the past few years, in which authors explore buildings and places termed ordinary. Compared to the numerous studies of hero designers, these works consider a much wider set of questions about how people shape their spaces. Academics are primarily responsible for this development, a group including not just architectural theorists, but historians, sociologists, and economists as well. When we also consider the recent proliferation of academic conferences devoted to the subject, it would appear that the everyday moment has arrived.

With Outside Lies Magic: Regaining History and Awareness in Everyday Places, landscape historian John R. Stilgoe aims to turn readers into explorers, leading them behind commercial strips, along drainage ditches, across power-line right-of-ways, and through torn chain-link fences. The book treats these margins of life, places we are used to ignoring or abhorring, as essential material for the understanding of how the apparatus of new technologies has ordered our physical environment.

Visiting these places, Stilgoe tells us their histories: how asphalt created new roadside ecosystems, how fencing in the agricultural north differed from fencing in the freerange west, how street trees in every city, town, and village were felled to accommodate the demands of fire insurance companies that power lines have clear space around them. Discussions of railroad and mail-delivery infrastructures are not meant to be complete, but rather to provide the reader with model routes of discovery.

Occasionally Stilgoe departs from neutral observation. He is bothered by electric fences, gated communities, and highway motels, as they signify the disappearance of public space and neighborly trust. Exploring offers a solution: the more we wander places that are supposedly "off-limits," the more we recover them for public use.

Bill Stumpf, author of The Ice Palace of the title, which was designed and built pro bono by architects, engineers, and contractors for the 1992 St. Paul Winter Carnival. The palace was an unquestionable delight to the one million people who visited it that winter. Stumpf's message to architects, that there is a strong need for their civic involvement, is delivered with humor and without undue force.

Architecture of the Everyday, edited by Yale professors and New York-based architects Steven Harris and Deborah Berke, demonstrates a more fiercely articulated political agenda in a collection of what are mostly obtuse, academic essays. Behind several of the essays is the argument that everyday or generic architecture, as lived in by most of us, resists capitalist demands to keep up with the Joneses. By limiting their discussion primarily to issues of class, the essayists—and the editors who chose them—have narrowly selected their audience.

More engaging are the book's essays about houses designed by untrained architects (whose work is mistakenly called "everyday"), floor plans of the homes of famous TV families (see Exhibitions, page 25), and presentations of artworks that show the everyday world as ordered yet isolated and frightening.
Briefly Noted

Michael Sorkin, the critic (once for the Village Voice and now as a contributing editor to ARCHITECTURAL RECORD), prefers architecture that is green, exuberant, and expressive of what he calls a tolerant community "vibe." Michael Sorkin, the architect and planner, is guided by the same creed. Wiggle is the Michael Sorkin Studio's first published collection of work. The projects are cheery, rainbow-hued responses to often dire urban circumstances in places like East New York, Bucharest, and Beirut.

None of the projects have been built. Like the work of Archigram, an obvious and acknowledged inspiration, the drawings are hyper-developed fantasy. Conceived with humor and optimism, they were designed not to solve problems realistically but rather to guide urban problem-solving along humane paths. Many of the projects are urban master plans and appear to have been formulated in respect to how they might appear framed on a wall, not how they might appear to a hypothetical city dweller at ground level. In one design, large, rational circles interrupt a shattered urban grid—picturesque chaos. It's not a broken city, however. The urban fragments represent green public space emerging in places where most powerful interests would find it inconvenient. The vision may be impossible; the message is humanistic.


ARCHITECTURAL RECORD senior editor Clifford Pearson hopped the islands of Indonesia with photographer Bryan Whitney to research an architecture and a building culture that are unfamiliar to most Western eyes. The resulting book, Indonesia: Design and Culture, is an enormous effort. There are 13,000 to 17,000 islands in Indonesia (depending on the tide), populated by 200 million people tethered only loosely by several hundred different languages.

The work is a thorough survey, revealing what is modern, traditional, imported, inventive, and—to us—unusual in Indonesian design. The plurality of cultures and building practices makes generalization risky. "Indonesian," after all, may only mean what the regime wants it to mean. Pearson, however, finds meaningful commonalities among the major cultures he surveys. Indonesians, he writes, are bold designers, brave enough to be open to nature, combine clashing elements, and absorb foreign influences.
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CIRCLE 13 ON INQUIRY CARD
EXHIBITIONS  Domestic arrangements: a variety of shows look at everything from sitcom houses to men and women working as design partners.

Affinities with Architecture, Belk Gallery, Western Carolina University, Cullowhee, N.C., January 13–February 18, 1999; Carroll Reece Museum, East Tennessee State University, Johnson City, Tenn., March 4–April 20; Anderson Gallery School of the Arts, Virginia Commonwealth University, Richmond, June 4–July 25.

Fifteen: Jim Isermann Survey, University of North Texas Art Gallery, Denton, January 19–February 13, 1999; Santa Monica Museum of Art, Santa Monica, Calif., April 2–May 30; Weatherspoon Art Gallery, University of North Carolina, Greensboro, June 27–August 8; Institute of Contemporary Art, Philadelphia, September 11–October 31.

Young Americans 2, Saatchi Gallery, London, through November 22.


Affinities with Architecture; Fifteen: Jim Isermann Survey; Young Americans 2

When architects are inspired by contemporary art, the results can range from the sculpted forms of Frank Gehry's Guggenheim Museum in Bilbao to the zigzag layers of Daniel Libeskind's Jewish Museum in Berlin. A series of current exhibitions and books display the by-products of a reciprocal trend in contemporary art, as a group of young artists uses architectural devices to explore the construction of modern identity.

Winning widespread exposure in American and European galleries, these artists, all of whom grew up in the late 1950s and '60s, are obsessed with ordinary domestic architecture. What architects should find interesting—and disturbing—about this new aesthetic trend is the source of the fascination. Forget larger-than-life figures like Frank Lloyd Wright and Richard Meier. Popular culture—sitcom decor, thrift-shop design, and the outré glamour of Palm Springs during the era of the Rat Pack—defines this generation's idea of domesticity. Representing the coming-of-age of the Me Generation, their work is consumed with the self-conscious construction of identity in the form of mise-en-scènes.

Mark Bennett's obsessively detailed plans of the television sitcom homes of his youth are featured in Architecture of the Everyday, a book edited by Steven Harris and Deborah Berke (see Books, page 22), and in "Affinities with Architecture," a traveling exhibition organized by Sam Yates, director and curator of the Ewing Gallery of Art and Architecture at the University of Tennessee, Knoxville. In "Fifteen: Jim Isermann Survey," sponsored by the Institute of Visual Arts and the University of Wisconsin, Milwaukee, Isermann reveals in the visual pleasures of do-it-yourself domestic craft. Overseas, this trend surfaces in "Young Americans 2" at the Saatchi Gallery in London. In this survey of what's hot in U.S. art, Clay Ketter's art-as-carpentry celebrates the marriage of Mondrian and IKEA.

The artists included in these exhibitions use actual construction as a metaphor for the construction of the self. Their work is often frankly autobiographical, alluding in personal, confessional ways to their own childhoods. The objective of this new art is to fabricate self-contained fantasy worlds, using set design techniques and theatrical lighting effects. Domestic life absorbs Bennett and his colleagues, who focus on the personal over the public, manipulating familiar and ordinary images of the home to create surreal visions of the postwar suburbs in which so many of their generation were raised.

Mark Bennett works like a contemporary monk, transcribing onto paper every detail of a pop-culture televisual bible. Drawing the fictional homes of Lucy and Ricky Ricardo in I Love Lucy or Carol and Mike Brady in The Brady Bunch, Bennett fills in the architectural blanks, creating buildable homes, complete with furniture, implied by the screen's partial sets. (Bennett's day job as a postal worker in swank Beverly Hills hones his capacity to imagine houses he has never personally experienced.) The artist provides viewers with the layouts of ancillary spaces that we never see but know must be there. And attention New Urbanists: Bennett has documented that El Dorado of small-town America—Mayberry, the site of The Andy Griffith Show.

Without critiquing mass culture, Bennett expresses his television-
saturated generation's bittersweet awareness of the disparity between real life and life on TV. His work underscores a unique characteristic of television: because it comes into our homes, its simulations have the power to blur the distinction between reality and fiction. "I created the TV sitcom floor plans," Bennett has written about his art-as-autobiography, "because I love the families on television and I figured if I drew their houses or living environments, then they could become real and become my family. You can go home again, even if only on television.

Part arts-and-crafts devotee, part Sonny and Cher, Jim Isermann creates architectural art of psychedelic intensity. A current retrospective, curated by David Pagel, showcases Isermann's hand-loomed rugs, hand-woven fabrics, wall hangings, stained-glass windows, hooked shag paintings, and furniture in tableaux evocative of postwar suburban living rooms. Isermann's installations blur the boundaries between the hermetic art gallery and everyday life. His interiors and furnishings fuse the aesthetics of postwar abstract art with vernacular domestic forms and do-it-yourself craft techniques.

"Without exception," Pagel writes, "Isermann's streamlined hybridizations of media, styles, and sources begin with the simple demand that art increase the pleasure people take in their surroundings."

The current traveling exhibition can only suggest Isermann's flair with architectural settings, which has been demonstrated in two other installations, one in New York, the second in France. "TV Lounge" (1988), a television-centered rec room permanently installed in New York's American Museum of the Moving Image, offers visitors the chance to watch avant-garde videos and network sitcoms in a 1960s "conversation pit" with red shag carpeting, yellow linoleum flooring, and a built-in sofa and swivel chairs upholstered in black-and-white cowhide. A Victor Vasarely–like Op Art canvas of yellow and red circles is mirrored by a hand-hooked yarn hanging on an adjacent wall, showing Isermann's view of the reciprocal relationship between the fine and decorative arts.

Isermann's ability to envelop viewers in sensuous patterns peaked in his temporary 1993 remodeling of a duplex at Le Corbusier's Unité d'Habitation in Firminy-Vert, France. Like many artists of his Postmodern generation, Isermann knows the history of the visual arts, and he consciously fashions a hybrid of opposing aesthetic traditions in this installation. Decorating the interior of Le Corbusier's high-art Brutalist monument in a traditionally low-art way, Isermann covered virtually every surface in multicolored, hand-sewn fabric with matching linoleum and window curtains.

Similarly, Clay Ketter elevates carpentry and millwork into fine art at London's Saatchi Gallery. Like unfinished houses or soon-to-be-demolished buildings, there's an eerie feeling of absence in Ketter's work. His canvases range from monochromatic assemblies of drywall, gypsum, spackle, and steel trim to "traces paintings" that reveal the silhouettes of electrical outlets and wires. Ketter's wall structures recall the abstract compositions of Charles and Ray Eames's storage units for Herman Miller. But Ketter reverses the Eameses' adaptation of Mondrian-like canvases into useful furniture. Instead, he combines IKEA cabinets, melamine, and Masonite to create nonfunctional compartments.

In their fascination with vernacular architecture and design, the works of Isermann, Bennett, and Ketter are typically American. Without an elite, aristocratic tradition in the arts, American artists often look to the everyday to express the country's egalitarianism. Edward Hopper's roadside motels and urban diners house America's "lonely crowd," while Walker Evans elevates the common man with his photographs of rural churches and sharecroppers' cabins. Like Edward Ruscha, who devoted entire books to gas stations and Los Angeles apartments, however, this new generation of artists presents a more deadpan, ironic view of the vernacular. What makes them unique is their use of media not normally associated with fine art, like Bennett's architectural plans or Isermann's handcrafted furnishings.

Whereas Ketter and Isermann practice art as full-scale architectural and furniture elements, "Honey, I Shrunk the Art" might be the motto of many contemporary artists who use miniatures, dioramas, and other nontraditional media to create cinematic worlds where scale is eerily manipulated. For these artists, reality is a construction, fabricated in a studio like a model or a photograph. In the hands of artists like Michael Askin or the more established Chris Burden, miniatures based on toy train sets suggest these baby boomers' attempts to recapture their childhood. Especially elaborate are Gregory Crewdson's color photographs of dioramas, also included in Architecture of the Everyday. Copying the cheap rear-projection techniques of 1950s sci-fi films, Crewdson's suburban scenes foreground three-dimensional birds, butterflies, and other animals against more two-dimensional
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representations of suburban tract housing. Crewdson's images expose the man-made artificiality of the postwar suburb's concept of "nature," with its manicured lawns neatly divided by white picket fences. Malevolence seems to lurk behind Crewdson's placid everyday architecture, evoking the opening of David Lynch's movie Blue Velvet, where hordes of vicious ants wage war in the roots of small-town lawns.

The work of model-making artists like Crewdson is radically different from that of the previous generation of artists, whose affinities with architecture tend toward the monumental and heroic. There is nothing ordinary or comfortable about Richard Serra's monumental sculptures Torqued Ellipses, now on view at the Geffen Contemporary in Los Angeles. Just how far the new generation has moved from Serra's sublime aesthetic can be seen in Sam Durant's series of flimsy cardboard and foam core models of the idealistic postwar Case Study Houses in Los Angeles. Riddled with holes and graffiti, the models' decrepit states metaphorically comment, according to Durant, on how the "utopian ideals of Modern design mutated into the culture of corporate ideals," losing their progressive social agenda in the process. This loss of high ambition and the acceptance of a highly personal role for art is an underlying theme in the work of this new generation of artists who sew, remodel, art direct, and miniaturize a brave new world of domesticity. Donald Albrecht

Equal Partners: Men and Women Principals in Contemporary Architectural Practice

Smith College's "Equal Partners" exhibition asks an intriguing question about contemporary architectural practice, only to leave the answer floating in the speculative fog. The question: whether buildings designed collaboratively by men and women are somehow different, less aggressive, more ingratiating and contextual than those designed by men alone. The answer appears to be, "Who knows?"

Curator Helen Searing, an architectural historian at Smith, says her intention was to celebrate women making their way in a notoriously closed profession, not to make a polemical point about gender. "I don't know that there is some essential quality to a woman's designing or a man's," she explains. "On the other hand, the work presented here seems different from that produced by macho male architects. I like to think that the buildings are friendlier and more contextual, that they don't stand out so clearly as autonomous objects."

Searing invited 15 firms that operate as male/female partnerships
to submit one built and one unbuilt project. She wanted some geographical distribution and some diversity in style and methodology; the only unbendable rule was that the work must be collaborative.

The range of the submissions is impressive: from a large government center in China by Fred Koetter and Susie Kim to a pair of small, vernacular houses in western Massachusetts by Andrus Burr and Ann McCallum. Cigolle X Coleman Architects of Santa Monica are represented by their own live/work "canyon house," while the London firm Long & Kentish submitted its stunning National Maritime Museum in Cornwall, England, which uses tidal pools and canals in its design. The exhibition features churches, theaters, and airports, storytelling projects and highly theoretical ones.

One inescapable conclusion is that women architects are no longer restricted to picking draperies and paint colors. They are now moving into the upper tier, with Smith itself having a particularly impressive list of architect alumni, including Kim, Coleman, and M. J. Long.

Beyond that, the exhibition provides an instructive overview of the various formal strategies and representational techniques in contemporary practice. In addition to conventional plans, drawings, and models, it includes computer graphics, CD-ROMs and virtual-reality presentations.

All of this is valuable information, particularly for an undergraduate contemplating an architectural career. But on the question of how—or whether—women are transforming contemporary architectural practice, "Equal Partners" is less convincing.

The best illustration is a pair of houses by Los Angeles architect Craig Hodgetts, one designed in 1982 when he was a solo practitioner, the other in 1997 in collaboration with his wife, Ming Fung. Searing describes the first as "aggressive" and "mechanistic," while the second she praises as "contextual" and "connected to the landscape."

Unfortunately, it's impossible to say even this much about the other projects in the exhibition, which reveal little about their making. In the catalogue, Tod Williams and Billie Tsien describe their studio as "a family" in which each member is responsible for his or her own work, and also for the good of the whole. But there is no hint of this rich collaboration in the exhibition text, which is mostly about materials and technology.

In the end, it is perhaps best not to focus too much on the gender issue and instead see "Equal Partners" for what it is: a provocative, handsomely presented sampler of contemporary design.

David Dillon

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CIRCLE 14 ON INQUIRY CARD
It was a dark and stormy night.

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A separatist government and a raw, industrial aesthetic have been shaping the new look of Montreal.

BY BETH KAPUSTA

Beth Kapusta, who graduated from the University of Waterloo School of Architecture in 1991, is working on a book about the National Archives of Canada. She lives in Toronto.

Montreal's historic architecture is perhaps the most European of all North American cities, an urbane amalgam of French, English, and other immigrant influences.

One might expect to see the same leading-edge, cosmopolitan influences in contemporary work. However, there is a curious lack of sophistication here, especially in terms of tectonics, though this is somewhat offset by an overarching focus on the public character of recent buildings.

This island-city seems fated to experience both the best and the worst of visionary planning and architecture, from the white elephant 1976 Olympic Stadium, a dysfunctional and deteriorating facility that taxpayers are still paying off, to the 1967 Expo site, now recouped with symbols of a new era: the skeletal Buckminster Fuller dome serves as the podium for an environmental interpretation center, while the French Pavilion houses a popular casino.

Montreal's greatest planning triumph is also its oldest: the Frederic Law Olmsted–designed park on the mountain that is the psychological heart of the city, a 550-acre masterpiece of picturesque planning surmounted by a neon-trimmed cross.

As apparently seamless as the marriage of symbols may be—the cross of French Canadian Catholicism watching over the second-generation English landscape—a war of words between the cultures continues to rage. Many of Montreal's architects claim to be apolitical in response to the divisive debate over the future of Quebec as a Canadian province, but with another election looming, uncertainty still reigns.

Even though architects haven't done badly over the past decade, enjoying work from a program that resembles a mini-grand projet initiative in the French tradition, there is an undercurrent of anxiety that political divisiveness is wearing the city down. While the incumbent separatist government has been preoccupied with weaving a cultural mythology, it has little concern for the day-to-day upkeep of the projects it has funded.

Some cultural facilities originally financed in this propagandist spirit are in a sorry state of disrepair because of a lack of ongoing maintenance. In addition, much of the provincially funded construction of the last four years has concentrated on Quebec City, seat of provincial politics, rather than Montreal, where a decisive majority voted against sovereignty in the last referendum.

Recent architecture mirrors the restlessness of Montreal's political spirit. While Toronto's architecture is a refined but extremely conservative neo-Modernism and Vancouver's regional bias is toward rustic tectonics of exposed (mostly wood) structure and lots of glass, Montreal is marked by the use of off-the-shelf materials, assembled with an unmistakable rawness.

It is a city whose architecture is surprisingly indifferent to the craft of building, a deliberately anticroppate sensibility that seems to be a sustained response to the conservative structures that characterized Montreal until Toronto supplanted it.
as Canada’s financial capital. It is almost as if the seduction of temporary architecture embodied by the Expo insinuated itself into the collective building techniques of a whole generation of architects.

Alongside the less-than-pristine craftsmanship is an emphasis on a building’s most public dimensions and on powerful, even graphic gestures. One of the strongest examples is the Old Port of Montreal by Cardinal Hardy and Associates Architects, a fine waterfront park that establishes an intimate relationship between the old city and the postindustrial landscape at the river’s edge by converting the abandoned port area into a crisply landscaped linear park. The park is being extended west to include parts of the Lachine Canal, which the city plans to reopen to recreational watercraft.

Just north of the Lachine Canal site, a project by the young firm Atelier In Situ is one of the most fetishistic examples of Montreal’s industrial aesthetic. Like the work of many other local practitioners—Atelier Big City, Jacques Rousseau, Saia et Barbarese—InSitu’s designs have a tough, graphic quality.

The Old Port park by Cardinal Hardy (left); Luc Laporte’s Via Roma (right).

Formerly the home of a marine outfitter, the industrial building was scoured out to create offices for a movie software business and a multimedia production company. The design strategy is more reductive than additive, with several large spaces carved from the existing floor plates. The detailing on new elements has the feel of a sort of welding-torch Modernism. The found spaces are raw and powerful, although aesthetic novelty tends to get the better of function and pragmatic detail.

A heavy emphasis on public amenity characterizes the Ecole des Hautes Etudes Commerciales de Montréal (H.E.C.), the school of business at the University of Montreal, by Dan Hangangu Architects and Jodoin Lamarre Pratte & Associates. At best, the Hangangu-led team has the ability to create buildings that are microcosms of slightly disheveled, chaotic, and animated cities. At the tectonic level, the work is preoccupied with using inexpensive materials, often in incongruously expensive ways. In the business school, for example, there is remarkably little standardization of technique, making what seems to be an off-the-shelf building quite expensive to build (about $150 per square foot).

An oversized, five-story portico that marks the business school’s entry is an extremely overt indicator of arrival. The strength of this building lies within, with its complex sectional collage. On the main floor, a sinuous glass inflection in the east wall preserves a stand of trees. The interior winter garden, a powerful visual focus, serves as the main

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Next door to H.E.C. sits the recently completed University of Montreal School of Architecture, by one of Montreal’s most talented firms, Saucier + Perrotte Architects (with Menkès Shooner Dagenais as associate designers). Like many of the most successful architects in Montreal, Saucier + Perrotte has made its mark by being diplomatic negotiators with history. The problem of expanding the school of design from its rather penitential vessel in an old nunnery has been handled with elegance, rigor, and compositional dexterity.

A grand lobby, featuring a huge screen showing the slides appearing in the 450-seat auditorium whose back wall protrudes into the space, is a grandiose move. The studio areas are less thoroughly designed, although a Bauhaus-like louvered glass wall on the north elevation creates an intriguing, almost digital display of goings-on within. The palette, shades of gray, is a little cool, but it is mediated by a careful modulation of light via a transparent courtyard.

The most interesting project to date by Saucier + Perrotte, probably the least “industrial” of contemporary Montreal practitioners, is the Cinémathèque Québécoise, whose salient feature is a backlit frosted glass wall that animates the street with moving images projected from within. The firm’s preoccupation with the cinematic effects of architecture is well suited to this program, as themes of voyeurism and architectural promenade are skillfully overlaid as montage on the structure of an old school.

To better understand the principles of Montreal’s unique sensibility, it’s good to look at the work of a lesser-known architect, Luc Laporte, whose designs, though mostly small-scale, are some of the city’s most cosmopolitan. Like Saucier + Perrotte’s work, Laporte’s In Situ’s “Zone,” an industrial building converted to offices, is highly expressive and carefully directed, and it has a spirited sense of the social quality of the city. His latest project is Via Roma, a trattoria that addresses one big idea: how to make a commodious outdoor dining terrace in one of the coldest cities in North America. This is accomplished by means of two retractable greenhouse roofs supported above a large, simple room, which is radiant-heated through the floor and has lush grapevines growing up the walls. It is an economical gesture, devoid of unnecessary embellishment, though it lacks finesse on the detail level.

In its contemporary architecture as in its politics, Montreal continues to feel the conflicting forces of parochialism and cosmopolitanism. Broadening the architectural dialogue and coming to terms with the technique and craft of building will be important factors in realizing the city’s rich architectural potential.

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CIRCLE 47 ON INQUIRY CARD
Architecture education will take a bold leap into cyberspace in January when the newGraduate School of Architecture opens its virtual doors. The program, which can be found at www.newgraduate.org, will offer holders of accredited architecture degrees—from either a five-year bachelor’s program or a master’s program—a way to earn advanced degrees via computer.

NewGraduate students can earn nonprofessional Master of Architecture degrees in three areas that are considered important to practice but are seldom stressed in traditional education: business and practice management, information systems technologies, and environmental design.

Tuition for a 30-credit master’s degree will average about $4,400. Students can expect to spend about eight hours a week on their studies in order to earn a degree in 15 months, says the school’s dean and cofounder, David Mackey, an associate professor of architecture at Ball State University in Muncie, Indiana, which has no ties to the new school. Students can also choose to take courses to earn AIA Continuing Education credits.

Mackey expects to attract recent architecture school alumni and mid-career architects looking for ways to squeeze continuing education into harried home and working lives. As one soon-to-be-newGraduate student put it in an E-mail: “I have been practicing architecture for 15 years and manage a seven-person firm. You just gave me a way to reach my goal of an M. Arch. degree without sending seven other people to the unemployment line.”

Mackey and the school’s other cofounder, Theodore C. Alex, director of the MBA program at the University of Findlay, in Findlay, Ohio, are hoping to enroll at least 80 students in 1999, with a goal of 240 in three years.

College-level distance learning using the World Wide Web has been spreading since schools like the University of Phoenix pioneered the idea on a large scale two years ago. More recently, other major, traditional schools like New York University have begun vying for a share of the online learning market.

Architecture education has been, until now, a scarce presence on the Internet. There are schools where students share projects over the Internet, or where individual courses have been put out on Web sites, says Martin Moeller, recently departed executive director of the Association of Collegiate Schools of Architecture (ACSA).

The ACSA has greeted the new program cautiously. NewGraduate won initial accreditation status with the Indiana Commission on Proprietary Education, permitting it to accept student applications. Still, the ACSA’s board rejected Mackey’s first bid for affiliate membership last June, opting instead to form a task force to study, among other things, how a school on the Internet might conform to existing rules and standards.

Among the early concerns is whether traditional architecture schools will honor newGraduate degrees for those wanting to gain teaching positions. Another worry is the quality of the faculty. A few, like Mackey, E. Fuller Moore of Miami University of Ohio, and Kenneth W. Schaar of Louisiana Tech, are veterans. Many others are junior faculty at architecture schools, attracted to newGraduate by the creative freedom and the prospect of royalties.

"NewGraduate is the first out of the box," says R. Wayne Drummond, president of ACSA. "We want to set the bars in the right place in this brave new world." Lee D. Mitgang

In June 1997, the government of Iran called Iranian-born Yahya Fiuzi, AIA, at his home in the suburbs of Washington, D.C., and asked him to design and lead construction of a huge convention center in Teheran. The new building would shelter the triannual summit of Islamic nations, to be held that December.

There are few architects, if any, in Iran with the requisite expertise for such a project. Fiuzi’s concern was whether he could hire non-Iranian contractors; he was told he could. Two days after getting the go-ahead, Fiuzi was meeting his new clients in Teheran.

Upon arrival, however, Fiuzi was asked to use local contractors. He adjusted: in the first 15 days Fiuzi selected a site and a primary contractor and hired a design staff of 140. "I didn’t hire architects older than 26," he says. "The young generation are like hungry tigers waiting to show their ability to the international community." Fiuzi’s design team produced 4,800 drawings over the next several months, including designs for fabrics and furniture. Several alternatives were rendered to account for the limitations of available technologies.

In the completed International Conference Center, much of the 250,000-square-foot space is given over to an 1,800-seat central assembly hall. A steel-framed, stainless-steel-paneled dome—a 130-foot-diameter cone centered off-axis—peaks 100 feet above the floor. The panels were punched with holes and fitted with 40,000 glass cylinders to channel daylight inside.

With 6,000 workers laboring around the clock, the project was finished on time. The government was satisfied, having spent $30 million, with only 7 percent of that in foreign currency. And Fiuzi was offered a dozen new commissions. "I’m staying because the country needs me, but also because some ideas take shape better here," he says. While admitting there are clear limitations to working in Iran, Fiuzi says that "in the United States every project is affected badly by developers and the like. I feel freedom here." David Simon Morton

The main facade of the 250,000-square-foot International Conference Center in Teheran (above). Local laborers work on the dome, whose panels were fitted with 40,000 glass cylinders (left).
ARCHITECTS AND ARTISTS TEAM UP FOR CALIFORNIA’S VILLA MONTALVO

Since 1912, Villa Montalvo has been an active arts center in Northern California; since 1942, it has had an artist-in-residency program. The Villa Montalvo Foundation recently invited five architects to collaborate with the artist of their choice to design a new complex of live/work spaces (one pair per design team) for the artists who populate the 175-acre site in the foothills above Silicon Valley.

Portland-based architect Donald J. Stastny, coordinator of the project, designed a commons building incorporating a large gallery and a library/office. His is the only scheme to evoke the palette and Mediterranean style of the original villa, which is listed on the National Register of Historic Places.

All the other schemes exhibit a range of design, construction, and materials, along with a range of muse. Jim Jennings, who teamed with artist Richard Serra and poet Czeslaw Milosz, saw in Milosz's poetry "an articulation of clearly defined volumes and spatial experiences," which he translated into a solid-walled rectangle cut into a slope. Jennings's other rectangular structure, inspired by "both the lightness and heaviness" of Serra's sculpture, is of concrete block and translucent sheathing. The plan is one-quarter solid living cube and one-quarter open courtyard cube, balanced by two translucent studio cubes.

Each 700- to 900-square-foot cottage was conceived for the execution of a specific art form, such as writing or performance art. "The contradictory requirements of a hermetic retreat and the need for community," as participating architect Dan Solomon puts it, was a programmatic concern as well.

The buildings, joined by a pathway and set in five acres of orchard, will complement the existing site's redwood groves, extensive formal gardens, miles of nature trails, and an Audubon Society bird sanctuary. Construction will begin next July and be completed by the summer of 2000. Terry Bissell

ST. JOHN’S AIMS BEYOND COMMUTERS WITH FIRST ON-CAMPUS RESIDENCES

“Build it, and they will come,” is the philosophy behind St. John’s University’s first on-campus student residence halls, to be completed by the fall semester of 1999. The university’s urban campus in the New York City borough of Queens has never had a strong dorm-based social life, catering mainly to commuting students who don’t have to stay overnight. Now St. John’s wants to encourage students outside commuting distance to enroll, and it has hired the New York architecture/design firm Einhorn Yaffee Prescott (EYP) to complete phase one of a $300 million project to house and feed students near where they go to class.

EYP’s marching orders are to design three residence halls, holding some 700 students, and a separate dining facility with seating for 430 on the Queens campus. “The design concept is a village of buildings separate from the academic buildings,” says Ron Whatley, an EYP partner and principal-in-charge of the project. Since it’s an urban campus, he says, EYP wanted “a village that fits in with the surrounding landscape, yet still feels like residences.”

The dining hall will be only two stories high, while the residence halls (above) that surround it will be five or six stories and total 250,000 square feet. Each residence floor will consist of at least six suites, and each floor will also include a common area, study, and lounge; EYP has used bay windows to break up the scale in these areas so they don’t appear too academic. For the facades, EYP is using a salmon-colored brick alternating with stone work, to harmonize with the campus’s dominant materials.

The dining hall and assembly facility will also include a fitness center and a “cyber lounge.” The overall goal: use architecture to create a self-contained, inviting social environment, something the university has been short on. The project will also set the tone for future on-campus housing. Rachael Butler

LOHAN’S SWEDISH ADVENTURE Chicago's Lohan Associates, whose current projects include an office building in Prague and a Grand Hyatt in Sao Paolo, has won a competition to design Vastra City, an 877,300-square-foot mixed-use development in Stockholm. Initiated by the city of Stockholm and the Swedish State Railway (SJ), the project will occupy the space over a section of railyard located near the city's historic and business districts. Plans include a 450-room hotel and a congress hall capable of seating 4,000, as well as retail, office, and residential space. The city and SJ are currently seeking investors; construction should be completed around 2003.

Although the site is not far from the 16th-century Klara Kyrka church, many of the adjacent buildings, such as the World Trade Center, were erected in the past 30 years. Municipal authorities requested that the design respect the surrounding building heights but they made no other style specifications. “[City officials] were concerned about how it fits into the urban context, yet they very much didn't want us to replicate what's around it,” notes Lohan principal Floyd Anderson. “They wanted a bold aesthetic statement.”

Working with a Swedish partner, Thurfjell-gruppen, Lohan designed a rectilinear mass with two projecting wings, one a glass-sheathed ellipsis. In a gesture both structural and symbolic of the context, the central portion of the building is topped with a mastlike rigging that supports the roof of the congress center and provides the building with a distinctive presence on the skyline. An extensive plaza between the two wings acts as an antidote to the massiveness the program demanded; in addition, the architects suggested bisecting the existing World Trade Center (at left in photo) to create a vista of the nearby waterway. Thomas Connors
FOREIGN PRESS ROUNDPUP

DUTCH TREATS
In the first of two issues of Architecture + Urbanism (Tokyo) devoted to the Netherlands, writer Peter Buchanan describes the Dutch government's extremely generous efforts to promote and develop architects and contemporary architecture. The government subsidizes the publication of architectural books and journals, the Netherlands Institute of Architecture in Rotterdam, and even foreign travel for architects. Because of such official support, the country is the easiest place for a young architect to start a career, according to Buchanan. In another unusual situation, private clients vie with government agencies to discover new talent as proof of architectural connoisseurship.

SITE CONCERNS
French firm Art'M recently completed its first big job, a junior high school for one of Marseille's less cheerful neighborhoods. In the September issue of L'Architecture d'aujourd'hui (Paris), Art'M principal Matthieu Poitevin writes frankly about the building's fate. "In spite of their reputation as combat zones, these places have a definite identity of their own and the violence is formalized... The school is broken into every other weekend [including 'bunker-rooms' designed to be especially secure] and burnt-out hulks of cars regularly appear beyond the sports grounds. But this is nothing out of the ordinary. You could almost say that it's normal."

HISTORY ON ICE
The latest issue of Arkkitehti (Helsinki) celebrates the 250th anniversary of the building of Soumenlinna, a small group of fortressed islands near the docks of Helsinki. The Finnish government has recently abandoned its attempt to vitalize the archipelago with full-time residents and move the islands into the stream of everyday Helsinki life. Twenty-five years after the military ceded the islands to civilian authorities, 870 people live there, far short of the goal of 2,000. Further funding will concentrate on the renovation of the historic military facilities and their conversion to tourist-grade public spaces, such as theaters and museums.

URBAN VALUES ENDANGEROED
Sarona is a century-old Tel Aviv neighborhood of 70 small homes and relatively lush greenery—dominated by a long-present military base. Architecture of Israel (Tel Aviv) editor in chief Ami Ran writes, "Thanks to the base, not only are the city streets filled with easy-going soldiers, but a very gentle and civilized piece of urban fabric has endured." However, commercial developers recently purchased much of Sarona's real estate, and the bulldozing has commenced. Ran suggests that the city engineer, who told Ran he was too occupied by the coming elections to interfere with the destruction, is a political crony who should be replaced.

SLOW LEARNERS
As reported in the October issue of Blueprint (London), British architect Kathryn Findlay has been named associate professor at the University of Tokyo's architecture program, the first woman to hold such a position at the university. She is also the first foreign-born professor to be appointed this century.

—compiled by David Simon Morton

SALT LAKE CITY AIRPORT
WILL FLY IN A NEW PATTERN

A new kind of airport design is preparing to take flight in Utah. Conceived by a joint Gensler/HNTB team, the Salt Lake City International Airport Authority will usher in the new millennium with a building that it hopes will be efficient and dynamic. It will be built in two phases over 15 years.

The building departs from typical airport layouts, which utilize fingerlike piers extending from a central hub. The organizing element of the new SLC airport is a linear spine that runs perpendicular to the terminal and roadway system. The spine is actually an extension of an existing light-rail line, which itself is tightly woven into the city's grid and terminates inside the airport's parking structure. The spine will connect parking with the terminal and main concourse, and includes a station for an underground moving walkway to ferry travelers to the remote concourse.

The building forms rise up along this line, emerging organically from the landscape. The multilevel spine separates outbound and inbound traffic, so travelers on each level all move in the same direction. The axiality of the building serves as a means of orientation and is important to the notion of "intuitive wayfinding" that the designers say they have explored extensively. That idea is further reinforced by the careful attention to daylight, which is present everywhere in the building and draws people forward and toward specific destinations.

The building's skin is highly transparent to take advantage of the spectacular views of the surrounding mountains.

The design team has come to know Salt Lake City and its inhabitants well, resulting in a building that responds to its context. To express the community's rootedness and connection to the environment and landscape, as well as its role as a leader in technology research and development, the airport is a mix of heavy materials at the base and lighter, transparent materials above.

The base is richly colored in rusts, purples, reds, greens, and golds, reflecting Salt Lake City's unique geography and culture. Out of it rises a glass skin and expressive steel structure and roof volumes.

If the architects' experimental spine design functions as intended, the resulting clarity of movement and spatial richness, coupled with the drama of the surrounding landscape and the tectonic boldness of the structure, could make the airport experience a pleasant and dynamic one for the millions of travelers who will pass through each year. Alice Y. Kimm
MIXED NEWS FOR BUILDINGS PROGRAMS IN LATEST FEDERAL BUDGET

Under the fiscal 1999 appropriations approved by Congress in October, some federal buildings programs saw increases, but other major players were cut. Winners included the General Services Administration (GSA), the National Institutes of Health (NIH), and the Department of Housing and Urban Development (HUD). But funds for building programs at the Department of Veterans Affairs (VA) and the Federal Bureau of Prisons were decreased.

Jim Dinegar, the AIA's vice president for government and industry affairs, says, "We think this is the start of some good money flow for public buildings construction."

The GSA is receiving $492 million for new building, after getting nothing for new construction this year. "I don't think it's going to alleviate the backlog, but it's going to help us go forward," says John Sporidis, senior vice president with HDR Architecture Inc., a firm based in Omaha, Nebraska, that designs many federally funded projects. The GSA will also get $668 million for repairs and alterations, more than double last year's $300 million.

The GSA's main business remains courthouses: 14 federal court projects account for $462 million of the agency's new construction budget, including design money for projects in Biloxi-Gulfport, Mississippi; Eugene, Oregon; Springfield, Massachusetts; Little Rock, Arkansas; and Cape Girardeau, Missouri.

At HUD, the HOPE VI program, which finances demolition of older high-rise public housing projects and construction or renovation of lower-rise replacement units, got a 14 percent boost, to $625 million. Other urban building projects are financed through HUD's 24-year-old Community Development Block Grant program, whose spending rises 7 percent, to $5 billion, including $200 million for disaster relief.

Receiving less funding are agencies like the VA, whose major construction program slipped 20 percent, to $142 million, and the Department of Defense, where construction money for military family housing plunged 20 percent, to $712 million, and other military construction declined 3 percent, to $3.1 billion.

HDR's Sporidis says budgets for law enforcement and medical research agencies will continue to be healthy. The NIH, which has some $850 million in construction planned or under way, will get $238 million, up 15 percent. At the Bureau of Prisons, which has turned to design-build for new projects, facilities spending will be down 26 percent, to $411 million. But Congress did instruct the bureau to seek an extra $300 million in fiscal 2000 for modernization and repair.

In the State Department's budget, lawmakers approved funds to design two U.S. embassies: $10 million for Berlin and $15 million for Beijing. The department is also getting $627 million for security improvements at overseas posts, prompted by bombings in August at embassies in Dar es Salaam and Nairobi. Of that amount, $163.5 million will go to clean up the sites of the damaged embassies, acquiring new sites, and design-build contracts for replacements.

Architects were disappointed that Congress rejected President Clinton's plan to stimulate school construction by buying down interest rates on bonds that local school districts issue. In addition, Dinegar says the big Capitol Hill news for architects this year was the Transportation Equity Act for the 21st Century. Funds for urban planning and for designing rail stations and other projects in which architects play a sizable role make up a relatively small part of the bill's $217 billion total authorization. But, Dinegar says, "The total amount is so big people fail to realize how many dollars are there for design."

Latin American Edition of Mies Prize Goes to Mexican Architects

The first Latin American Mies van der Rohe Prize, established by the Barcelona Foundation as a biannual award to complement its well-known European honors program, has been awarded to the Televisa Services Building, designed by Enrique Norten and Bernardo Gomez-Pimienta of Mexico City-based TEN Arquitectos. With the award, a miniature replica of Mies's Barcelona Pavilion, comes a 50,000 ECU ($55,000) purse.

TEN Arquitectos, founded in 1987, has sought to bring some of the global avant garde to a country with conservative tastes. The firm's winning building, completed in 1995 on a difficult wedge of Mexico City land for Mexico's largest television network, houses a parking garage and offices in a polished black concrete plinth, and contains a dining area in a vaulted, aluminum-paneled shell above.

Juror Ignasi de Solá-Morales said the design won for the clarity of its urban placement, the adjusted hierarchy of its interior spaces, and the lightness of its forms. It was selected over projects by Oscar Niemeyer, Teodoro González de León, and Ricardo Legorreta, among others.

Miquel Adrià
A STUDY IN LONGEVITY: RAMBUSCH CELEBRATES 100 YEARS

Of all the decorative arts workshops in business in the United States at the turn of the last century, the Rambusch Company of New York and Jersey City is one of the very few that will survive into the new millennium. The firm, founded by a Norwegian immigrant, Frode Vladimir Christian Rambusch, is celebrating its 100th anniversary this month.

Though many architects are familiar with the company’s lighting products, decoration was the firm’s core business for much of its history (below, the studio in 1898). An ad Rambusch placed in the 1906 edition of Sweet’s Catalogue lists its services as “interior decorations, mural painting, wall hangings, relief work, painting and wood finishing, and cabinet work.” Among commissions listed in the young firm’s ad were the Baltimore Cathedral, St. Jerome’s Church in New York, the Grand Opera House in Cincinnati, and Brooklyn’s Orpheum Theater.

The firm went on to decorate thousands of churches and cathedrals, hundreds of movie palaces, restaurants, academic buildings, and hotels such as the Waldorf-Astoria. Rambusch even had contracts to camouflage air bases during World War II. One of the firm’s current projects is the redecoration of Conception Abbey in Conception, Missouri.

Viggo Rambusch, former president of the firm and grandson of the founder, attributes the firm’s longevity to its never having adhered to any particular design style. The firm completed commissions in whatever look was popular, including Beaux-Arts and various revival styles, Art Deco, streamlined, Modern, and Postmodern. “We have always felt that it was the role of our designers to refine the ideas of the architect and the client, and not to dictate them,” he says.

The firm is also well known for its lighting products. Legend has it that the firm began designing its own light fixtures in 1908, after Frode Rambusch became frustrated with the poor electric lighting that was obscuring some newly painted murals. In 1937 Rambusch patented the first recessed architectural downlight; the current catalog lists 1,081 variations of this basic design.

The firm is now operated by Edwin and Martin Rambusch, Frode’s great grandsons, from a newly established factory and studio in Jersey City, New Jersey. Charles D. Linn, AIA

CLASSIC MEETS CONTEMPORARY After two years of construction and renovation, the Danish National Gallery (Stanes Museum for Kunst) in Copenhagen reopened last month, showcasing a revamped 100-year-old main building and a new addition erected in the park behind it. The project’s architects, Anna Maria Indrio and Mads Moller from local firm C. F. Moller and Partners, created a Modernist design for the new building (left), where predominantly 20th-century art is displayed. The rooms are minimally decorated and painted white, while the doors, window frames, and other detailing are graphite gray. The extension traces the length of the old gallery’s north facade, with a glass-covered arcade connecting the two wings.

Meanwhile, extensive restoration work has returned the classical main building, where older works are displayed, to its original appearance. The project nearly doubled the museum’s space, to 315,000 square feet. S.L.

ATTENDEES AT GREEN CONFERENCE PONDER SUSTAINABLE RATING SYSTEM

There were neither winners nor losers among the teams of architects, building owners, engineers, and designers who entered the Green Building Challenge, a sort of cooperative and friendly competition among 14 countries to build the most ecologically sound building.

Instead, the goal of the challenge, which culminated in a conference held in Vancouver in October, was to work to define an industry-level rating system for green buildings.

“There’s no question that buildings of sustainable design are essential. We’re already reaching the end of the earth’s capacity,” said William Rees, a professor at the University of British Columbia. “It’s easy to say buildings should be green, but difficult to know how to make them that way.”

Each of the 14 participating countries selected buildings in one or more categories, which included offices, residential structures, and schools. These were scored according to a list of environmental attributes, such as land use, water conservation, proximity to mass transportation, energy efficiency, and indoor air quality.

The scoring process used a benchmark based on “standard practice,” or buildings that meet code but do nothing more to benefit the environment. The benchmark varied from country to country, and the regional nature of sustainable design was taken into account in other ways: for instance, what makes sense in one climate and economy won’t work elsewhere, and products differ in availability.

“Ultimately, what we want to develop is a sort of environmental building code,” said Lynn Foerschle, AIA. “We want to make it as easy to size up green performance as we can tell the gas mileage of a car.”

The conference addressed other issues that come with sustainable design: using software programs that evaluate energy performance, selecting sustainable products, making green buildings attractive, and professional liability. Wendy Talarico
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CIRCLE 18 ON INQUIRY CARD
EIFFEL'S BUDAPEST STATION TO GET A MODERN EXTENSION

The spirit of Alexandre Gustave Eiffel is alive and well in downtown Budapest. His artistry can already be seen in the Nyugati (Western) Railway Station, designed and built in the 1870s, and his legacy will be visible in TriGranite Development Corp.'s $200 million West End City Center, an office-and-shopping complex currently under construction adjacent to the station.

But unlike the Eiffel Tower, which soars 984 feet into the Parisian sky, the new center’s buildings will reach a height of 88.5 feet at most and sprawl across approximately 12.4 acres.

A new commuter station will connect the center to Nyugati Station, which has been an important hub for travelers and daily commuters for over 100 years. Trams, buses, an underground Metro line, and commuter and international trains all converge at the terminal and the square it dominates. More than 400,000 pedestrians and 225,000 vehicles pass by daily.

In designing West End City Center, Finta and Associates Architect Studio "used elements of the old [terminal]," according to Jozsef Finta, the firm’s managing director. "We think it’s a beautiful building and we didn’t want to break the continuity. For example, the glazed roofs of the new commuter station and the main entrance to the center will have the same 22-degree pitch as the roof of the terminal. The present commuter terminus, scheduled for demolition, is garbage," says Finta.

Four separate buildings will house a 65,000-square-foot hypermarket, a 14-screen multiplex cinema, more than 150 specialty shops, over 300,000 square feet of leasable office space, a five-star casino hotel, and indoor parking facilities for 1,700 vehicles. There will be an 80-foot-wide promenade along the street side of the complex, and a landscaped roof garden with an ice skating rink will extend over the tracks leading to the commuter station.

The first phase of construction began last year. The retail/entertainment portion is scheduled to open next November; the hotel and office components will open later the following year.

“It’s the largest project of this kind in Central Europe since the fall of Communism,” claims Brian Jenkins, chief development officer for TriGranite, a joint venture between the Toronto-based real estate giant TrizecHahn Corp. and a major Hungarian real estate firm, Polus Investment Co. "It’s longer than six blocks in New York City," Jenkins adds.

And the complex will become even larger. Ensuing phases will include residential facilities and additional office space, with completion slated for 2005. Carl Kovac

BIG, BUT NOT THAT BIG: PALM BEACH CONTEMPLATES SCALE

Palm Beach has always had its share of big houses, to say the least, but in recent years the winter home of America’s rich has been beset with stylistic problems.

New owners, not happy with the Old World eccentricities of Palm Beach’s 1920s houses, have chosen to alter, expand, and otherwise deface important pieces of the town’s architectural legacy. Speculators have bought smaller, simpler houses—some of them dating to the early years of the century or even before—and assembled two- and three-lot parcels for new houses that overwhelm the old.

Two separate but complementary ideas have been proposed to grapple with the problems of scale, style, and visual intrusion brought about by the town’s newest and biggest additions.

The Palm Beach Civic Association asked New York planning consultant and Yale professor Alexander Garvin to create urban design strategies for the north end of town, where many of the more egregiously big houses have appeared. Garvin, working with Miami architect and garden historian Joanna Lombard, proposed a series of landscape interventions that would appease the eye and enhance the "continuity and distinctiveness" of Palm Beach streets.

The Palm Beach Preservation Foundation hired Ray Gindroz of Pittsburgh’s Urban Design Associates (UDA) to create a model for future development based on the ideas of 19th-century architectural pattern books. Gindroz put together a pattern book for Disney’s town of Celebration, and has used the same approach in other cities.

Gindroz and his staff spent almost 100 hours looking at and recording Palm Beach’s architecture, to begin to understand it as “a remarkable ensemble of urban and public spaces,” he says.

Palm Beach has long been the winter resort of choice for America’s most moneyed, who moved into Mediterranean-inspired houses by such architects as Addison Mizner and Maurice Fatio. “These are discreet houses,” Gindroz told Palm Beach’s Planning and Zoning Commission at a hearing last month. “The composition is superb. The proportions are correct, balanced, harmonious. The use of decoration and ornament is restrained.”

Gindroz’s studies show that most of Palm Beach’s greatest landmark houses could not be built under the current zoning, a code that leads more to “inflated-looking, pumped-up houses with monster roofs.” (UDA’s “ideal plan” for Queens Lane is shown below.)

Gindroz’s study starts to provide an alternative to that zoning; it proposes a pattern book as an overlay to a stricter code, so that architects and developers who would like to build bigger must follow time-tested approaches to siting, massing, and form. The next step is for the city and its various boards to decide whether to proceed with a full pattern book as a way to keep the attack of the “monster houses” at bay. Beth Dunlop
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CIRCLE 19 ON INQUIRY CARD
RECORDNEWS

NEWS BRIEFS

Quite a pair After creating perhaps the most talked about design of the decade, the Guggenheim Museum in Bilbao, Spain, Frank Gehry and the Guggenheim could be teaming up again. According to reports, the museum is planning a large new branch, to be designed by Gehry and built on New York's West Side, at the Hudson River off Houston Street. It would be built on state land in the middle of a new shorefront state park, and would be the third Guggenheim in Manhattan—though the SoHo branch is losing money and has an uncertain future.

Prado picks Moneo Spanish architect Rafael Moneo has won a competition to enlarge the Prado Museum in Madrid, Spain's Ministry of Culture has announced. His design was selected from projects by the 10 finalists in a 1996 open international competition that ended without a winner. The extension, to be located behind the existing building, used by the museum since 1819, will house temporary exhibition galleries, visitor services, and modern technical facilities.

Curtain raiser Construction has started on the latest in a series of new buildings that is changing the face of Times Square. The New 42nd Street Studios, a 10-story structure housing rehearsal studios (much needed in the area), offices, and a small theater named The Duke, was designed by Platt Byard Dovell Architects. The $23 million costs are being covered by public and private funds. Meanwhile, a development that would include as many as 11 small theaters and 350 new apartments is being planned for Theater Row, a stretch farther west on 42nd Street. A large theater and some smaller ones would likely occupy the base of a new mixed-income apartment tower. The project will be financed primarily by the state-sponsored 42nd Street Development Corporation, with some private help.

Good connections Robert A.M. Stern is already having an effect in his new role as dean of the Yale School of Architecture. He's lured architects Philip Johnson, Hendrik Koning, Julie Eizenberg, and Charles Gwathmey to sign on as visiting professors for next spring. Each will present one lecture and instruct a studio course. In addition, Bernard Tschumi, Peter Eisenman, Rafael Viñoly, Michael Sorkin, and others will give lectures.

Biloxi bound Frank Gehry is also set to commence work in the spring on the design for a museum in Biloxi, Mississippi, to showcase the region's culture—in particular, the work of George E. Ohr, known as the "mad potter," whose ceramics did not receive acclaim until long after his death in 1917. The city has pledged $1 million toward construction. Former Mayor Jerry O'Keefe, who is raising funds for the $8 million project, has donated $750,000.

Well furnished You've heard of the "Chippendale Building," the nickname for Philip Johnson's AT&T (now Sony) Building in New York, whose cutaway top resembles a piece of furniture. Taking the idea a step further, the Furnitureland South Mart...
in High Point, North Carolina—known for its home furnishings market—has constructed an 85-foot-high replica of a highboy chest to sit at its front door. Furniture designer Sid Longer designed the facade, which is made of Outsulation, an exterior insulation and finish system. The detail work on the top is made of foam.

**Eastern philosophies**
New York's Van Alen Institute, a civic organization devoted to public architecture, has given first prize in its "Design Ideas for New York's East River" competition to Victoria Marshall and Steven Tupu, who suggested that waste accumulation be used to build livable and evocative landscapes on the waterfront. Other schemes, on display at the institute through February, ranged from a series of interlocking parks to a new subway line running along the river.

**Trumped again**
Donald Trump isn't short on ambition. The developer, who has long wanted to build the world's tallest building, is settling for the claim of New York's tallest residential building. Trump has hired architect Costas Kondylis to design Trump World Tower; Kondylis's 900-foot-tall building, sheathed in a bronze glass curtain wall, would house 376 luxury condominiums, a health club, and a restaurant. If all goes according to plan, the building will be in place on its site across from the U.N. sometime soon after the turn of the millennium.

**New doings at DMJM**
International architecture and engineering firm Daniel, Mann, Johnson & Mendenhal has reshuffled by combining its architectural and interior design divisions to form a new, as yet unnamed practice. The move coincides with the departure of Richard Keating, FAIA, who had headed its design practice, and the return of Paul Danna, AIA, who was at HOK.

**Harry Weese; Albert Frey**
Harry Weese, a Chicago planner and architect best known for designing the Metro system in Washington, D.C., died last month at age 83. Weese also oversaw the renovation of both Adler and Sullivan's Auditorium Theater and the Field Museum in Chicago, while designing new structures such as that city's Time and Life Building.

Albert Frey died last month at the age of 95. Early in his career, the Swiss-born Modernist worked in Le Corbusier's atelier; later, his houses and buildings had a great impact on the Palm Springs area.

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Calendar

**Equal Partners**
Northampton, Mass.
Through December 13

**New Chicago Skyscrapers: The Year 2000**
Chicago
Through December 31
An exhibition of new skyscrapers that will be completed early in the next millennium, a welcome relief from the drought of construction in downtown Chicago over the last decade. Included are buildings by DeStefano & Partners, Solomon Cordwell Buenz, SOM, and others. Chicago Athenaeum. 312/251-0175.

**The American Dream by Mail Order**
Chicago
Through December 31
An exhibition exploring the history of Sears, Roebuck & Co. catalog houses built between 1908 and 1940. Chicago Architecture Foundation. 312/922-3432.

**New Ways of Revitalizing the American City**
Washington, D.C.
Through January 3, 1999
An exhibition illustrating how new cultural facilities have enlivened tired downtowns in Phoenix; Cincinnati; Fort Worth; Newark, New Jersey; San Jose, California; and Kansas City, Missouri. National Building Museum. 202/272-2448.

**La Présence des Objets: Gaetano Pesce**
Montreal
Through January 3
Furniture, objects, models, and plans of recent projects by the architect and industrial designer. Musée des Arts Décoratifs de Montréal. 514/284-1252.

**The Elusive City: Photographs of Houston by Paul Hester**
Houston
Through January 3
Approximately 40 black-and-white photographs of Houston from the late 1970s to the present. Menil Collection. 713/525-9404.

**Japan 2000: Kisho Kurokawa**
Chicago
Through January 3
A retrospective of the Japanese architect’s work, from his early Metabolist projects to his current addition to the Van Gogh Museum in Amsterdam. Art Institute of Chicago. 312/443-3600.

**Robert Adam: The Creative Mind**
Washington, D.C.
Through January 3
An exhibition of drawings by the 18th-century neoclassical Scottish architect, demonstrating his design process from conception to final presentation. The Octagon. 202/638-3221.

**The Work of Charles and Ray Eames**
London
Through January 3
A comprehensive traveling retrospective of the work of the great modernist designers, organized by the Vitra Design Museum and the Library of Congress. More than 500 examples of their work, from furniture to toys, are included. Design Museum. 011/44/171/378-6055.

**Bechtel’s First Century**
Washington, D.C.
Through January 4
A portfolio of projects by the San Francisco–based Bechtel Group, one of the world’s largest engineering and construction firms. High-lighted projects include the Hoover Dam, San Francisco’s rapid-transit system, and the Channel Tunnel between England and France. National Building Museum. 202/272-2448.

**Tensions in Architecture**
New York City
Through January 5
An examination of the extraordinary recent developments in the materials and technology of tensile structures. Material ConneXion Gallery. 212/445-8825.

**Ad Fontes: The Art and Projects of Veibjorn Sand**
Washington, D.C.
Through January 8
An exhibition of works by the Norwegian artist, including documentation of three unusual public projects: a highway bridge modeled after one of Leonardo’s designs, a troll’s castle built of ice and snow, and an installation based on the discoveries of astronomer Johannes Kepler. AIA Headquarters Gallery. 202/638-3221.

**Designing the Disney Theme Parks**
New York City
Through January 10
“The Architecture of Reassurance” examines how Disney attractions are conceived, planned, and built. On display are 200 plans, drawings, paintings, and models from Disney archives, many of which have never been publicly displayed. Cooper-Hewitt National Design Museum. 212/849-8300.

**George B. Post: Great American Architect**
New York City
Through January 10
Among the works featured in this exhibition of the late 19th- and early 20th-century architect are renderings of the long-demolished Equitable Life Assurance Society (the first building to use elevators) and the Western Union Building (the first to reach 10 stories). New-York Historical Society. 212/873-0059.

**Premises: Invested Spaces from France**
New York City
Through January 11
An exhibition of visual arts, architecture, and design in France from 1958 to 1998 that underlines the relationship between the artist/architect and the constructed environment. Included are models, drawings, photos, and installations by Christian Boltanski, Yves Klein, Le Corbusier, Jean Nouvel, and Annette Messager, among many others. Guggenheim Museum SoHo. 212/423-3500.

**All Wright: The Dana-Thomas House**
Chicago
Through January 31
An exhibition showcasing the most complete and best-preserved example of Frank Lloyd Wright’s early Prairie houses. Chicago Architecture Foundation. Call 312/922-3432 or fax 312/922-0481.

**Main Street Five-and-Dimes**
Miami Beach
Through January 31

**Louis Comfort Tiffany at the Metropolitan Museum of Art**
New York City
Through January 31
Nearly 100 Tiffany works from the museum’s collection, including windows, lighting fixtures, and objects, are featured. The full-scale entrance loggia from Tiffany’s Long Island estate is also on view. Metropolitan Museum of Art. 212/570-3951.

**Cities on the Move**
New York City
Through February 7
This exhibition brings together artists, architects, filmmakers, and other “creators” who explore the... (continued on page 48)
Monuments of the Future: Designs by El Lissitzky
Los Angeles
Through February 21
An exhibition of works by the early 20th-century Russian artist, including designs for utopian skyscrapers. Getty Center. 310/440-7300.

Incandescence: Watercolors by Lauretta Vinciarelli
San Francisco
Through February 23
A series of paintings commissioned by SFMOMA that examine the relation of space to the horizon line. San Francisco Museum of Modern Art. 415/357-4000.

The Cartoons of Roger K. Lewis
Washington, D.C.
Through February 28

Design Ideas for New York's East River
New York City
Through February 28
On display are entries to the Van Alen Institute's ideas competition to transform the East River into public space, and the New East River Park Project by Reiser + Umemoto Architects. Van Alen Institute. 212/924-7000.

Unlimited by Design
New York City
Through March 21
An exhibition of products, services, and environments designed to meet the needs of people throughout their life spans, from toddlers to the elderly, demonstrating the effect design can have on the quality of life. Cooper-Hewitt National Design Museum. 212/849-8300.

Forgotten Gateway: The Abandoned Buildings of Ellis Island
Washington, D.C.
Through March 28
A photographic exhibition documenting the deterioration of the historic hospital complex on Ellis Island, which remains untouched by the renovation that transformed the north side of the island. National Building Museum. 202/272-2448.

The Little Apple: Souvenir Buildings
New York City
Through March 28
On display is a collection of 125 miniature New York buildings, with the oldest souvenir dating from 1800. Museum of the City of New York. 212/534-1672.

Zigzags and Speed Stripes: The Art Deco Style
Pittsburgh
Through March 28
An exhibition that surveys the impact of the Art Deco style on architecture and design, tracing the interwar phenomenon from zigzag modern to streamlined moderne. The exhibition complements the permanent installation of The Chariot of Aurora, a gilded and lacquered relief from the SS Normandie. Carnegie Museum of Art. 412/622-3131.

Building the Empire State
New York City
Through March 31

Architecture on the Rise: Renderings by Hughson Hawley
New York City
Through April 4
Hawley's watercolor drawings from 1880 to 1931 offer a vision of the developing city. Museum of the City of New York. 212/534-1672.

(continued on page 50)
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**Beyond Architecture: Marion Mahony and Walter Burley Griffin**
Sydney, Australia
Through May 2
This exhibition explores the professional and spiritual journey of architects Mahony and Griffin, from their years in Frank Lloyd Wright’s office at the turn of the century through their work in Australia and India in the 1920s and 1930s. Powerhouse Museum. 011/61/02/217-0111.

**Thermal VII**
Clearwater Beach, Florida
December 6–10
A conference focusing on the latest technologies related to the thermal performance of building envelopes. The core conference and workshops meet AIA/CES criteria for quality levels II and III, respectively. Sheraton Sand Key Resort. Call Mia Prater at 422/576-7942 for details or E-mail her at unb@ornl.gov.

**Photography and Transformations of the Contemporary City: Venezia–Marghera**
Montreal
December 9–April 25
The work of 15 Italian photographers exploring the relationship between historic Venice and the modern, industrialized, and polluted mainland port of Marghera nearby. Canadian Centre for Architecture. 514/939-7000.

**IASTE ’98**
Cairo, Egypt
December 15–19
This year’s conference of the International Association for the Study of Traditional Environments examines how nations are cultivating traditional architecture as a means of attracting tourism. About 120 papers by scholars from around the globe will be presented. Contact the Center for Environmental Design, University of California at Berkeley, 510/642-2896.

**Celebrating Chandigarh: Fifty Years of the Idea**
Chandigarh, India
January 8–11
An international conference marking the 50th anniversary of the Punjab capital’s conception includes discussions of how its design, by Le Corbusier and many others, affected city planning in developing nations around the world. Among the speakers are Charles Correa, Norman Foster, Ricardo Legoretta, Richard Rogers, Kenzo Tange, and Robert Venturi. Call 011/91/172/548742 or visit www.cperspectives.org for details.

**International Builders’ Show**
Dallas
January 15–18
The world’s largest convention and exposition geared to the home-building and construction industry will also host, for the first time, the International Commercial Construction Exhibition. Dallas Convention Center. Call Jason Lowe at 202/861-2104 or E-mail jlowe@nahb.com for details.

**Transformations: Mixed-Media Assemblages by Keith Krueger**
Washington, D.C.
January 15–February 26
An exhibition of works by a local architect, who uses discarded elements from buildings and construction sites in his compositions. AIA Headquarters Gallery. 202/638-3221.

**World of Concrete USA**
Las Vegas
January 18–22
An exposition focusing on materials, equipment, and technology for the concrete construction, repair, and refurbishment industries. Las Vegas Convention Center. Call Maria Prior at 630/705-2578 or visit www.wocexpos.com for more information.

**Solid Surface ’99**
Las Vegas
January 21–23
The International Solid Surface Fabricators Association’s annual event will feature over 100 exhibitors and 5,000 attendees. Riviera Hotel. Call 702/567-8150 for more information.

**Restoration and Renovation**
Washington, D.C.
January 28–30
This year’s International Exhibition and Conference for Traditional Buildings, Homes, Design and Craft will be held in the nation’s capital to encourage networking with the public sector. Sheraton Washington Hotel. Call 978/664-6455 or visit www,egiexhib.com for more information.

**Community Built Association Conference**
Santa Barbara, Calif.
January 29–February 1
A conference run by an organization devoted to involving local residents in the building process. Attendees will include artists, architects, landscape architects, designers, builders, community gardeners, park and recreation officials, and community development specialists. La Casa de
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(continued from page 50)

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National Roofing Contractors Association Convention
Phoenix
February 7–10
The NRCA hosts the largest roofing convention in the United States, attracting more than 8,000 attendees and 390 exhibitors. In addition to educational programs, there will be presentations by Gen. Colin Powell and humorists Dave Barry and Rita Rudner. Phoenix Civic Plaza. For registration materials, call 800/323-9545, fax 847/299-1183, or visit www.roofonline.org. For fax-on-demand, call 888/455-6722 and request document 1203.

Greenprints '99: Sustainable Communities by Design
Decatur, Ga.
February 22–23
A conference and trade show on environmentally appropriate building technology and sustainable community design, hosted by Southface Energy Institute and the Georgia Environmental Facilities Authority. Atlanta-Decatur Hotel and Conference Plaza. Call the Morningstar Management Group at 404/653-0606 for more information, or visit www.southface.org.

Inter Con '99
Orlando
February 24–28
A convention and trade show for the commercial interiors construction industry, sponsored by the Ceilings and Interior Systems Construction Association and Interior Construction magazine. Walt Disney World Coronado Springs Resort. For information, call 630/584-1919 or visit www.CISCA.org

AIA National Convention
Dallas
May 6–9
The theme of this year's convention, expected to draw as many as 14,000 people, is "Think Big, Make IT Happen: Leadership in the New Millennium." Architects can earn all 36 Learning Units needed for AIA accreditation by attending seminars and exhibitor education sessions. Dallas Convention Center. For information, visit the convention Web site at www.aiaexpo.com (not yet online). For information on exhibiting, contact Hill, Holliday Exhibition Services at 617/572-3553.

Competitions

Rudy Bruner Award for Urban Excellence
Submission deadline: December 18
This award is given to urban places that demonstrate a successful integration of effective processes and meaningful values into good design. The Gold Medal winner receives $50,000. For more information, call 617/492-8401 x139 or E-mail info@brunerfoundation.org.

London AIA Excellence in Design Awards
Submission deadline: January 15
The awards program honors excellence in architectural design for work completed between January 1, 1993, and December 31, 1998. Eligible are projects by U.K.-based architects working anywhere in the world; projects in the U.K. by architects from anywhere in the world; and projects in the U.K. by U.K.-based students. For more information, write AIA, Kent House, 14-17 Market Place, London W1N 7AJ, or fax 011/44/171/636-1987.

Young Architects Forum
Submission deadline: January 29
"Scale" is the theme of this year's competition sponsored by the Architectural League of New York. Open to architects and designers who have graduated from undergraduate or graduate programs in the last ten years. Winners receive a cash prize and are invited to exhibit their work and give a lecture at the Urban Center. For an entry form or for further information, call 212/753-1722.

(continued on page 160)
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Photographs by Alex S. MacLean

Step back and take a cosmic view of the world. That's what photographer Alex S. MacLean and writer James Corner did in their award-winning book, *Taking Measures Across the American Landscape* (1996). ARCHITECTURAL RECORD is pleased to present a collection of MacLean's previously unpublished images photographed from a high vantage point. Our selections illustrate the intersection of human intervention and the natural world—specifically, the relationship of construction and landscape. MacLean's work demonstrates how emphatically and forcefully the world is changed by human will, how directed and linear, how like a language, are the patterns that we make. Here are circumscribed pentagrams and octagons of suburban developments counterpoised with the random lushness of the northeastern hills, the stylized inscriptions of asphalt paving laid like a ribbon on the desert, and the rhythmic power of simple storage buildings. All speak to intention and to transformation, and from such a height, even these simple artifacts sing. Robert Ivy, FAIA
Objects in the landscape

Patterns

mid the anxieties of starting and running an architectural practice, the founders of a firm are not likely to think about who will succeed them. They are just hitting their professional stride, and their objectives rarely extend beyond simply surviving. But from the first day of business, an unwelcome and often frightening deadline looms: the day when the current principals must step down and make way for the next generation.

No matter when a firm confronts it, the issue of leadership and ownership transfer is a touchy one. The realignment of power involves establishing new leaders and ushering out the old ones, who are often reluctant to let go. It involves finding money to compensate former principals while coping with friction and competition among remaining staff members. And it involves maintaining a good image and a solid front so that clients see the firm as steady and reliable.

While ownership turnover is hardly a new issue, there are undoubtedly more firms considering it now than ever before. For one thing, there are exceptionally large numbers of principals confronting the prospect of retirement, however varied their ages. A large proportion of today’s firms date from the prosperous postwar years, roughly 1950 to 1965, when the profession expanded rapidly. Many of the leaders, in their prime then, are now ripe for retirement.

The most recent recession also left a lot of pent-up demand for ownership transition. When a firm’s finances are languishing, there is little incentive for anyone to seek ownership shares, or to offer them. Although financial markets are volatile today, most firms are prospering. Indeed, many cannot find enough help. That means now is a good time for transitions to take place. Staff members who survived the downturn have absorbed some tough economic lessons; no starry-eyed idealists, they are concerned and informed about the business of architecture. They want to be adequately rewarded for remaining loyal whether times are good or bad.

Two Kinds of Firms

Though an architecture firm may be set up in various ways—as sole proprietorships, partnerships, or professional corporations—legal structure is not as important to the ownership transition process as is the firm’s history. For the purposes of this article, there are two types of firms: those where the founders are still the owners and those that have gone through the transition process before.

Past experience can make a big difference in how leadership succession is handled. Second-generation principals tend to focus on maintaining the firm’s continuity rather than their personal reputation. They are likely to view ownership transition more objectively and to think about the next transfer of power from the day they take the reins. By comparison, founding partners often don’t think about succession until they have to, which is often too late. It is hard for them to imagine the firm without them; it is a part of their identity. Founding partners have the hardest time letting go. In fact, some simply can’t.

The death of a firm’s senior principal may complicate the ownersh ip transition process. If the heirs become embroiled in an estate battle or a dispute with the surviving partners over the value of the firm, untangling the matter in court could take years.

A buyout is most difficult financially if a firm is entirely owned by one individual, or by two or three partners of about the same age who want to retire at about the same time. So much change all at once is not only disruptive to a firm, it also creates financial strains: buying out the retiring owner or owners overtaxes the new principals, especially if the decision is a relatively sudden one and the new partners haven’t had an opportunity to reserve some money. The selling partners, too, will feel the...
There is an ownership transition in every firm's future, if it is to have a future.

effects, since they are likely to get less money for their shares or will be forced to wait for their money.

The greatest challenge comes when a firm is headed by a star architect, one with a strong design reputation and whose firm carries his or her name. All of the firm's appeal in the marketplace, and often the ownership as well, is invested in one individual. Firms headed by a design celebrity rarely survive after that person's departure. But there are exceptions, rare instances when architect stars have determinedly provided for the continuation of their firms and their name. Marcel Breuer and I. M. Pei, for instance, both made full-fledged partners of younger associates while they were in the heyday of their practices. Breuer's successor firm flourished briefly after his death, then disbanded. But Pei Cobb Freed & Partners has continued to prosper despite Pei's retirement, though the question now is who will succeed Harry Cobb and James Freed in the firm's name.

If a firm is to survive, it must take a hard look at its staff, its resources, and its long-term goals. Whatever the structure of the firm, ill-considered succession decisions can negate the years of effort that went into building it. Successful ownership transition demands the full attention of current principals and potential ones, and it calls for some soul-searching.

Developing a Transition Plan

Effective transition involves sharing ownership with valuable talents and potential leaders on the staff as soon as they can be identified. Firms should begin succession planning when the current owners are in their 40s, advises Boyce Appel, an Atlanta-based management consultant. Plans must be in place early enough to allow adequate transition time for those moving into senior management positions. Unless incoming principals have the opportunity to gain adequate experience in leadership roles, they may be ill equipped to do their jobs and inspire confidence that the firm can maintain its momentum. That's not only detrimental to the firm, it may reduce the amount that departing principals will get for their ownership shares. Worse yet, late plans are more likely to be disrupted by death or disability.

Why is transition planning so seldom started early? One reason is that current owners are reluctant to share control and accountability. And any planning for transition is difficult psychologically, says Perry King Neubauer, FAIA, of ADD Inc., in Cambridge, Massachusetts, because it signals a first step toward retirement, implying the loss of identity, authority, and income. Everything the owner has worked for over the years is about to be handed over to others while being coldly evaluated in dollars and cents.

This process is not easy, yet refusing to face it can damage the whole firm. "For your own good and for the good of the company, put your ego aside and start planning early," says Leonard Peterson, FAIA, president of O'Donnell Wicklund Pigozzi & Peterson Architects of Chicago. His firm has made identifying and training potential partners one of its guiding principles (see sidebar, page 63). Doing so makes the transition process more gradual and, therefore, smoother. Also, Peterson knew that if he and his associates didn't take the initiative in making succession plans, they might find themselves reacting to demands by key staff members instead of orchestrating the changes themselves.

There are essential financial details to every transition plan, including how payments are made to outgoing principals, the basis for valuation of shares, and the number of votes each share brings. But most of these issues can be worked out with a lawyer once the more important fundamentals of the plan are decided. Laying the foundation of a good transition plan requires studying every aspect of a firm—its clients, its staff, its modes of operation, and its goals. Lawyer and consultant Paul Lurie of Schiff, Hardin & Waite in Chicago draws an analogy to architectural design: the most important part is the programming and conceptual
PAYETTE ASSOCIATES IN BOSTON

was structured to allow partners to play a major role in governing their firm. Tom Payette, FAIA, is a second-generation owner himself, having been chosen at the age of 33 to succeed Paul Nocka and Frederick Markus, who founded Markus & Nocka in 1931. The firm became Markus Payette & Associates in 1970. Since those early years, Payette has been committed to sharing ownership with promising staff members, as Markus and Nocka had with him. He is critical of owners of architectural firms who wait until the next generation of leaders is in their 50s or beyond before they turn over control.

Payette's ongoing goal is to create ownership equalization, ideally with each partner having the same number of voting shares. This is a collaborative approach that guarantees a balance of power among partners—there are now 11—and also helps ensure their full commitment to the firm.

EVALUATING THE WORTH OF THE FIRM

Crucial to the transfer of any ownership shares is placing an accurate value on the firm as a whole. As one wise old sage has said, the most important asset an architecture firm can possess can't be bought: "blue sky and goodwill."

One common measure is book value: the total value of a firm's financial assets minus its liabilities. But Peter Piven of the Coxe Group stresses that value must not be set by simple rules or formulas but by a careful assessment that is adjusted to such factors as real estate ownership, backlog of work, market prospects, and whether people in key positions will be retained in the transition.

Internal sale of ownership shares is typically about 10 to 30 percent above book value. The added percentage is calculated based on such hard-to-define qualities as the firm's reputation, the promise of continuity, and confidence in the newly aligned leadership.

If firms are sold on the outside—to other firms, for instance—the buyers may pay up to twice the book value, assuming that the merger enhances the efficiency and revenue potential of both firms.

Identifying the Next Principals

When Martin Raab, FAIA, was first offered a partnership at HLW in New York City, he was told by his seniors: "Your first job is to find your successor." Since partners usually aren't compensated for their stake in the firm until they retire from ownership and are bought out, Raab
recognized the importance of putting a good team in place and retaining
their respect. That way, the firm would be willing and able to compensate
him and his associates adequately when they departed. Effort also had to
be invested in making the successors function as a team, since staff mem-
er members with leadership qualities are bound to be competitors from the start
and to remain competitors. When he retired in 1996, Raab left behind a
thriving firm.

Many lists of desirable qualities for ownership candidates have
been drawn up. The distinction between owners and leaders is more than
mere semantics. Not all architects with skills essential to the firm have
either the ability or the desire to exercise leadership. It must be made very
clear to those who are given ownership without an obligation to lead that
they must support the designated leaders. They may have a voice in part-
ner or shareholder meetings, but their support of the leaders is essential
to the firm’s survival and, ultimately, its succession to the next generation
of leaders.

However ownership may be dispersed, it is widely agreed that
an effective firm should have a single, buck-stops-here leader. “Cama-
raderie among partners is vital, but there has to be one individual who
wants to lead and commands the respect of both clients and staff,” says
Tom Payette, chairman of Payette Associates in Boston (see sidebar, op­
posite page).

Founders should avoid hunting for successors with character­
istics that match their own. First-generation leaders have an entrepre­
nurial spirit that is invaluable in launching the firm. These qualities may

FOUNDERS SHOULD AVOID SUCCESSORS
WITH TRAITS SIMILAR TO THEIR OWN.

be hard to find among employees who choose to stay with an established
firm and, more important, they may not be the most essential for per­
petuating it, says Hugh Hochberg of the Coxe Group, management
consultants in Seattle. Ideally, a leadership team should have a combi­
nation of first-generation enthusiasm and second-generation cautiousness.

As a way of retaining the most promising candidates for succe­
sion within the firm, Hochberg proposes singling out employees with
leadership potential early in their careers. His recommendation is to
announce that such individuals have been selected as principals-to-be,
then to begin grooming them for the roles they will be filling 10 or more
years later. The risk of error in such selections is small if they are carefully
done, he contends, since traits consistent with leadership—effectiveness,
talent, insight, intelligence, dedication, maturity, and modesty—evidence
themselves early. Payette, who took over leadership of his firm at the age
of 33, finds it ironic that principals looking for successors hesitate to ele­
vate 35-year-olds to leadership positions, when statistics show that the
average age for starting a practice is 31.

It is essential to involve valuable members in this strategy and to
explain it carefully throughout the firm. It’s also necessary to emphasize
that these designees are not the only candidates. Grooming someone to
be a principal doesn’t preclude others from having a shot at the job. There is
always the possibility that the principals-to-be could be lured away or
leave the firm on their own. The risk of developing and then losing poten­
tial leaders must be weighed against the risk of not developing them at all.

Simply identifying next-generation leaders is not enough. They
must be put in positions to develop the leadership skills they will need.
Management skills in particular must be nurtured. If a potential principal
is sent off to earn an MBA, he or she must be allowed to put this knowl­
dge to the test in the firm, or the value of the degree will be lost. Ideally,
special opportunities should be created for potential successors to hone and test their leadership skills. One excellent way is for next-generation candidates to head branch offices where they will face the kinds of challenges they will be exposed to as leaders, but on a smaller scale.

If members of the owners' families are in line for succession, the picture changes in significant ways. David Martin and his cousin Chris Martin, of A. C. Martin Partners in Los Angeles, represent the third generation of family ownership of their firm. In some ways, David Martin says, the issue of succession is easier in a family setup. There is no question as to who will lead the firm next. But there are family dynamics to contend with—a parent who doesn't want to retire, spouses who may want to get involved, family members who feel left out, incompetent relatives who cannot be gracefully dismissed.

Family-owned firms also run the risk of alienating anyone outside the family who has management ambitions. The Martins have responded to the lack of ownership opportunities for those outside the family by providing a generous profit-sharing program. And though both David and Chris have children who show promise as fourth-generation owners, they are not ruling out the possibility of broader ownership in the future.

When the Boss Won't Let Go

At Firm X, there is an employee of tremendous skill. He knows the firm's background and he has extensive contacts. But he takes exception to management or design decisions and lets everyone within earshot know it. He's a threat to efficiency and morale. He is, in fact, one of the firm's former principals who has retired from ownership with the agreement that he can continue to work part-time.

Almost everyone interviewed for this article advocated continued employment, on a full- or part-time basis, for former owners. But most of them cautioned that keeping former principals on staff requires sensitive orchestration. People who have been at the top of the firm are so accustomed to a certain level of power and respect that becoming a mere member of the team can be traumatic. They may try arguments that used to be persuasive, and they may be shattered if they're overruled.

If retired owners are to work on staff, certain rules should be observed. Make sure the retired owner is comfortable with his or her buyout money and, conversely, that current principals don't resent the cost to them. Be sure that the firm's current structure gives one person—a president and/or CEO—the final word on all decisions, to defuse divide-and-conquer tactics. Make it clear to previous owners working in the firm that criticism of the firm's current management should be taken up with the boss, not aired with others.

Of course, there are owners who welcome the chance to retire, in some cases before they are 65. Sometimes they are wary of getting involved in the firm's liability suits, which could (depending on the firm's structure and on state laws) threaten their own resources. More commonly, such suits threaten the firm's reputation, making the owners' stock in it less valuable. And while the economy is good right now, it is also volatile. Some owners would rather bow out now, before another recession undermines the value of shares.

Who Pays?

Money for retirement may not ultimately be the most important concern in firm succession, but it is one that always presents a fundamental conflict. Principals giving up their ownership always want to be adequately compensated for it, while those buying in don't want to be unduly burdened. Professionals who may have had a mentoring relationship before are forced to become adversaries, assuming the uncomfortable roles of seller and buyer.

Some type of payment plan that compensates the departing owners without placing painful burdens on new principals must be devised. The most financially successful transitions are those in which the owners see their holdings not as assets they can cash in when they retire, but as an opportunity to have a say in directing the firm for all those years before retirement.

But ownership transition is the major way most departing principals fund their retirement. It is easy to see retirement as the reason a succession plan is needed, Lurie says, because senior partners who initiate the process are probably seeking an exit strategy. The attitude of the outgoing principals is crucial here. If there's greediness on any side, things can get bitter.

There are two common ways for incoming principals to buy out present owners: tapping their personal resources (second mortgages, loans, or other cash), or paying in installments that come from bonuses or profit-sharing. Much less frequent, but recommended by some, are two alternatives: present partners simply donate shares to younger members of the firm, or they establish a retirement fund, so that the firm as a whole contributes to the buyout, reducing the burden of the principals acquiring ownership.

The strict pay-for-your-own-shares policy works best if compensation for the incoming principals is generous. Paying out of bonuses usually means increasing the size of bonuses for those buying in. In one common scenario, all partners receive equal shares of the profit, but that the junior ones pay back part, installments toward their ownership stake.

A retirement fund was established by one successful (hence valuable) firm when they realized that the buyout of the three founders, all of whom would retire about the same time, could not be comfortably achieved by conventional means. Money paid into the fund in monthly
PROFILE

Turnbull Griffin & Haesloop's transition would have been hard even under the best of circumstances. Matters were made worse when William Turnbull Jr., FAIA, died suddenly last year at the age of 62. His wife, Mary Griffin, AIA, who was president and CEO of San Francisco-based William Turnbull Associates, became the sole shareholder. That meant she suddenly had full responsibility for the firm's succession plan. Fortunately, enough thinking had been done that succession proceeded as smoothly as could be expected.

These were "tough emotional circumstances," says Lou Marines, president of the Advanced Management Institute for Architecture and Engineering, an educational and management consulting firm in San Francisco. While Turnbull had suffered a chronic illness, his death came unexpectedly. "We had done some prior planning in light of [Turnbull's] poor health, but we carried on with the great hope that this was going to be a conventional succession," Marines says. "There was an established framework, but the specifics were not in place."

Eric Haesloop, AIA, joined the firm about the same time as Griffin, almost 13 years ago. Griffin became a controlling shareholder in 1994 and was selected president and CEO in 1996. But all three principals shared leadership responsibilities, with each taking one third of the firm's business, which includes institutional and residential work. Within a few weeks of Turnbull's death, the firm changed its name to Turnbull Griffin & Haesloop—a move that had been planned before last summer—and Haesloop began the long process of buying ownership shares, paying for them out of his bonuses.

Some type of ownership role is important to establishing Haesloop's position with the firm and is a logical career move for him. "It is a reflection of how we had been working before Turnbull's death. Becoming an owner is part of a natural succession," Haesloop says.

The partners face a challenge similar to that confronted by their mentor in 1970, when Turnbull became sole owner of MLTW. Griffin and Haesloop must prove themselves without their partner. It's a scenario played out whenever a leadership transition occurs. Since Turnbull was active until just before his death, most of the work in progress bears his imprint. Reassuring clients that they will receive the same level of design service has been a top priority.

Two associates, Andrew Mann and Susi Marzuola, have served as a secondary level of leadership, helping to keep work moving steadily while Haesloop and Griffin were forced to meet with lawyers, accountants, and consultants. "Just as these kinds of things bring a family closer together, we've found everyone here has contributed a lot and helped work through this," Haesloop says.

With both partners in their mid-40s, now is the time to look ahead to the next succession, even as Haesloop and Griffin continue to decide what kind of firm Turnbull Griffin & Haesloop will become.

installments has spread the burden over all aspects of the firm's operation. In recent years, the cost has hardly been felt, and the fund is growing nicely.

When a large majority of ownership has to be bought out, and the financial burden on incoming owners is daunting, it is tempting to expand the pie by pursuing strategies intended to expand revenues and make the buyout painless. The problem with such an approach, of course, is that business conditions and competitive forces can thwart even a well-considered expansion strategy. The Complete Guide to Ownership Transition (PSMJ Resources, 1996) is very blunt on this point: base buyout plans on actual revenues, not on the assumption that they may increase.

The easiest solution is to stretch payments out over a period of years. Or the firm may pursue more imaginative strategies, such as establishing a retirement fund or an employee stock ownership plan (ESOP). These profit-sharing plans invest in the stock of the employer rather than a diversified portfolio. ESOPs are recommended as a way to fund buyouts when large amounts of ownership have to be bought from retiring partners within a short period. Though few architecture firms have adopted ESOPs, they can be advantageous because the funds are also available for such purposes as purchasing equipment. Special tax provisions for ESOPs magnify these advantages. And with an ESOP comes the requirement for an annual valuation of the firm by an outside expert, which provides a useful index of its value.

Whatever type of plan is adopted, it is essential to involve key staff as planning proceeds. Firm members earmarked for ownership may find it difficult to buy their shares, whether by borrowing or paying for them out of future income, so it is essential to involve them in the planning process, not just offer them a take-it-or-leave-it deal.

The Price of Perpetuity

How much effort should be invested in the firm's survival? Some star-designer firms seem to have no reason to exist without the stars, but most architects want the organizations they have nurtured to go on representing their intentions long after they have departed. A combination of personal ego, professional responsibility, and camaraderie with associates is involved. However long a firm survives, it will never stay the same. It will constantly evolve, quite possibly becoming an organization hardly recognizable to its founders. The cost of survival is often the transformation of a firm into an organization less daring and more businesslike. But while the surviving firms are more likely to become businesslike, the more businesslike firms are the most likely to survive.
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Locking Them Up

IS GETTING TOUGH THE BEST WAY TO APPROACH PRISON DESIGN?
OR SHOULD FACILITIES RESPOND TO THE NEEDS OF THE POPULATIONS BEING DETAINED?

James S. Russell, AIA

Politicians may be calling for more prisons that punish offenders at the lowest cost, but architects and facilities operators understand the need to tailor the approach to the population. The four projects featured in this Building Types Study address the needs of different kinds of detainees, from women with children to children themselves. The essay below considers the dilemmas of corrections design at its most vexatious: the world of juvenile offenders.

The Epidemic of Youth Violence,” screams one headline. “Crime Time Bomb” cries another. “In a Dark Alley, Most Feared Face Is a Teen’s” declares USA Today. Moral relativism and glamorization of violence, say pundits, have bred a new generation of teen “superpredators,” a phenomenon whose lurid potential is gleefully seized on by sensation-hungry media. Out of this attention to juvenile crime has come legislative action mandating more jail-like facilities for juveniles, a reduction in rehabilitative programs, and the transfer of juvenile offenders to the adult courts and corrections systems.

Most people involved in juvenile justice believe that a significant percentage of youth offenders are capable of rehabilitation. Most designers see their chief role as making environments that encourage better behavior. Yet the political momentum toward harder facilities and more severe punishment is at odds with this consensus.

A bill now in Congress would relax federal restrictions on jailing juveniles with adult felons, and make some federal aid available only to states that prosecute violent juveniles age 15 or older as adults. It has yet to pass, but similar efforts have succeeded in the states. For architects, the dilemma is: should they design better kid warehouses, get out of the business, or help change the political climate? There are no easy answers.

Fear drives policy

John J. Dilulio Jr., the Princeton professor of politics and public affairs who coined the term "superpredator," calls those who think youth violence can only be averted by the threat of long, hard prison terms "dangerously deluded.” Frightening trends, many of them highlighted by Dilulio himself, fuel the fear that youths are more violent and less capable of rehabilitation. Over the last 10 years the rate of juvenile arrests has
WHAT YOU MUST CONSIDER WHEN DESIGNING A JUVENILE FACILITY

Many clients say they want to do more with the design of juvenile detention facilities. Architects can help by creating facilities that reconcile staffing, programs, and other needs. What follows are some key design issues that architects must address.

**Siting:** The detention facility must be secure and project a sober institutional face to the community, yet it must not overtly advertise its function. High chain-link fences topped by razor wire are usually not acceptable in established communities and may fly in the face of regulations or corrections methodology. Many jurisdictions choose to site facilities in remote rural areas to lower costs and avoid neighborhood conflicts. These locations make family visits onerous (an important concern, especially for younger offenders), entail high inmate-transportation costs, and may offer a too-limited pool of talented specialized staff.

**Hard or soft:** In spite of the trend toward harder facilities, Essex County’s Joseph Clark says, “You’ve got to make sure it is possible to have appropriate programs.” Harder facilities are generally more expensive to build and operate, and not all facilities need to be heavily secured. “I would like the flexibility to house different behaviors,” says Robert Murray, director of a Hudson County, New Jersey, jail. “Not all kids need two-inch-thick doors and very heavy furniture.” In every facility, however, security comes first, not just to keep inmates in, but also to protect staff. Walls, doors, and gates control undesired movement but can impede the visual surveillance and communication needed to supervise and manage the facility. Excessively inconvenient security features may prompt staff to circumvent them, creating unintended problems. Higher levels of programs and higher security generally mean higher staffing. A facility will simply fail—become prone to violence and escapes—if necessary staffing levels are not funded.

**Housing type:** Most new facilities have moved to a “direct supervision” model, in which staff mingle with detainees within the housing unit and elsewhere. (Prisoners are observed from outside the secured unit in the “indirect” model, used in many adult prisons.) Though it would seem risky to expose guards directly to residents, supervisors placed in the housing units know better what is going on with inmates, can reach out to them, and can address problems before they get out of control. Total beds in a juvenile detention center are likely to be far fewer than in adult facilities. While as many as 40 adults may reside in a single unit, juvenile housing units usually have no more than 12 residents. Adult facilities often have little daylight and few design flourishes, but juvenile facilities may have residential-style amenities such as carpeting, sunlight, and a range of recreational offerings.

“You are not going to lock up most of these kids for a long time,” says architect Michael McMillen, “so you want a good response from them. You want to co-opt them, rewarding good behavior.”

**Programs:** Most in-facility programs need to address small groups, for security reasons and to assist residents who often have major deficits in school and social skills. Regular programs may include mentoring, school (even a Graduate Equiva­lency Degree), drug treatment, psychotherapy, and religious services. “Our program may be the first time these kids have ever received individual attention,” says Joseph Panepinoto, principal of the Hudson County facility’s school. The location of programs within facilities is key to security and operational efficiency. Centralized locations for education, dining, and other programs may offer efficiencies of scale but may also entail time-consuming and costly inmate movements. Many juvenile detention facilities house some programs in the housing units (or share them among two or more units), but this arrangement may stretch staff too thin or cost too much for duplicated spaces.

**Durability:** Building products and finishes suited to residential occupancies were acceptable in the days of less-confining facilities. Today operators seek a residential appearance, but also a level of durability that reflects lower maintenance budgets, as well as a population that is typically more aggressive and more suicide-prone. (With time on their hands, inmates can turn a sprinkler head, a light fixture, or any kind of hardware into a weapon.)

J.S.R.

risen, and the arrests are for more violent crimes. All arrests for murder and negligent manslaughter, for example, increased about 23 percent between 1985 and 1994, but the number of juveniles arrested for the same crimes went up by 150 percent, according to FBI figures. The percent of homicides committed by juveniles also increased rapidly in the '80s and early '90s, though it still represents only 10 percent of all murders. But from 1994 to 1996, the juvenile arrest rate declined by 12 percent. The recent declines have been variously attributed to crime-prevention efforts, a reduction in the availability of handguns, and the waning of the crack-cocaine epidemic. Complacency about juvenile crime, though, is risky, warns Dilulio. The number of teenagers will grow rapidly in the next few years, presumably pushing youth crime up as well.

Though only about 5 percent of all juvenile arrests are for violent crimes, it is this “small percentage of youth that is driving public policy,” says Karen L. Chinn, of Chinn Planning, a consultant based in Columbia, South Carolina. Many state and local governments are building "harder" new facilities that are more secure and institutional in design, or requiring the transfer of juvenile offenders to adult courts (and thus prisons).

The great majority of juvenile arrests (2.7 million in 1994) are related to drugs or vandalism, or are “status offenses” such as truancy or running away from home. Chinn says drug treatment, education, and vocational training programs have high success rates for these offenders, but are often sacrificed in today’s overheated political environment.

**Looking kids up instead of finding other solutions**

About 674,000 kids passed through juvenile facilities in 1993, but only about 60,000 were actually held. That number is growing rapidly, however, as is the number of beds. This is less because of a growth in convictions per se than because juveniles are now incarcerated for crimes that in the past would have resulted in probation or other punishment.

F. Jerald Adamek of the Colorado Division of Youth Corrections described the events that spurred $30 million worth of spending in his

Looking Mountain in Golden, Colorado (Anderson Mason Dale and RNL Design, 1988), represents a model that is falling out of favor. Its residential character is meant to encourage good behavior among inmates.
The Hudson County (New Jersey) Detention Center offers some of the amenities of the less harsh "normative" model in a higher-security, more discipline-oriented facility. Design architect Ricci Associates worked with Dean Marchetto Associates.

system. Several terrifyingly violent crimes committed by teenagers in Colorado in 1992 became, in the media, a "summer of violence." After that, the system started adding beds, but demand surged ever higher: "Detentions went from an average of seven days to 18 days," recounted Adamek at a conference last spring sponsored by the AIA Architecture for Justice professional interest area. "Policy changes and mandatory sentences moved incarceration times from an average of two years to approaching five years. What were once misdemeanors became felonies," he says. As a result, a 600-bed system in 1991 will become a 2,200-bed system by 2004.

Juvenile facilities, because of their staffing needs and the intensity of their programs, are significantly more expensive to build and operate than adult facilities, which have, over the years, cut back on many rehabilitative programs. The average cost per bed to construct a juvenile detention center is $100,000 to $150,000, says Chinn. Operating costs are equally daunting at $150 to $200 per day. (The upper range is more than double what it costs to house a typical adult prisoner.)

**ONLY ABOUT 5 PERCENT OF JUVENILE ARRESTS ARE FOR VIOLENT CRIMES, BUT IT IS THIS SMALL GROUP THAT IS DRIVING PUBLIC POLICY.**

Changing roles for the justice system

Juvenile facilities design is changing because the perception of what the justice system is supposed to accomplish is changing. From the 1970s to the late 1980s, a "normative" model prevailed, emphasizing behavior modification in noninstitutional settings that had a minimum of the visible apparatus of security or confinement. Projects built according to these tenets respected privacy and individuality through varying architectural finishes, movable furniture, generous use of daylight, and a great deal of interaction with staff, who could encourage residents while controlling them.

This model, though successful in some jurisdictions—such as Colorado's Lookout Mountain facility, designed by Anderson Mason Dale and RNL Design and completed in 1988—has been overwhelmed by political reality. The growth in offenders, the lengthening of sentences, and the reduction in judicial discretion over the past few years have made this model a luxury fewer jurisdictions can afford.

Joseph Louis Clark, who directs a new juvenile detention facility in Essex County, New Jersey, that serves Newark, which is among America's poorest and most crime-ridden cities, has returned to the "custodial" model. "This is a secured, locked-down jail," he says, and the brooding red-brick exterior of this one-year-old facility, with its chunky massing and slitlike windows surrounded by a high, barbed-wire-encrusted fence, leaves no doubt. He thinks cities like his need more youth jails. (Clark, once a high-school principal, was immortalized as a baseball-bat-wielding protector of youth in the movie Lean on Me. He took over the Essex County juvenile justice program four years ago.)

Given a population that comes largely from what Clark calls environments of "hopelessness and despair" that "lure young people into lives of criminality," he disparages the usefulness of the behavior-modification model. The design of the housing units at the Essex County facility reflects this perspective. On each of three floors, four 16-room units fan out around a glass-enclosed central control room. Furniture is fixed; floors are vinyl tile; lights are fluorescent. The rooms have toilets and sinks of standard prison type. But Clark has also developed a 300-person mentoring program and involves 35 churches to encourage a grounding of character through spirituality.

Clark's approach resembles the military model promoted by advocates of "boot camps" in which inmates are subjected to military-style discipline, sometimes humiliating, sometimes physical. These programs and lock-down-type facilities have been politically popular with a public fearful of parole and halfway houses. But can such approaches be credited with recent drops in the crime rate? This question elicited a room-wide groan at last spring's juvenile justice conference. "No data support this," says James R. Bell, staff (continued on page 151)
MODELED ON THE IDEA OF A VILLAGE, THIS WOMEN'S PRISON PROVIDES VARYING LEVELS OF SECURITY IN A NONINSTITUTIONAL SETTING.

by Beth Kapusta

Both critics and supporters of the Grand Valley Institution for Women agree on one point: it feels more like a community center than a jail. This relatively casual atmosphere is the result of two decades of studies by the Canadian government, which revealed what many corrections workers knew intuitively: the old methods of incarceration weren't working, especially for women.

Before Grand Valley was built, all federally sentenced women with terms of two years or more were sent to a central maximum-security facility in Kingston, Ontario, a complex too inflexible to accommodate inmates with lesser security needs. Geographic dislocation was a particular hardship for the 40 percent of incarcerated women caring for children, and reintegration into society often proved very difficult.

A 1990 government report entitled "Creating Choices" led to something of a minor revolution in thinking about prisons and to a radical shift in the architecture of women's prisons. Grand Valley, designed by Kuwabara Payne McKenna Blumberg Architects, is one of five regional centers built to replace Kingston's centralized facility. The new prison is just outside Kitchener, a small southern Ontario city selected for its strong local industry and numerous community colleges, which facilitate outreach and work programs that act as transitional steps back to society.

Loosely modeled on the layout of a village, the institution comprises 10 "houses" surrounding a green, with all of the shared and administrative services located in a long wing to the east. Even here, the institutional character is played down by the articulation of the various programmatic elements—administration, visitation, casework, gymnasium, education, and health care—into separate volumes joined by a loggia facing the common. Rather than radiating from a central surveillance tower, Grand Valley has at its core a cylindrical structure that serves as a nondenominational chapel.

While the prison's perimeter wall is solid, almost monolithic, to reinforce the notion of security, its highly transparent inner skin gives the complex an architectural quality. Light-filled corridors stepping down to match the sloped grounds create an attractive common realm. Subdued colors, natural maple millwork, and indirect lighting reinforce the noninstitutional character. Particularly successful are the entrance sequence and the visiting area, a lofty pavilion supported by tall, exposed steel columns with branchlike capitals.

To encourage self-sufficiency...
The main building (above) has offices, a gym, vocational training rooms, health-care facilities, and a "spirituality room" (left in photo below). Women live in 10 houses grouped around a green (opposite).
To help inmates prepare for their return to society, the prison has spaces for education (right) and casual interaction (above). and make their eventual transition back into society smoother, the women live in houses, each of which accommodates a maximum of eight people.

The sloped-roof cottages offer a progression of spaces from the most public (porch, living, dining, kitchen) to more private areas (laundry, study, bathroom) and finally to the most private (four bedrooms on two levels). Instead of one large cafeteria, each house at Grand Valley is responsible for ordering and cooking its own food. The well-maintained gardens in front of the houses reflect a palpable pride of place, an indication that the inmates appreciate the responsibilities offered them.

Though all 10 houses appear similar, they accommodate varying levels of security; the maximum-security house, for example, has an enclosed walking yard. Another house is for women who have children.

According to George Centen, acting director of facility planning and standards for Correctional Services Canada, the cost per unit for this type of prison is one-third to one-half that of traditional penitentiary construction. Maintenance costs are also greatly reduced, as the sense of ownership and responsibility instilled by this model results in less vandalism and damage. And the simple wood-frame construction is much easier to alter than traditional concrete prisons. Although it is too early to document the effect of the new prison model on recidivism rates, anecdotal evidence from both inmates and staff indicates that the more humane environment has a calming effect. "The public is best served if we can assist in making better people when they return to society," observed Centen.

Some of the initial idealism, though, has been tempered since the start of the project. The notion of replacing fences with electronic security devices, for instance, was abandoned in the face of public fears that prisoners were insufficiently confined. Barbed wire was also added at the front to reinforce the appearance of security, even though the building's public face acts as a secure perimeter.

Yet the humanist aspirations of this project remain powerful. Like the facility's staff, Marianne McKenna, the partner-in-charge, is committed to the idea that good design can help create a prison that rehabilitates, not just incarcerates.

Sources
Steel frame: Nu-Arch Steel
Aluminum curtain wall: Sherwood Industries
EIFS: Durock
Rigid roof insulation: Dow Chemical
Security hardware: Von Duprin, Rutherford, Locknetics
Each of the 10 houses accommodates eight inmates. Women take responsibility for everyday chores such as doing their laundry and ordering and cooking food. Front porches reinforce the residential feeling of the facility (right).
Federal Detention Center
SeaTac, Washington

NBBJ WRESTLES WITH THE CHALLENGE OF DESIGNING A HIGH-RISE FEDERAL PRISON IN A MAJOR METROPOLITAN AREA.

by Barbara A. Nadel, AIA

Project: Federal Detention Center, SeaTac, Washington
Client: Federal Bureau of Prisons
Architect: NBBJ—James Jonassen, FAIA, partner-in-charge; Richard Dallam, AIA, design principal; Steve McConnell, AIA, senior project designer; Leigh Sutphin, project manager; Gary Edmonds, technical designer; Niranjan Benegal, project planner; Bruce Bonine, AIA, medical planner; John Adkins, AIA, Steve Betje, John Christiansen, Tessie Dantes-Era, Judy Djunaedi, Bob Dooley, Becca Dudley, Ken Eckert, Laurance Glasser, Kristine Gormley, Jay Halloran, Gretchen Harriott, Connie Halloway, Ralph Jorgenson, AIA, Dave Leptich, AIA, Bing Lin, John Palewicz, Mike Rogers, Derek Ryan, Andrew Smith, Daniel Smith, Ed Storer, Rysia Suchecka, Vince Vergel De Dios, Karen Wiram, designer

Engineers: Andersen Bjornstad Kane Jacobs (structural); Anne Symonds Associates (civil); CBGKL (mechanical/electrical)

Construction Manager: Heery International
General Contractor: M. A. Mortenson

Size: 355,000 square feet
Number of beds: 1,013
Construction cost: $63 million

From Seattle to New York City, new detention facilities are emerging on the urban landscape, one product of legislative and popular mandates for longer sentences for criminals. The limited availability of sites and the need to be close to courts, transportation, workers, and inmates' families often mean that metropolitan facilities must be located in established neighborhoods.

While communities often resist attempts to locate prisons in their backyards, the jobs, contracts, and tax revenues generated by these projects can be attractive. And architecture can play a key role in making prisons good neighbors.

Balancing costs, the needs of security, and community concerns remains a major challenge for architects and their clients.

The Federal Bureau of Prisons (BOP) operates 93 institutions housing over 108,000 inmates. While most prisons house inmates sentenced to 18 months or more, the Federal Detention Center at SeaTac International Airport serves a more transient population: those awaiting trial at the Tacoma or Seattle federal courthouses; convicted criminals awaiting transfer to other federal prisons; illegal aliens awaiting deportation; and a work cadre of short-term minimum-security inmates performing maintenance chores. The facility is also the western hub for the U.S. Marshals air transportation service ("Con Air"), which moves up to 120 detainees each week.

The detention center is located on a 6.86-acre site on a hillside adjacent to SeaTac Airport, amid industrial buildings and single-family homes. Because of the steeply sloping site, motorists on busy Pacific Highway South can't see the 10-story, 355,000-square-foot tower a few blocks to the west.

Establishing a civic image for the building and a secure, federal presence within a neighborhood context were among the primary design objectives, says Steve McConnell, AIA, a principal at NBBJ. "The project team wanted the building's scale, form, materials, and detailing to articulate durability and the prudent use of public funds."

The building's exterior envelope is the primary security element. Closed-circuit television and motion detectors monitor the building exterior, rendering perimeter fencing unnecessary.

"Our neighbors are pleased with this facility because it looks like a modern office building, not a prison," observes Warden Bill Perrill.

The $63 million complex comprises a four-story cylindrical base and three six-story towers of male and female housing units and offices. The base includes administration, public spaces, and inmate services. The towers are set back from the main entry, minimizing visual contact between inmates and the public.

Barbara A. Nadel, AIA, is principal of Barbara Nadel Architect and specializes in criminal justice and institutional work.
Three triangular housing towers sit above a circular base with public spaces and administrative functions (left). Dayrooms in the center of each housing unit allow for direct supervision of inmates by corrections officers (plans below).

Designing a high-rise prison for an urban area was made more challenging by the need to monitor daily inmate transfers while also separating inmates, staff, and visitors, says Mitch Miskimins, AIA, BOP project administrator. Three separate entries clarify circulation: a vehicular sally port for the marshals and a service entry (both below grade), and a public entry for staff and visitors.

The number of cells (502), types of housing units, and number of beds per unit were specified by the BOP. Double bunking expands capacity to 1,013 beds, allowing flexibility for population spikes. Stacking functions vertically posed design and operational challenges, says Niranjan Benegal, project planner for NBBJ. Due to a small footprint, housing units are on separate floors from program spaces, multipurpose rooms, and education areas—requiring inmates to move around more than in other facilities. Outdoor recreation areas, though, are directly adjacent to each housing unit.

Sources
Concrete masonry units: Eastside Block
Steel doors: Habersham
Hardware: Folger, Adams
Acoustical ceilings and resilient flooring: Armstrong
Elevators: Montgomery-KONE
Mecklenburg County Jail Central
Charlotte, North Carolina

TO DEAL WITH THE PROBLEM OF OVERCROWDING, THIS COUNTY JAIL WAS DESIGNED TO PROCESS DETAINED AS EFFICIENTLY AS POSSIBLE.

by Charles Linn, AIA

The past few years have seen major growth in Mecklenburg County, North Carolina. The population has risen from 511,000 in 1990 to approximately 550,000 today, with an additional 5.5 million people living within a two-hour drive of Charlotte, the county seat. As in other geographic areas where population becomes quickly concentrated, crime in the county has increased from 40,000 arrests in 1991 to about 60,000 in 1997.

In dealing with this increase in potential prisoners, Mecklenburg County worked with a simple idea to keep the population of its new Jail Central low: move people through as quickly as possible. Everything needed to complete the release of a person accused of a crime was put within easy reach. Those who can post bond, pay a fine, or be released on their own recognizance get out quickly, so the jail does not fill up. Police can drop off arrestees, complete paperwork, and be back on patrol with little delay. “Fifty percent of those arrested are out within 24 to 48 hours,” says James Kessler, AIA, the jail’s principal designer.

Efficiency was also one of the key considerations in siting Jail Central in downtown Charlotte, next to the courthouse and a city and county government building. (An obsolete 350-bed, 1970s-era jail was demolished in phases to make room for the new facility.) The proximity to other government facilities is important: the less the prisoners have to be moved, the lower the operational costs. And because many of the county’s arrests take place in downtown Charlotte, a central jail made good sense.

But as plans for the jail were being developed, citizens expressed concern. They worried that a large jail might counteract the hard work they had put into to maintain the economic vitality of downtown Charlotte. In addressing these concerns, the architects knew that the building had to convey an appropriate message. “No one who works or lives nearby needs to have lessons about the strength of justice embodied in a massive building in their neighborhood,” says Kessler. “But a jail should be part of the community that creates it; it shouldn’t be hidden.”

To design a building that projected a dignified image without looking like a fortress, the architects used the unusual triangular floor plate of the adjacent government office building as a starting point. They developed the jail’s plan as a series of triangular, direct-supervision pods organized along a circulation spine. Setbacks on both major elevations break up the facade and prevent the building from appearing monolithic.

As in most detention facilities, arrestees at Jail Central are moved from police cars and into the building out of public view. In the main lobby’s glass entry, though, Jail Central feels like a safe, public building. A special emphasis was placed on making the layout of the building comprehensible through signage. “We want people to feel...”
The triangular blocks of the new jail relate to the floor plate of a city and county office building across the street (far left). Ground has just been broken for a new wing of the jail (far right in axonometric). The jail's public entry (below) and its relationship to the existing courthouse give the structure a prominent civic presence in downtown Charlotte.
Rather than sitting in an unsupervised cell with an assortment of unclassified detainees, everyone being held at Jail Central sits together in airport-style seating (right) in full view of corrections officers. Detainees wait here while identification and records research take place to determine whether they will be released or taken into custody. This system helps keep as few people as possible from actually entering the jail system. The light-filled public lobby (below) is meant to give the facility a less oppressive feel.

"That safety and professionalism reside here," says Kessler.

Everyone arrested in the county is booked at Jail Central, unless they are injured, in which case they are booked at the hospital. This eliminates the wasted time and personnel redundancies that occur when booking is spread over many locations. After being searched and given physical examinations, the accused are seated in an open waiting area while their identification is being established and their criminal records are being researched. The process allows the staff to classify detainees and determine whether they are of danger to themselves or to others.

There are areas here for magistrates, court-appointed defense counsel, and district attorneys. If negotiations for release on bond or recognizance are successful, or if charges are dismissed, the detainee is released. If not, the accused person is bound over for arraignment or trial.

Prisoners are placed in one of two types of security pods: those with "wet cells" and those with "dry cells." Detainees who are new to the prison system or who are in maximum security go to wet cells, which are equipped with their own plumbing. General-population prisoners go to dry cells and use common toilet facilities, a system that is much cheaper to construct.
Security pods consist of a central dayroom lined with cells. All of the cells at the facility are single-occupancy; some pods have cells with their own plumbing, while others have less expensive cells with no plumbing.

Direct-supervision detention was chosen for the Jail Central facility. Officers work alongside prisoners in large, open dayrooms; prisoners can move about freely between these rooms and their cells, which are located nearby. This creates an environment where detainees feel they are safe, says Kessler, and where “security is maintained with the least amount of force.”

Because privacy is considered a key element in preventing trouble within a detention facility, the architects agreed with Jail Central’s citizens’ advisory committee to take the unusual step of making all the cells single-occupancy. “Operating costs are lowest when both detainees and staff feel the least amount of stress,” says Kessler. “That’s what we’ve tried to accomplish here.”

Sources

Curtain walls and entrances: Vistawall
EIFS: Dryvit
Elastomeric roofing: Johns Manville
Steel windows, special doors, and security devices: Norment
Glazing: LOF, Viracon
Wood doors: Weyerhaeuser
Hardware: Corbin, Hagar, LCN, Yale, Von Duprin
Lighting: FailSafe, Vista, Louis Poulsen, Halo, Sterner
Lighting controls: Microlite
Elevators: Otis
The time a juvenile offender spends in secure detention—between arrest and adjudication—is an opportunity for positive intervention in his or her life. The Crossroads Juvenile Center, a 114,500-square-foot, $24 million facility run by the New York City Department of Juvenile Justice (DJJ), was designed to take advantage of this chance for guidance and rehabilitation.

The center houses alleged juvenile offenders aged seven to 15 while their cases are pending and, after sentencing, while they await transfer to state facilities. In 1998, 37 percent of the residents stayed three days; 58 percent were out in 10 days; the rest remained for weeks or months.

Crossroads' temporary residents are encouraged to rehabilitate themselves before becoming further enmeshed in the criminal justice system; the DJJ offers counseling as well as discipline, which is often lacking in their lives. "Aftercare," a voluntary program, provides continued support services—counseling, advocacy, educational monitoring—to youth returning to the community after detention.

In 1985, the city authorized replacement of the 289-bed Spofford Juvenile Center—built in 1957 as a home for runaway boys—with two new 124-bed secure detention facilities, in Brooklyn and the Bronx. The politically charged site-selection and approval process took four years. Planning began in 1989, construction started in 1993, and both facilities opened in 1998.

"The Brooklyn community was apprehensive," recalls DJJ Commissioner Tino Hernandez. "We met regularly with neighborhood leaders. The [finished] facility looks like a community center, has a meeting room for public use, and fits in well with the rest of the neighborhood."

Located in Brooklyn's Brownsville section, the juvenile detention center has projecting cornices that evoke the classic silhouette of New York brownstones, while its precast panels contrast with the neighborhood's aging commercial, industrial, and residential buildings. Across the street, the blank brick wall of the local police precinct faces the center's modestly scaled sidewalk entry.

"The challenge was to create a normalized environment to rehabilitate kids, not a lock-up facility," says David Hobstetter, AIA, the Kaplan McLaughlin Diaz (KMD) principal in charge of the project. "Housing units, or pods, are designed as small residential neighborhoods," he adds.

Pods consist of either eight or 16 single bedrooms, allowing flexibility for accommodating girls or boys. Each pod includes private, rather than communal, toilets, counselor offices, and an enclosed outdoor recreation space. Gypsum board, not concrete-block, walls are used throughout the facility, and the pods feature commercial finishes, soffitted ceilings, and skylights—elements of an environment that is intended to have a positive effect on juvenile behavior.

A central outdoor courtyard, paved with terrazzo mosaics designed by a local artist, is an
A masonry street wall helps connect the facility to its neighborhood (below). To protect the identity of juveniles, the building offers few views inside but many outdoor spaces within its walls (opposite).
organizing element visible from many areas inside the facility. The building's spacious public areas receive plenty of daylight and provide clear sight lines for supervision.

To prevent visual contact with the public, street-facing windows are frosted. Windows overlooking the interior courtyard and the light-filled two-story main entry hall, though, are transparent.

Wall-mounted sconces and indirect lighting, instead of fluorescent ceiling fixtures, illuminate corridors and activity areas. The palette of warm, natural colors and noninstitutional finishes, fabrics, furniture, and wood trim all reinforce the facility's residential feeling.

Recreation spaces within the complex include landscaped socializing areas, handball and basketball courts, play structures, and a gym. An “elite lounge,” reserved for residents exhibiting good behavior, is available for cooking, crafts, and learning new skills.

The facility is monitored by closed-circuit television from a central control room near the entrance. Counselors, wearing individual duress alarms, work closely with residents; roving officers are unnecessary. By law, one counselor is provided for every eight residents.

“The public wants to treat juvenile offenders as adults,” observes Peter Krasnow, AIA, KMD's director of justice facilities. “Yet the client users we work with believe that kids can change their behavior in a normalized environment within the security envelope. Our challenge is to balance the call for harsh lockups by the public, politicians, and contracting agencies with the rehabilitation staff's request for user-friendly, manageable environments.”

Next spring, the DJJ and KMD will complete a postoccupancy evaluation to see if the facility is working as intended and if the softer environment is appropriate for more secure housing units planned for the site.

From its experience at Crossroads, the DJJ has identified key steps for a successful juvenile detention project: work with the community early on so it is supportive, not frightened; involve staff during the planning process; design in flexibility for male or female housing; test materials for durability; and locate offices within the housing pods to provide greater interaction between the staff and the residents.

Sources
GFRC and precast concrete: GFRC Cladding Systems
Security steel windows: William Bayley Company
Security glazing: GE
Security sliding doors: Folger Adam
Acoustical ceilings and resilient flooring: Armstrong
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This year, a panel of five judges gathered at our offices to select the best products for ARCHITECTURAL RECORD's Product Reports 1998. Steven Goss, AIA, from HLM Design (formerly JPJ Architects) in Dallas; Sandra Leibowitz from Hellmuth, Obata + Kassabaum (HOK) in Washington, D.C.; Robert Siegel from Garrison Siegel in New York City; Dan Himmelberg, AIA, from Gould Evans Affiliates in Kansas City, Missouri; and Berni Hui from Gensler in New York City spent a full (and intense) day sifting through piles of product literature, information, drawings, and photographs. From the more than 500 products submitted, 101 were chosen for publication because of their high level of innovation or improvement in three areas: performance, appearance, and value. The judges agreed that these new and noteworthy products would meet the needs of their peers, our readers.

The panel of judges found that the most dramatic product innovations were in the area of technology. Two- and three-dimensional imaging and rendering programs, real-time document sharing, design software packages, and wireless communication devices were just some of the products that incorporated new technologies for design professionals.

But even though the industry is moving toward a high-tech future, the judges also found much to admire in improved building materials, both traditional and new. They chose products that have revived interest in brick, metal, wood, plastic, and concrete. They were particularly impressed, for instance, with concrete-form liners that produce walls with a three-dimensional texture and deep shadows.

One of the judges, Robert Siegel, summarized the panel's overall feelings on the technology trend and how manufacturers of traditional building products are keeping up: "Computer applications allow for a rationalized, quantitative analysis of a building," he said. "They are effective tools, but cannot substitute for human knowledge and intuition." With this in mind, the panel chose a variety of product literature on paper and CD-ROM that documents building products and installation procedures.

Also included as part of Product Reports 1998 is the Readers' Choice Awards. This year, we tallied the winners from ballot forms that were mailed, faxed, and E-mailed to our office, grouping the winners by individual product categories. They are presented on page 91.

We want to thank the five judges on our panel, the readers who filled out Readers' Choice surveys, and the manufacturers who submitted products for consideration. We look forward to reviewing next year's submissions. —Elana Frankel
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Confidence. Dependability. These qualities are obvious every time you walk through a Kawneer entrance.

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CIRCLE 35 ON INQUIRY CARD
ARCHITECTURAL RECORD's 1998 Readers' Choice Awards recognize manufacturers whose products contribute to the success of architectural projects. Using a survey circulated in the August issue, readers nominated manufacturers based on their product's design, cost, and value as well as the company's level of customer service. The companies that received the most votes in each of 33 CSI categories are presented below.

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800/933-TILE

**APPLE**  
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**AUTOCAD**  
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**BELDEN BRICK**  
Masonry Units  
330/456-0031

**CARLISLE**  
Roofing System/Commercial (tie)  
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**GAF**  
Roofing System/Residential  
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**HEWLETT-PACKARD**  
Computer Peripheral  
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**JOHNS MANVILLE**  
Roofing System/Commercial (tie)  
800/654-3103

**JULIUS BLUM**  
Architectural Metalwork  
800/526-6293

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Window System/Commercial  
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**KIM**  
Exterior Lighting Fixtures  
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**KOHLER**  
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**LARSENS**  
Fire Protection Specialties  
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**LEVOLOR**  
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**LIGHTOLIER**  
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**LM SCOFIELD**  
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**MARVIN**  
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**OTIS**  
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**OWENS CORNING**  
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**PELLA**  
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**PPG**  
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**SHAW**  
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**SMITH & HAWKEN**  
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**TRUS JOIST MACMILLAN**  
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**WOLVERINE**  
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This year's panel of judges included (middle photos, left to right) Berni Hui, Steven Goss, AIA, Robert Siegel, Sandra Leibowitz, and Dan Himmelberg, AIA. Each panel member brought his or her own area of architectural expertise to the judging and a personal understanding of materials and products to the process. They reviewed a wide range of entries from various product manufacturers to identify which were worth noting to their peers.
In choosing our panel of judges for the Product Reports each year, we try to create a good balance of experts, taking into consideration the architect or designer’s involvement with specifying materials and products, the type of design the person specializes in, and the size and location of his or her firm. This year, we brought together a particularly well-rounded group.

Berni Hui graduated from the University of Toronto in Fine Arts Studio. Her design career began in Tokyo, where she worked on a variety of projects, including the first Japanese Blockbuster store. She is now a project designer for Gensler, New York, where she is working on projects for Goldman Sachs.

Steven H. Goss, AIA, a senior associate and lead designer of the corporate studio for HLM Design (formerly JPK Architects) in Dallas, is responsible for the design of all planning, architecture, and interior design projects. Goss received a bachelor’s degree in architecture from Oklahoma State University.

Robert Siegel is a partner in New York’s Garrison Siegel Architects. His current work includes the Korean Embassy in China, the Swiss Center in New York, and the master plan for Tokyo’s Gotanda district. He graduated from Syracuse University’s School of Architecture and received a master’s degree in architecture from Columbia University.

Sandra Leibowitz, a sustainable design specialist and chair of the sustainable building materials committee for Hellmuth, Obata + Kassabaum in Washington, D.C., focuses on materials research and environmental specification development. She holds a master’s degree in architecture from the University of Oregon with a concentration in sustainable design.

Dan Himmelberg, AIA, vice president at Gould Evans Affiliates in Kansas City, is the senior designer for the retail group and the director of the environmental graphic design group. He is overseeing the design of several projects, including the Times Square AMC Theater. He has a bachelor’s degree in architecture from Kansas State University.
Technology products have become essential tools for design professionals. Every year we receive more submissions in this category, making it an increasingly difficult one to assess. This year, we expanded the category to include products that aren’t traditional architectural tools, such as the wireless phones that are now ubiquitous on job sites.

**Wide-format digital system**
Xerox’s 8830 Digital Document System (DDS) can copy, print, and scan engineering and technical documents from sizes A to E. For increased ease of use, printing jobs can be interrupted to make copies. With scan-to-network software, the DDS can store documents on a local or network drive. 800/XER-TALK. Xerox, East Rochester, N.Y. CIRCLE 200

**Interior specs on CD-ROM**
The MasterSpec interior design library on CD-ROM provides more than 75 specification sections, which are organized by CSI categories, including interior construction, finishes, furnishings, and equipment. With Masterworks 3.0 (free with the CD-ROM), designers can customize data and tailor it for use on a specific project. 800/424-5080. Arcom, Salt Lake City. CIRCLE 201

**Accessible British products**
The Virtual Design Centre's Web site and companion CD-ROM make foreign product information more accessible. The CD-ROM includes detailed information on various British products, allowing specifiers to shop without leaving the office. 011/44/171/928-7248. Virtual Design Centre, London. CIRCLE 202

**Window and door software**
Window Studio from Andersen Commercial Group is CAD-compatible software that allows users to design combinations of Andersen window and patio doors. The software also includes product specification text files in CSI format. 800/426-1899. Andersen, North Bayport, Minn. CIRCLE 203
Lighting design software
Columbia Lighting and Prescolite Moldcast have created LitePro software for Windows 95 and NT. For indoor and outdoor lighting projects, designers can use the software for information on vertical and horizontal illuminance, exterior building shadowing, and other details. 510/562-3500. Columbia Lighting, San Leandro, Calif. CIRCLE 204

Wireless network on site
In response to industry demand for wireless communication on the construction site, Sprint has partnered with SONY and Samsung (shown) to develop a wireless, digital phone and battery system that provides approximately 2.5 hours of talk time. 800/480-4PCS. Sprint PCS, Kansas City. CIRCLE 205

Realistic graphic imaging
The latest version of Art\-lantis Render 3D software (3.0) is compatible with ArchiCAD, MiniCAD, Archi+, Amapi, and Star. New functions include background editing as well as animated and virtual-reality creations in QuickTime, QuickTime VR, Video for Windows (AVI), and RealSpace. 415/431-3412. Absent, San Francisco. CIRCLE 206

Client and project tracking
Sema4 software tracks project expenses and schedules and provides real-time processing of financial and accounting data. One section of the screen features a tree structure that displays all projects relating to a client. The other section displays relevant financial information. 800/545-7484. Semaphore, New York City. CIRCLE 207

Virtual building
In response to user demands, ArchiCAD's new version 6.0 features 3D editing, database links, an open API, and a variety of 2D drafting tools. Available for Windows 95 and NT and Macintosh operating systems. ArchiCAD 6.0 translates DWG files up to r14 and preserves any Xref files within ArchiCAD for later export to AutoCAD. 800/344-3468. Graphisoft, San Francisco. CIRCLE 208

Professional liability program
Victor O. Schinnerer's current Premier program for mid-sized architecture and engineering firms includes broader coverage of issues such as pollution, asbestos, equity interest, and insurance. 301/961-9800. Victor O. Schinnerer & Company, Chevy Chase, Md. CIRCLE 209
Petersen Aluminum Corporation's SNAP-CLAD Panels top the new $4.75 million press box and stadium club, completing an eight year long renovation of the 48-yr-old Rosenblatt Stadium in Omaha, Nebraska. The stadium plays host to the NCAA College World Series and serves as home field for the Omaha Royals. The new press box features a peaked metal roof, which dramatically altered the exterior appearance of the stadium. Boone Brothers Roofing Inc. in coordination with the general contractor, Weitz Company, Inc. installed over 11,000 square feet of SNAP-CLAD Panels manufactured by Petersen Aluminum Corporation. The panels are a custom blue PAC-CLAD finish and were corrective leveled to provide superior panel flatness. Color and panel appearance was critical considering the prominence of the roofing panels in the stadium design.

For more information on SNAP-CLAD Panels, please contact Petersen Aluminum Corporation, 1-800-PAC-CLAD or visit our web site @ http://www.pac-clad.com

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CIRCLE 48 ON INQUIRY CARD
SITE WORK

Earth retainage • Unit pavers
Site improvements • Landscape accessories

All five of the judges were particularly drawn to site work designs and products that were aesthetically pleasing without deliberately imitating natural elements. The more subtle the look, the better it fared with the panel. The unit pavers, retaining walls, and site furniture presented here all demonstrate that quality of subtlety.

DESIGNERS WANT TO CREATE ‘NATURAL’ MANMADE ENVIRONMENTS. WITH NEW PRODUCTS THAT EMBRACE THE NATURE OF ENVIRONMENT, WE CAN. —Dan Himmelberg

Concrete unit pavers
Hanover’s Tumbled Brick concrete unit pavers have the look of worn stone. The pavers meet or exceed ASTM standard C936. 800/426-4242. Hanover Architectural Products, Hanover, Pa. CIRCLE 210

Retaining wall source
Mesa Retaining Walls from Tensar Earth Technologies have a block-to-grid connection with a structural geogrid for soil reinforcement. The walls are available in different facing options and a variety of color blends. 800/677-8640. Tensar Earth Technologies, Atlanta. CIRCLE 211

Natural inspiration
Wausau Tile’s precast-concrete Stoney Creek pavers are available in four color blends. Custom colors are also available for orders over 10,000 square feet. 800/388-8728. Wausau Tile, Wausau, Wis. CIRCLE 212

Streetscape seating
Landscape Forms’ Plainwell bench and litter receptacles are made with partially recycled cast-aluminum frames that can be powder coated in a variety of colors. Seating and receptacle surfaces are available in ipe, oak, maple, or jarrah wood. 800/430-6203. Landscape Forms, Kalamazoo, Mich. CIRCLE 213

Retaining wall source, too
Keystone’s residential wall is created with an interlocking, dry stacked assembly system. Instead of using mortar, the wall is held in place and aligned by fiberglass pins. The system is noncorrosive. 800/891-9791. Keystone Retaining Wall System, Minneapolis. CIRCLE 214
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CIRCLE 36 ON INQUIRY CARD
CONCRETE

Concrete accessories, materials, and restoration
Form liners • Precast concrete

Concrete materials have seen substantial changes over the past 10 years. Form liners, for example, now produce beautiful, complex designs for highway barriers, while new stains give concrete a natural stone look. One of the most exciting recent products is autoclaved aerated concrete, a new type of manufactured building stone.

Concrete design and effect
Increte's Stain-Crete is a permanent chemical stain that creates color tones in existing concrete by reacting directly with its natural minerals. 800/752-4626. Increte Systems, Tampa. CIRCLE 215

Solid, aerated material
Autoclaved aerated concrete from YTONG combines cement, limestone, sand, and water to provide thermal and sound insulation with a six-hour fire rating. Wall, roof, and floor panels are lightweight and easy to work with and can be hand-sawn. 800-YTONGFL. YTONG, Haines City, Fla. CIRCLE 216

Concrete-forming system
AFM's Diamond Snap-Form is an insulated concrete forming system that uses expanded polystyrene panels connected by AFM's Diamond Snap-Ties every 12 inches. The system remains in place after the concrete is poured to become the wall, insulation, and facing material. 800/255-0176. AFM, Excelsior, Minn. CIRCLE 217

Prison all-in-one
The Tindall prison construction module is a double-cell unit made of precast-concrete panels that can be lifted and finished. Custom modules are also available. 800/849-4521. Tindall, Spartansburg, Pa. CIRCLE 218

Concrete floor overlay
L. M. Scofield's Overlay has been developed as an abrasion-resistant interior concrete floor finish. It is available in ash white, light gray, beige cream, tile red, and natural gray. 800/809-9900. L. M. Scofield, Douglasville, Ga. CIRCLE 219
THE BEST BUILDINGS ON EARTH ARE STILL BUILT BY HAND

More than a million bricks laid in a series of unique patterns, textures and colors make the Veterans Administration Health Care Facility in Detroit, Michigan, a striking example of masonry design by architects Smith, Hinchman & Grylls Associates. But masonry was chosen for more than its beauty and flexibility of design. Buildings built of masonry by skilled union craftworkers will outperform, outshine and outlast any others. Add to that the speed and efficiency of union masonry contractors, and you have a prescription for health care facilities that satisfies any schedule and budget. We're The International Masonry Institute, and we'd like to help you design and construct the best buildings on earth. Visit us on the World Wide Web at www.imiweb.org, or call us toll free at 1-800-IMI-0988 for design, technical and construction consultation.

The International Masonry Institute — a labor/management partnership of the International Union of Bricklayers and Allied Craftworkers and the contractors who employ its members.

©1998, IMI
The judges found that most of the masonry products on the market today are being designed to look as natural as possible or to have an Old World feel. Among the examples are sand-coated bricks manufactured with the same recipe used by 17th-century masons, and exterior cladding that resembles red sandstone.

Bricks from the heart
Heartland sand-coated bricks from Glen-Gery Bricks are available in six sizes: utility, modular, three-inch queen, 70 modular, econo, and 16 inches. They meet ASTM standard C216 for grade SW and type FBS. Colors include a variety of grays, roses, tans, and reds. 800/854-4863. Glen-Gery Brick, Iberia, Ohio. CIRCLE 220

Old-world building layers
Boral Brick's 17th Century bricks are made with a casting process in which moist wet clay is pressed into handmade wooden molds. The bricks are dusted with sand, which serves as a releasing agent and gives them their final color, then put through a two-week drying and firing process. 800/5-BORAL-5. Boral Bricks, Atlanta. CIRCLE 221

Natural masonry units
Renaissance masonry units are pressure-formed from calcium silicate, then autoclave cured. They are now available in cinnamon (red sandstone), wheat (soft buff), and nutmeg (striated white and beige), bringing the total available colors to 12. 800/265-8123. Arriscraft, Cambridge, Ont., Can. CIRCLE 222

U.K.-designed anchor system
CLS's Cintec is an anchor system in a mesh fabric sleeve. A cementlike grout is injected under low pressure into the sleeve, which restrains the flow and expands up to twice its normal diameter. The sleeve then takes on the shape of the designated area, like the arch shown at right. 800/363-6066. CLS Cintec, Nepean, Ont., Can. CIRCLE 223

For more information, circle item numbers on Reader Service Card
WAUSAU'S HIGH QUALITY ARCHITECTURAL WINDOWS AND WALL SYSTEMS ARE ENGINEERED AND MANUFACTURED BY EXPERIENCED, CONSCIENTIOUS ASSOCIATES FOR TROUBLE-FREE PERFORMANCE AND ENERGY EFFICIENCY. WHAT'S THE SECRET? INTELLIGENT DESIGN. PRECISE FABRICATION. EASY INSTALLATION. WE PLACE A HIGH VALUE ON VALUE. ASK ABOUT OUR INDUSTRY-LEADING 10-YEAR STANDARD WARRANTY.

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Architectural metalwork • Perforated metals
Railings and handrails

The metal products submitted for our panel’s review had uses ranging from the structural and utilitarian to the sculptural. Whether bolted, welded, cast, or woven together, they provided a wide range of architectural possibilities. While all of the metal products were well received by the judges, the five below really caught their eye.

**Interior and exterior cable net**
DecorCable’s stainless-steel X-Tend flexible cable net can be used for displays, shelving, furniture, stairways, or cable components. The stainless-steel fabric mesh, for interior and exterior use, has the structural properties of a membrane or tent. 800/444-6271. DecorCable, Chicago. CIRCLE 224

**Custom-designed frieze**
For a client who wanted to re-create a wall frieze from the SS Normandie for his home, Forms + Surfaces used a bonded metal in a resin mold. The design team worked from a color photograph that documented the Art Deco frieze, which was destroyed when the ship burned. It measures 7½ feet by 11 feet by 3 inches. 877/626-7788. Forms + Surfaces, Carpinteria, Calif. CIRCLE 225

**Railings for children**
Hewi’s balustrades now include small-diameter handrails at the right height for children. The rails are made of nylon with steel inserts. 877/HEWI-INC. Hewi, Lancaster, Pa. CIRCLE 226

**Metal column covers**

**Exterior metal cladding**
Foamwall, Centria’s exterior metal cladding, is a lightweight, highly insulated composite panel system. 412/299-8240. Centria, Moon Township, Pa. CIRCLE 228

**ENTRIES IN THIS CATEGORY CONTAINED THE MOST VARIETY OF COLOR, TEXTURE, AND FORM AND COVERED THE WIDEST RANGE OF APPLICATIONS.** —Robert Siegel

For more information, circle item numbers on Reader Service Card
While forest preservation continues to be an important topic in the environmental movement, its relevance to designers lies in the choices they make about the type and quantity of wood to specify. In selecting products within this category, the judges kept these issues in mind, choosing, for instance, a guide to specifying certified forest products.

**Prefab shearwall**
The Simpson Strong-Wall is a factory-built wood shearwall that comes complete with preattached hold-downs. Less expensive than site-built shearwalls, it also provides more strength. 800/999-5099. Simpson Strong-Tie, Pleasanton, Calif. CIRCLE 229

**Perforated plastic sheets**
Plasti-Perf, a perforated polypropylene plastic sheet, is stocked in .063 and .125 gauges, and with hole sizes from 1/16- to 1/4-inch. 800/237-3820. McNichols Co., Tampa. CIRCLE 230

**Engineered wood beams**
Parallam parallel strand lumber beams can span up to 60 feet. The high-strength, defect-free beams are available in cambered and noncambered configurations. 800/423-5808. Trus Joist MacMillan, Boise. CIRCLE 231

**Certified forest products guide**
To qualify as a certified forest product, a wood product must come from a forest that has been independently audited to ensure it is being managed in a way that maintains the health of the ecosystem. This brochure explains how to develop specifications for such products. 503/590-6600. Certified Forest Products Council, Beaverton, Oreg. CIRCLE 232

**High-pressure laminates**
ChemArmor high-pressure laminates are resistant to more than 100 substances, including acids, solvents, bases, reagents, and difficult stains, such as India ink. Almost two dozen colors and patterns are available. 800/638-4380. Nevamar, Odenton, Md. CIRCLE 233

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**A Guide to Specifying Certified Forest Products**

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For more information, circle item numbers on Reader Service Card
EDITOR'S CHOICE

Balustrade system

Style-Mark has added seven new sizes of balustrades and two new sizes of rails to its product line. The traditionally styled balusters, made from fiberglass-reinforced urethane, are now available in heights from 18 to 36 inches. The rail system includes balusters, top and base rails, and newels. The newels and rails are also made from urethane but are reinforced with PVC. The system is double-primed using a UV-stable exterior coating that requires no additional finish, and is resistant to rot, weather, and insect damage. 800/446-3040. Style-Mark, Archbold, Ohio. CIRCLE 234

Engineered wood product line

Willamette's line of engineered wood products, called the E-Z Frame system, consists of glulam beams capable of spanning up to 130 feet in several grades and sizes; StrucLam laminated veneer lumber, for unexposed headers and beams; StrucJoist engineered wood joists, for floors or roofing; and E-Z Rim Board, for rim joists. The company backs up the system with a staff of engineers and field representatives, and provides a guarantee that all of its products are free from defects. 541/926-7771. Willamette, Albany, Oreg. CIRCLE 235

Laminate flooring

Bruce Laminate Floors has expanded its Traffic Zone oak collection to include Mountain Oak. The product is available in 7/8-inch-wide strips to produce a wide-plank appearance, and comes in natural and chestnut finishes. Other additions to the Traffic Zone line include Toledo, a 15×15-inch-square pattern inspired by ceramic tile, and Terrana, an octagon-shaped stone pattern that can incorporate matching or contrasting diamond-shaped accent patterns. The Toledo and Terrana patterns are available in two colors, Rossa and Fontana. The ⅝-inch-thick materials can be installed over existing floors. 800/722-4647. Bruce Laminate Floors, Dallas. CIRCLE 236

TODAY'S PRODUCTS DEMONSTRATE THAT ARCHITECTS DON'T NEED TO ENDANGER RESOURCES TO ACHIEVE STYLE. —Elana Frankel
In a category that is not always known for sustainable or environmentally friendly products, the judges identified responsible manufacturers who are creating some new and noteworthy items. Sustainability expert Sandra Leibowitz from HOK was particularly excited by these recent developments.

**Pan and batten system**
This new pan and batten system uses an ultra-high batten cap in heights up to 11 inches to create deep profiles and cast shadows. 909/829-8618. Custom Panel Industries, Rancho Cucamonga, Calif. CIRCLE 237

**Fire-finished building panel**
AFM’s FireFinish is an R-Control structural building panel with a fire-resistant thermal barrier directly applied to the OSB surface, eliminating the need for gypsum board. 877/R-CONTROL. AFM, Excelsior, Minn. CIRCLE 238

**HVAC duct insulation**
ToughGard Ultra Round is a new semi-rigid acoustical and thermal insulation used to line spiral and oval metal HVAC duct systems from CertainTeed. 800/233-8990. CertainTeed, Valley Forge, Pa. CIRCLE 239

**Environmental insulation**
AFM’s Perform Guard is insect-resistant, expanded polystyrene (EPS) insulation that does not contain CFCs, HCFCs, or formaldehyde, preventing decomposition, decay, and off-gassing. Perform Guard is used with AFM’s R-Control and Diamond Snap-Form concrete-forming systems. 877/R-CONTROL. AFM, Excelsior, Minn. CIRCLE 240

**Lead-free roofing**
FreedomGray roofing is made from Revere Copper and is coated with a preweathered zinc/tin coating from Follansbee. The process gives the lead-free roofing a weathered gray look. 800/448-1776. Revere Copper Products, Rome, N.Y. CIRCLE 241
EDITOR'S CHOICE
Coating application
Reynolds Metal's collection of architectural products now includes Durogloss Colorweild 3000, a polymer-based paint finish in bright glossy colors for the company's Reynobond aluminum composite material (ACM) and flat-sheet material. Durogloss-painted ACM and flat sheet are available in standard colors; they can also be matched to custom corporate colors. Applications for the finish include canopies, signage, columns, fascia, trim, and accents. 804/281-3939. Reynolds Metal Company, Richmond, Va. CIRCLE 242

Mortarless siding
Novabrik from Allan Block is a split-face concrete masonry product made with an interlocking tongue-and-groove design that screws into place. It does not require a foundation and does not need to be installed by brickmasons. Color options include snow white and rustic red, among others. Measuring 3 by 2.6 by 8 inches, Novabrik can be used in both commercial and residential settings. 800/899-5309. Allan Block, Edina, Minn. CIRCLE 243

Enhanced board performance
Johns Manville's new darker TopLoc coating for its Fesco and Retro-Fit boards optimizes the bitumen adhesion between membrane and board. Mopping asphalt takes more easily to the improved surface because it's smoother and produces less dust. 303/294-9944. Johns Manville, Denver. CIRCLE 244

Light block shades
The electric LightBlock shade from VELUX-AMERICA, Inc., is available for all models and sizes of the company's roof windows and skylights. The shade has an energy-efficient coating that reflects heat. LightBlock is available in eggshell white. 800/283-2831. VELUX-AMERICA, Inc. Greenwood, S.C. CIRCLE 245

Exterior insulation finish
TEC's Ful-O-Mite exterior insulation finish system can be applied in the field to approved substrate; panelized in the preassembly stage and built into place on the skeleton; or created in a combination of the two. The installed system weighs approximately one pound per square foot. TEC offers 16 standard colors as well as custom shades. 800/323-7407. TEC, Inc., Palatine, Ill. CIRCLE 246

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DOORS & WINDOWS

Fire-rated glazed wall/door assemblies
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When evaluating products in this category, as in the others, the judges used performance, appearance, and value as their criteria. However, here they were also concerned with personal safety and protection from the elements. Most of the products chosen deal with these issues in new ways.

WE FAVORED PRODUCTS IN THIS CATEGORY THAT TOOK PERSONAL SAFETY AS WELL AS INNOVATION INTO ACCOUNT. —Berni Hui

Engineered water flashing
The Sto Sill Sentry captures water from beneath windows and other wall openings and channels it to the exterior of the wall, preventing it from entering the wall cavity. The flashing is made of rigid polyvinyl chloride (PVC) and can support the weight of windows or doors. It is non-corrosive, nonstaining, and eliminates the thermal bridge between exterior and interior. The Sto Sill Sentry can be used for both new and retrofit applications. It is available in 10-foot lengths, which are cut on site to custom-fit each window opening. 888/522-0184. Sto Corp., Atlanta. CIRCLE 247

Upward-acting glass doors
Clopay’s Model 901, a full-view, upward-acting sectional door, is available with insulated glass, wire glass, Plexiglas, DSB, or aluminum panels. It provides protection against rain, snow, heat, and cold and is designed to withstand wind-load pressures as required by building codes. Standard finishes include white or brown, clear anodized aluminum, or anodized bronze. Glazing options, such as thermal glass, are also available. 800/2CLOPAY. Clopay Building Products, Cincinnati. CIRCLE 248

Fire-rated glazing
FireLite Plus is a wireless glass that is fire-rated and impact-safe, meeting ANSI standard Z97.1 and CPSC standard 16FR1201 in category II. The glazing fits in standard fire-rated frames and comes in sizes up to 36 by 84 inches. 800/426-0279. Technical Glass Products, Kirkland, Wash. CIRCLE 249

For more information, circle item numbers on Reader Service Card
**DOORS & WINDOWS**

**Intumescent glazing tape**
Zero International’s intumet glazing tape has successfully been tested with ¾-inch wire glass for positive-pressure fire performance under the new UBC 7-2 1997 fire door standard. It is applied using pressure-sensitive adhesive (PSA), eliminating the spacers and caulks used by other systems. 800/635-5335. Zero International, Bronx, N.Y. **CIRCLE 250**

**Composite sectional door**
The Genesis sectional door is made of a composite material called Fybron. It is dent- and rust-proof, scratch-resistant, and will not pinch fingers when manually opened or closed. The door is available in a white or almond powder-coat and in three sizes. 800/4-RAYNOR. Raynor Garage Doors, Dixon, Ill. **CIRCLE 251**

**Fire-rated glazing compound**
FireGlaze is a black flexible sealant that is gun-applied. It allows glass panels up to 106 inches (in any direction) to be 20-, 45-, and 90-minute fire rated when used with a hollow metal door and frame, and Pilkington’s Pyroshield polished ¾-inch wire glass. 800/283-9988. Pemko Manufacturing, Ventura, Calif. **CIRCLE 252**

**Hardware by Sir Norman**
Sir Norman Foster has designed a collection of hardware for Fustal, a division of Gruppo Valli & Valli. Foster was inspired by the form of a bird in creating these new designs, which are available in wood, metal, black rubber, leather, and other materials. The Italian hardware manufacturer also produces door levers, knobs, and other accessories. 800/423-7161. Gruppo Valli & Valli, Duarte, Calif. **CIRCLE 253**

** Exit door device**
Von Duprin has introduced fire exit hardware that does not need a bottom rod. The less-bottom-rod option eliminates the need for a floor strike, reducing the installation and maintenance associated with vertical rod applications. Applied to pairs of doors, the device includes a spring-loaded latch that installs in the lower door edge. When exposed to heat, the latch releases one door leaf and engages the other, keeping doors closed and aligned during a fire. 317/897-9944. Von Duprin, Indianapolis. **CIRCLE 254**

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Q: Why specify Timely prefinished door frames?
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FINISHES

This year, mosaic, patterned, and inlay tile were all the rage. As the demand for quality products and skilled installers increased, manufacturers delivered the goods, from terrazzo-style tile to an in-depth, technical, tile-installation guide. Another trend that emerged this year was carpet recycling, which extends the life of a product in an ecofriendly way.

**PRODUCTS ARE NOW BEING MADE THAT REPRESENT A SIGNIFICANT NEW APPROACH TO THINKING ABOUT THE FULL LIFE CYCLE OF FINISHES.** —Sandra Leibowitz

**Terrazzo-like tiles**

Bisazza's new Logos collection, designed by Atelier Mendini, includes terrazzo-like tiles for floors, walls, counters, and, because they are lightweight, even furniture veneer. They can also be used on preexisting floors or surfaces. To create the tiles, glass granules held together by an organic amalgam are embedded in a composite base, creating a glistening effect. At right, Logos is shown with Bisazza's Le Gemme glass mosaic tiles and Oro 24 karat gold-leaf mosaics on a wall. 305/597-4099. Bisazza, Miami.

CIRCLE 255

**Street-smart tiles**

Based on images and textures from the streets of lower Manhattan, Street Smarts ceramic tiles from Imagine Tile are made with all-natural materials to look like manhole covers, asphalt, and crosswalks. Floor tiles are available in eight, 12, or 16 inches square and in glossy or slip-resistant surfaces. Wall tiles are available in eight or 10 inches square. 800/680-TILE. Imagine Tile, Jersey City, N.J. CIRCLE 256

**Resilient flooring**

LonFloor Galvanized resilient sheet vinyl flooring from Lonseal looks like a solid surface but has a subtle galvanized pattern. The flooring has a wear layer of .015 inches and a cloth backing measuring .084 inches. It is available in six-by-60-foot rolls in seven patterns: White Diamond, Platinum, Peridot, Black Pearl, Crystal Blue, Gold, and Granite. 800/832-7111. Lonseal, Carson, Calif.

CIRCLE 257

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Ceiling system
Gordon's Aluma-Vault is a ceiling grid system that integrates lighting, air handling, and sprinklers. Shown here is the ceiling in a ballroom at the Denver Center for the Performing Arts. The lighting combines recessed incandescents and fiber optics. The curved cross runners, spaced three feet apart, provide the housing for the sprinklers and fiber optics. Movable theatrical lights are hung throughout the ceiling by two-way hinging access panels made from perforated aluminum. 800/747-8954. Gordon, Shreveport, La. CIRCLE 258

Antifracture tile and stone
Laticrete's Blue 92 is a two-part system for tile and stone floors that consists of a blue liquid rubber and a reinforcing fabric. The company offers a written guarantee that the system will prevent tile and stone floors from cracking. 800/359-3297. Laticrete, Bethany, Conn. CIRCLE 259

Exterior tile-installation guide
Laticrete has published an information and technical guide by Richard Goldberg, AIA, for the design community. The book is a technical manual that provides step-by-step methodologies for installing direct-adhered tile, stone, and thin brick on building facades. 800/359-3297. Laticrete, Bethany, Conn. CIRCLE 260

Renewable carpet program
Earth Square, Milliken Carpet's renewable carpet program, rejuvenates old carpet for reuse. In a three-step process, customers' old carpet tiles are supercleaned, retextured, and dyed, creating recycled tiles that cost 50 percent less than new carpet. Milliken will ship the carpet back to the customer to be reinstalled. All Milliken carpets can be renewed through the Earth Square process. 877/EZ-RENEW. Milliken Carpet, West LaGrange, Ga. CIRCLE 261

Inlaying elegance
In Latin, intarsia refers to the process of inlaying fine materials to create lasting beauty and elegance. The American company Intarsia uses waterjet cutting, directed by a CAD/CAM computer, to create elaborate marble and granite designs. The Medallions collection, an example of which is shown at right, comes assembled in round, oval, square, or rectangular formats in 24- to 96-inch sizes. 407/859-5800. Intarsia, Orlando, Fla. CIRCLE 262

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CIRCLE 40 ON INQUIRY CARD
SPECIALTIES
Toilet, bath, and office accessories

When choosing products in the specialties category, the judges favored those that got their points across clearly and simply. Starck's elegant bathroom fixtures, Steelcase's unique power accessories for the office, American Specialties' user-friendly hand dryer, and Metpar's ecofriendly toilet partitions all exhibit a single strong idea.

Bathroom collection
Philippe Starck has designed a new bathroom collection called Edition 2, available from Duravit. The collection includes an elegant one-piece porcelain toilet with an elongated bowl. 888/387-2848. Duravit, Duluth, Ga. CIRCLE 263

ADA-compliant hand dryer
American Specialties has developed an ADA-compliant surface-mounted hand dryer. The Profile dryer's infrared sensors start the dual jets of warm air when hands are placed under the nozzle. The dryer stops when hands are taken away. 914/476-9000. American Specialties, Yonkers, N.Y. CIRCLE 264

Office system enhancements
Two new components of Steelcase's office system are the Conjunction corner shelves and hub table and post. The shelves fit around power access structures, while the table and post are modular components that house four electrical outlets on a single circuit and accommodate one communication faceplate. 800/333-9939 x799. Steelcase, Grand Rapids, Mich. CIRCLE 265

Toilet partitions
Metpar's Polly toilet partitions are made from fire-rated recycled plastic. Other features include a concealed lock with an in-use indicator; stainless-steel plaster mountings with leveling bolts; contoured corners on the doors and panels; and heat sinks on all the doors and panels. A lifetime guarantee promises that the plastic will never rust or delaminate. 516/333-2600. Metpar, Westbury, N.Y. CIRCLE 266
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EQUIPMENT

Residential appliances • Waste chutes and collectors
Audiovisual equipment

The panel chose products in this category that represent technological trends affecting equipment for both corporate and residential environments. Audiovisual products, like Smart Board, and appliances, like Viking's and Jenn-Air's kitchen stovetops, are enhancing the workplace and bringing commercial standards to the home.

AS DESIGNERS, WE HAVE TO KNOW ABOUT TECHNOLOGICAL TRENDS FOR EQUIPMENT THAT WILL PLAY A LARGE ROLE IN THE FUTURE. —Berni Hui

A dry-erase board with memory
An ideal tool for design meetings, Smart Board looks and acts like a conventional dry-erase board. But when the board is linked to a computer, what's written on it can be saved to disk and printed out. Users can also use a finger as a point-and-click device to operate computer applications that are projected onto the board. 888/42-SMART. SMART Technologies, Calgary, Alta., Can. CIRCLE 267

A built-in wok for the home
This 24-inch-wide wok/cooker gives the kitchen counter a restaurant-quality cooking appliance. The gas burner reaches 27,500 BTUs. 888/845-4641. Viking Range Corp., Greenwood, Miss. CIRCLE 268

Stashing ash trash
The Bullet Buttler ash receptacle is a stylish stand-in for the conventional, open-face ash can, which always seems to be overflowing. The closed canister, rounded at both ends, comes in polished and coated aluminum and standard and custom powder-coated colors. The smaller model can handle 100 cigarette butts and the larger fits 200. 800/451-0410. Forms + Surfaces, Carpinteria, Calif. CIRCLE 269

More professional cooktops
Jenn-Air offers restaurant-quality gas cooking appliances for residential kitchens. Available in 48-, 36- (shown), and 30-inch models, the cooktop features electronic, pilotless ignition and burners that can be adjusted from 800 to 15,000 BTUs. 800/536-6247. Jenn-Air, Newton, Iowa. CIRCLE 270
FURNISHINGS

Furniture

Furniture for the home and the office (and the home office) has seen subtle improvements in recent years. Cordless blinds and an ADA-compliant filing cabinet solve safety problems, while new office chairs and adjustable workstations address ergonomic issues. The products highlighted here solve these problems in an aesthetically pleasing way.

File-friendly cabinet
The Arcus lateral file from Office Specialty is available in 60 standard colors as well as custom colors. The pulls may also be specified in 15 colors. The ADA compliant cabinet, with four lateral drawers and a lock at the top, measures a total of 44 inches. 905/836-7676. Office Specialty, Holland Landing, Ont., Can. CIRCLE 271

Sit there—It's vacante
The Vacante seat from Forms + Surfaces (in cooperation with Sellex Spain) was created by architect Enric Miralles. The company is currently expanding the line to include an upholstered version in wood or metal, and complementary products such as litter receptacles, planters, side tables, and bicycle racks. 877/525-5566. Forms + Surfaces, Carpinteria, Calif. CIRCLE 272

Conference table with pop
Designer Edward F. Weller III has created a new conference table for Halcon's Gemini collection. The center square pops up to accommodate electronic and voice communications. 507/533-4235. Halcon, Stewartville, Minn. CIRCLE 273

Tiny tables
The methacrylate polystyrene tops of Zero's Art Café tables are removable for use as trays and come in black, white, blue, opaline orange, and transparent with serigraphic patterns. The supporting structure consists of cast-aluminum legs bound by a steel ring, finished in protective gray powder. 401/724-4470. In New York City, 212/925-3615. Zero U.S. Corporation, Lincoln, R.I. CIRCLE 274

ALTHOUGH SEEMINGLY INSIGNIFICANT, A DEVELOPMENT SUCH AS THE CORDLESS BLIND IS UNDOUBTEDLY INNOVATIVE FOR THIS CATEGORY. —Berni Hui

For more information, circle item numbers on Reader Service Card
Computer stand with flexibility
Designer Richard Holbrook has designed a new computer furniture system for Herman Miller called the Levity Suite, which consists of three components. The Interaction Tower uses a counter-weighted system to adjust the keyboard, mouse, and monitor to heights from nine to 48 inches above the floor. The equipment cart holds a CPU, a printer, and a built-in display chart. A mobile worktable provides an additional work surface. 800/851-1196. Herman Miller, Zeeland, Mich. CIRCLE 275

Tom terrific
Keilhauer’s Tom chair is both functional and attractive. It is available in four types of upholstery; three back heights; five arm types; three seat depths; two widths; and two colors: black or gray. The Tom can be raised, lowered, tilted, and otherwise adjusted for comfort. 416/759-5665. Keilhauer, Scarborough, Ont., Can. CIRCLE 276

Leaning tower of shelves
Jonah Zuckerman of City Joinery designed the remarkably stable Leaning Shelves: the more weight placed on them, the sturdier they become. The shelves shown are made from birch and walnut; other wood species are available. The shelves are 86 inches high, 56 inches wide, and 16½ inches deep, and can be joined end to end to create wider shelf systems. 718/596-6502. City Joinery, Brooklyn, N.Y. CIRCLE 277

Cordless blinds lead the blinds
The Mark I cordless blinds from Levolor have no lift cords and are raised and lowered simply by moving the bottom rail. This creates a safer environment for children and pets and a sleeker appearance. The blinds are tilted by turning a rod at one end. The Mark I is available in 110 colors. 800/826-8021. Levolor Contract, High Point, N.C. CIRCLE 278

Folding shelf brackets
Stanley Works’ new folding shelf brackets allow shelves to be folded down when they are not being used, to avoid personal injury. Able to support up to 150 pounds, the brackets attach to wall studs and have a bright powdered-white finish. The brackets can accommodate shelves 12 inches deep. 800/STANLEY. The Stanley Works, New Britain, Conn. CIRCLE 279
The judges had fun choosing products in this category. They opted to highlight two types of unique structural systems that are beginning to pop up in cities around the United States.

**Invisible fasteners**

With Pilkington’s structural glass system, Integra, structural fasteners are placed inside a laminate layer. Integra was first used in the United States for the surface of the pyramid at the California Palace of the Legion of Honor in San Francisco (above right). 800/452-7925. W&W Glass Systems/Pilkington Planar, Nanuet, N.Y. CIRCLE 280

**Dome-style original**

Ratech specializes in the design, fabrication, and installation of vaulted architectural structures that require spherical, compound-curved, or other shapes. The company recently completed the world’s largest dome—180 feet in diameter—located in Reno, Nevada. 702/827-2222. Ratech, Sparks, Nev. CIRCLE 281

**KING KONG GROMMET**

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CONVEYING SYSTEMS

Elevators

The judges were particularly impressed with the Montgomery-KONE elevator system because of its environmental friendliness: it eliminates the use of hydraulic fluid and reduces energy consumption because of its downsized power supply.

New elevator design

The AC gearless EcoSystem elevator from Montgomery-KONE (far right) is powered by EcoDisc (detail, right), a compact machine disc that integrates the traction sheave, brake flange, and rotor into a single flat, thin design with two independent brakes. The system does not need hydraulic fluid nor does it require additional building space like a penthouse unit. The EcoSystem elevator has a weight capacity of 2,000 to 2,500 pounds (NEII standard platform size); a speed of 200 feet per minute; a standard eight-foot cab; and a seven-foot entrance. 800/956-KONE. Montgomery-KONE, Moline, Ill. CIRCLE 282

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For beauty and consistency, specify Hy-Lite.
From a wide variety of products submitted in the mechanical category this year, the judges chose these five because of their commitment to design. From Sieger Design's classic Tara shower to Moen's futuristic faucet and filter, each presents a new way of looking at a product that is usually more concerned with function than with form.

WE LIKE TO SEE PRODUCTS THAT ARE USUALLY CONSIDERED UTILITARIAN BUT ARE ALSO WELL DESIGNED AND THOUGHT THROUGH. —Steven Goss

Water filter system
Moen's PureTouch combines a faucet and a filter in one unit. Water can flow unfiltered or, at the push of a button on the faucet's wand, be filtered through a replaceable Culligan cartridge. 800/321-8809. Moen, North Olmstead, Ohio.
CIRCLE 283

Open shower
Dornbracht's Tara, an exposed shower system created by Sieger Design, is available in polished chrome, brushed or matte platinum, and brass. The shower is wall-installed with headstand and ring. 800/774-1181. Dornbracht, Duluth, Ga.
CIRCLE 284

Temperature reset control
Wirsbo's DuoMix 201 is a two-temperature reset controller for a hydronic heating system. It resets two separate water temperatures using variable-speed injection mixing and primary/secondary piping. 612/891-2000. Wirsbo, Apple Valley, Minn. CIRCLE 285

Bathroom exhaust fan
American Aides's SV 160 multiport bathroom exhaust fan vents three areas: two at 40 cfm and one at 80 cfm. 800/255-7749. American Aides Ventilation, Sarasota, Fla. CIRCLE 286

Kitchen faucet control
The new Allegra Linea kitchen faucet from Hansgrohe has a retractable spout and two spray settings: a nonsplash, aerated spray and a needle spray. Allegra Linea is available in four finishes: chrome, chrome/gold, white, and black. 800/719-1000. Hansgrohe, Cumming, Ga. CIRCLE 287

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ELECTRICAL

Lighting products

The jury noted that when it comes to lighting, designers continue to be given a wide range of options. This is true not only in terms of fixture appearance and the types of lamps available, but also in terms of emerging lighting technologies. Among the most interesting developments are those in fiber optics and sulfur lamps.

IN THIS CATEGORY, THERE ARE PRODUCTS THAT ARE IMPROVEMENTS ON EXISTING IDEAS AND THOSE THAT ARE JUST GOOD DESIGN.

—Steven Goss

Bendable-stem luminaires
The Curly Torpedo’s hand-bendable stem measures ¾-inch in diameter. The luminaire requires a MR16 lamp and can be accessorized with several different shades. It can also be mounted on a track, from one- or three-point canopies. 773/583-6110. TechLighting, Chicago. CIRCLE 288

Fiber-optic downlight
Lucifer Lighting’s interior and exterior fiber-optic lighting products now include the Fiber Downlight. Light is supplied to the downlights via fiber-optic cable that originates at a remote metal-halide light source. Once installed, the downlights never need to be removed for servicing. 210/227-7329. Lucifer Lighting, San Antonio. CIRCLE 289

Mercury- and lead-free HPS
Osram Sylvania has introduced a mercury- and lead-free high-pressure sodium (HPS) lamp. The conversion of all HPS lamps currently in use to this technology could eliminate the use of 330 pounds of mercury and 14 tons of lead per year. The direct-retrofit lamps have the same light output as previous HPS lamps in equivalent wattages. 800/544-4828. Osram Sylvania, Danvers, Mass. CIRCLE 290

Outdoor light columns
The Sierra light column by .hessamerica consists of a steel column with an integral base topped by an acrylic diffusion lens. The luminaire is available in 3½-foot, 6½-foot, and 12-foot heights and takes compact-fluorescent or metal-halide lamps. 704/471-2211. .hessamerica, Shelby, N.C. CIRCLE 291
Fluorescent on track
Mobilé's three-circuit track can accommodate T8 or T5 fluorescent uplighting and diffused downlighting fixtures, as well as aimable halogen accent lights. The track can be ceiling-integrated, suspended, or span-mounted. The system is ideal for use in spaces that change frequently. Mobilé is the first of LAM's Leuchte series of fixtures to be adapted for the U.S. lighting market. 800/732-5213. LAM Lighting Systems, Santa Ana, Calif. CIRCLE 292

Glass fiber light bar
Lighting Services' fiber-optic lighting system consists of a remote illuminator, bundles of glass fiber-optic cable, and light bars and fixtures. The cables do not transmit UV or infrared wavelengths, making the system ideal for illuminating heat- and UV-sensitive objects. Light bars are also useful for illuminating shelves or niches where conventional fixtures would not fit. 914/942-2800. Lighting Services, Stony Point, N.Y. CIRCLE 293

Compact-fluorescent dimming
The Tu-Wire compact ballast from Lutron Electronics uses only two wires to provide power and control for dimming of 34W, four-pin, compact-fluorescent lamps. The unit is capable of smoothly dimming these lamps down to 5 percent of full light output without flickering. The unit meets FCC and commercial RFI requirements, and is designed for factory installation into architectural lighting fixtures. 877/2LUTRON. Lutron Electronics, Coopersburg, Pa. CIRCLE 294

Economical suspended series
Ledalite has introduced a series of suspended fluorescent fixtures that are competitive in price with parabolic fluorescent troffers. There are five different fixtures in the line: fully perforated, semi-perforated, perforated with cutouts, perforated with louvers, and fully indirect. A patent-pending linear leveling system helps overcome the problem of sag between mounting points to ensure straight rows. The fixtures are prewired and quickly snap together to save on installation costs. 604/888-6811. Ledalite Architectural Products, Langley, B.C., Can. CIRCLE 295
Blvergent direct/indirect
Zumtobel's new La Trave direct/indirect linear fluorescent downlight uses a bivergence reflector for uniform illumination without glare or reflections; the indirect component of the fixture is provided by the reflector's translucent wings. The fixture, developed by the company in response to the need for better lighting in VDT environments, is available in four- and eight-foot lengths, with three or six 32W T8 lamps. 800/932-0623. Zumtobel Staff Lighting, Highland, N.Y. CIRCLE 296

Post-top luminaire
Kipp is the newest luminaire from Louis Poulsen. Using a flat-top shade, a white internal reflector, and a conical diffuser to shield the lamp, the luminaire provides a uniform, efficient, wide distribution of light. The support arms are made of die-cast aluminum and are available in a natural or painted finish. 954/349-2525. Poulsen Lighting, Fort Lauderdale, Fla. CIRCLE 297

Remote source lighting system
3M's Light Pipe System couples Fusion Lighting's electrodeless sulfur-lamp technology with tubes ranging from 13 to 131 feet. The tubes emit bright full-spectrum light continuously along their lengths. The luminaire is located at one end of a polycarbonate tube lined with 3M's Optical Light Film, and a mirror is located at the other end. Light is projected into the tube and reflected out by the film. 800/480-1704. 3M, St. Paul. CIRCLE 298

Automated downlights
Irideon's AR6 and ART recessed luminaires produce either a hard- or soft-edged beam. With the use of a computer or motorized scanning mirror, the luminaire's intensity, color, and motion can be choreographed. 214/819-3208. Irideon, Dallas. CIRCLE 299

T5 fluorescent uplight system
Surf from Artemide is a lighting system made of extruded aluminum that provides indirect fluorescent uplighting with a T5 fluorescent lamp. The Surf system can be wall-hung, suspended, or joined using 90-degree corners and can be finished in white or metallic gray. With Surf's wall-mounted and suspended systems, power can be fed to several modules from a single point. 516/694-9292. Artemide, Farmingdale, N.Y. CIRCLE 300
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CIRCLE 49 ON INQUIRY CARD
Building Comfort with Less HVAC

ARCHITECTS AND ENGINEERS MUST WORK TOGETHER TO REDUCE A BUILDING'S THERMAL LOAD AND DOWNSIZE THE HEATING AND COOLING PLANT.

by David Houghton, PE

Once upon a time, buildings were designed to stay comfortable passively. Thick masonry slowed the transfer of heat, walls were bermmed to minimize temperature swings, openings were positioned to take advantage of prevailing winds, and roofs were shaded by overhanging trees. Now that there are chillers, ducts, boilers, and pipes, it's easy to rely on artificial means to keep inhabitants comfortable rather than designing the building itself for comfort. But reducing the thermal load instead of going all out on the HVAC system can reduce construction costs and minimize operating expenses by making more efficient, effective buildings.

Although the heating and cooling of buildings is the province of the mechanical engineer, the architect determines many of a building's thermal properties by selecting its shape, color, layout, and composition. Engineers, who are not often consulted on these decisions, may find themselves literally boxed into designing the size and capacity of the heating and cooling system based on the architect's selections.

"Architects don't think in terms of tons of air-conditioning," says Gary Gardner of Gardner & Pope Architects in Pittsburgh. "It's not in their vocabulary." But developing a mutually challenging partnership with the mechanical engineer means the team works together from the beginning to optimize the building's design. Such an approach, he says, results in greater comfort for occupants and energy savings—something that's increasingly important as more clients ask for energy-efficient buildings.

That said, it's important to recognize that most mechanical engineers are mortally afraid of not providing enough cooling in their designs. Thus, they introduce a safety factor—the amount of installed cooling capacity above the anticipated cooling load. Safety factors are expressed as a percentage of the anticipated load. If calculations show 300 tons are required, 380 tons might be specified instead. The safety factor is 80/300, or 27 percent. However, the load itself, 300 tons in this case, usually includes its own safety factor. This can compound to produce cooling systems that are overdesigned by 100 percent or more, significantly increasing energy usage and equipment costs.

Still, engineers know that if there is insufficient cooling, it will be blamed on them. The engineer is therefore liable for corrective action, which may be very expensive. "After a restaurant owner specifically instructed us to cut the cooling equipment down to the bone, he ended up having problems with kitchen ventilation and outside air infiltration," says Jerry Novotny, a mechanical engineer in Boulder, Colorado. "The cost to fix the problem was nearly as much as the entire HVAC system. And there was a lot of scrambling and finger-pointing. It got pretty ugly." While this is a reasonable thing to fear, there is no similar incentive to not oversize, so the safety factor can get quite large. To minimize this wastefulness, architects and engineers need to understand how improving the building's thermal performance introduces a different type of safety factor, one based on the performance of the building itself.

Keeping cool

A building's cooling load is the rate of heat rejection required to keep it cool inside. Conversely, the heating load is the amount of added heat required to maintain a comfortable temperature. 

David Houghton, PE, is president of Resource Engineering Group, a consulting firm based in Crested Butte, Colorado, that specializes in energy-efficient mechanical systems for commercial buildings.
needed to keep it warm inside. Of these two, cooling loads are the problemmakers because cooling capacity is more expensive to buy and install; chillers cost more than boilers. Cooling also eats up more building space than heating equipment and costs more to run—pumping 100,000 Btus of heat out of a building with electricity can cost twice as much as adding 100,000 Btus of heat with natural gas, especially during peak load times.

The cooling load, from outside and inside the building, depends on a number of variables, including solar radiation through glazing or thin wall sections, heat gain through the building skin, hot outside air brought in through the ventilation system, lights, people, and plug loads. Commercial buildings need more cooling than heating because they are blocky—internal areas without outside exposure have no windows through which they lose heat in the wintertime.

A useful benchmark for cooling load is cooling density, measured in square feet per ton. If you were to visit 100 commercial buildings and compare their size and the size of the cooling plant, you would find a remarkable cluster at about 350 to 400 square feet of floor space per ton. It turns out that this is the general rule that engineers use; more than 400 square feet per ton and most engineers start getting nervous that there won’t be enough air-conditioning.

There are two factors in establishing a commercial building’s cooling load. The first is the design load—the worst-case scenario for keeping the building cool. Most engineers use one of several software programs based on the calculation methods of the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) to quantify thermal loading based on window area, interior lighting, plug loads, occupancy, and other factors. The program builds a thermodynamic model of the building using an internal library of weather data, then spits out a load report describing the peak heating and cooling loads for the hottest day of the year, assuming all the building’s lights and internal devices are running and the building is occupied at peak capacity. A safety factor of 20 to 100 percent is added for good measure. This total, reflecting a situation that will probably never occur, is the design load.

The second, more practical aspect of cooling load is the actual operating load the building experiences throughout the year. The operating load is what actually reaches the chillers much of the time—usually much less than the design load. It’s not unusual for a cooling system to operate at 20 to 50 percent of full capacity. This oversizing is expensive. If the cost of a cooling system plant is $1,500 per ton, downsizing one in a 100,000-square-foot building from 250 tons (a density of 400 square feet per ton) to 150 tons (a density of 667 square feet per ton) saves about $150,000.

Energy modeling
Simply downsizing an HVAC system’s peak load capacity saves money. But for an accurate picture of where the heating and cooling energy will go before the equipment is specified, architects and engineers are using

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RENOVATING PORTLAND CITY HALL POSES DIFFERENT CHALLENGES

Before renovation, the 103-year-old Portland City Hall in Portland, Oregon, was a maze of dark offices with space heaters, small air-conditioners, and fans. Air-conditioning wasn’t a huge expense because it was used only in isolated spaces. “This was not a nice place to work,” says Skip D. F. Stanaway, AIA, principal of SERA Architects. An early energy audit, conducted by the project engineers, System Design Consultants, showed that the massive masonry walls radiated cold in the winter. The roof was uninsulated, allowing heat to escape in the winter and enter in the summer. The building had single-pane windows, which opened to the noisy streets for ventilation, and incandescent lights hanging ineffectively from the 13-foot-high ceilings.

The first step was to reopen the building’s two central light courts and expose the original white glazed-brick walls that reflected light into the interior. Transoms and lights in the office doors were restored and the light fixtures were fitted with compact fluorescents. Insulation was added to the walls and the roof, and the windows were replaced with low-e-coated insulated glazing. A new air-conditioning system was also installed. D.H.

Adding insulation to the roof and walls, replacing old glass with low-e glazing, introducing daylight, and using compact fluorescent fixtures made the Portland City Hall more comfortable.
energy modeling software systems. The best known of these is DOE-2, developed by Lawrence Berkeley National Laboratory in the late 1970s. A new modeling package, EnergyPlus, based on DOE-2, will be available in prototype next year.

Energy modeling software requires time and money to run. Many architects hire consultants who specialize in energy modeling and may charge $10,000 or more to run these calculations. If carefully done, energy modeling provides an accurate and revealing look at the building.

Sandy Mendler, AIA, sustainable design advocate for Hellmuth, Obata + Kassabaum (HOK) in Washington, D.C., used modeling software to analyze the Environmental Protection Agency Campus, a one million-square-foot complex under construction in Research Triangle Park in North Carolina. She was surprised to learn that in the laboratory area of the building, the envelope accounted for a small percentage of thermal load. Because of the high air-change rate required, most of the cooling energy was going out with the exhaust air. In the office portion, however, the building envelope was more significant. That information allowed HOK to allocate its resources appropriately.

Energy modeling is especially useful and accurate for building renovations. System Design Consultants, who served as mechanical and electrical engineers for the renovation of the 103-year-old Portland (Oregon) City Hall, were able to mimic the actual building's performance, making it easy to see where heat was being lost. "We plugged in real numbers based on the building's history, instead of predicting these loads," says Gary Barnes, PE. The resulting design responds to these needs.

Reducing thermal load
There are many sources of thermal load, but the following are the most significant:

Solar load. A building's solar load is determined mostly by its glazing. Often the architectural program dictates the size and placement of glass, and cooling-load considerations take a backseat. By now most architects recognize that glass on the south and west facades of the building introduces heat, while glass on the east side generally provides beneficial morning light and warm-up heat.

Specifying glass with a low solar heat gain coefficient (SHGC), the fraction of solar radiation admitted through a window or skylight, reduces heat gain. The SHGC replaces the shading coefficient as the indicator of a window's shading ability. Glass with an SHGC of 0.20 lets in 20 percent of the solar radiation that strikes its outer face. Most commercial glazing SHGC values are in the range of 0.10 to 0.60; using glass near the bottom of that range keeps cooling loads in check. At the same time, the visible transmittance of the window should remain above 20 percent to avoid a dark and gloomy effect.

Spectrally selective and low-emissivity, or low-e, coatings, which reflect heat, control solar gain while allowing visible light to enter. Tinted...
TECHNOLOGY

glass, which absorbs infrared waves, lessens the amount of heat and light entering a space. Tints, low-e, and spectrally selective glazing allow architects to use more glass without sacrificing thermal control.

Broad eaves, awnings, and other shading devices also reduce solar gain. HOK’s Mendler took advantage of the existing tree canopy to shade the western facade of the EPA Campus. “This was one solution that was absolutely free,” she says. Deeply recessed windows, light-colored pre-cast concrete, and, most important, light-colored roofing material also help. Hashem Akbari, a researcher at Lawrence Berkeley National Laboratory, says, “Buildings can typically save 15 to 20 percent of total cooling energy if they have a light-colored roof.”

Lighting. A decade or two ago, it was not uncommon to see lighting power densities of two to four watts per square foot. Connected lighting loads in new construction have now dropped to 0.5 to 1.5 watts per square foot, thanks to electronically ballasted T8 and T5 fluorescent systems, an ever-expanding array of compact fluorescent lamps and fixtures, and the decline in overall illumination levels that has accompanied the arrival of computer-based work.

Nearly all the heat generated by lights and other internal loads must be removed by the building’s cooling system. Introducing daylighting reduces operating loads, but not the connected load (the building must be operable at night). Few engineers are willing to discount the connected load in their cooling calculations.

Defining a low target for lighting power density—and making sure the engineer uses that value for cooling-load calculations—will make a significant dent in cooling tonnage. “When we tell the mechanical engineer that our lighting load will be one watt per square foot, they often don’t believe us,” says Nancy Clanton of Clanton Engineering, a lighting design firm in Boulder, Colorado. “There’s a fear and trust issue at work here. If there’s not enough cooling, the mechanical engineer is the first to take the blame. Why should they take a chance on what we tell them? So they go back to their computer and enter two or three watts. We see it all the time.”

Many states now specify maximum lighting power density via the ASHRAE/IES Standard 90.1, Energy-Efficient Design of New Non-Residential Buildings. Some states, including Oregon and California, have their own more stringent requirements. Lighting consultants can also work with the engineer to reduce the lighting load.

Plug load. A certain mystery surrounds the power density estimates engineers use for plug-in devices, such as computers and copiers. Conventional wisdom holds that as the workplace becomes more com-

DESIGNING AN ENERGY-EFFICIENT BUILDING FOR THE EPA

Since the Environmental Protection Agency is in the business of protecting the environment, designing the agency’s campus in North Carolina’s Research Triangle Park presented an opportunity to demonstrate responsible energy use. Scheduled for completion in 2002, the building will use 40 percent less energy than a similar design built to “standard practice,” says Sandy Mendler, AIA, sustainable design advocate for Hellmuth, Obata + Kassabaum (HOK) in Washington, D.C. Energy consumption by building mechanical systems accounts for about 50 percent of energy costs, Mendler says.

The EPA’s Green Lights program outlines efficient use of lamps, ballasts, and smart controls, as well as fixture maintenance. HOK followed these guidelines and used daylighting whenever possible. Subscribing to the agency’s Energy Star program reduces plug loads. Low-e, tinted glass with a spectrally selective coating reduces glare and solar gain. Deeply recessed win-

dows and the existing tree canopy provide shade. Light-colored concrete and roofing also reduce heat gain.

Energy modeling conducted during the contract documents phase helped the architect and the engineer, R. G. Vanderweil in Boston, see where money would be best spent to conserve energy. “It was important for the whole team to see this,” Mendler says. “For an efficient building, we had to work together.”

D.H.
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puterized, plug loads increase dramatically. But many plug-in devices now use less power than ever—inkjet printers use a 20th of the power of laser printers, for example. Most engineers settle on an estimate between two and five watts per square foot, just to be safe.

Unfortunately, a “safe” estimate means oversizing the cooling plant. In an eye-opening analysis, building scientist Paul Komor, writing in the ASHRAE Journal, researched actual plug-load measurements. He found that they rarely exceed one watt per square foot. That’s because all the electronic equipment in a building is seldom in full use. Shrinking computer storage media and an increasing reliance on laptop computers also reduce plug load density.

People. Population density inside a building affects the design cooling load; each person puts out about as much heat as a 150-watt light bulb. Typical design densities range from 100 to 250 square feet per person, though this depends on the use of the space. In real life, the diversity of work ensures that there are fewer occupants than expected.

Since engineers size for the highest expected density, it’s worth checking the estimate to make sure it’s reasonable. It should include the number of people who will actually be in the space, as opposed to the maximum allowed by the fire code or the capacity of the parking lot.

Thermal mass. Concrete slabs, stone walls or floors, and other massive building elements, when they exchange heat with the ventilation system or the building’s exterior, can buffer peak loads and take advantage of cool night temperatures or warm afternoons. Coupling greater floor mass with night ventilation (which allows cool air into the building when external temperatures drop to a certain level) allowed Ove Arup & Partners in San Francisco to reduce the size of the chiller in an office building by 25 percent. “We always try to use a passive design approach when the owner is interested in environmental issues,” says mechanical engineer Sarah Nicholson.

Insulation. Although the insulating value of a building’s walls might seem to be a big factor in determining heat gain, it doesn’t matter much for most commercial buildings. That’s because cooling load is dominated by internal loads and solar gain. Also, there isn’t much temperature difference between a 75-degree space and the 95-degree outdoors. Insulation does, however, have an impact on winter heating load. Then temperature differentials between indoor and outdoor air can easily reach 60 or 70 degrees. A typical wall section providing R-19 performance is good enough for most applications. Roof insulation is crucial, since the sun beats on the roof all day. For large single-story buildings in southern climates, heat transfer through the roof can amount to as much as 30 percent of total cooling load, and higher insulation values are warranted.

Engineers as friends

Aside from making better design decisions, architects can work with engineers to avoid oversized HVAC systems by expressing interest in the central plant design. If the engineer knows that the architect and the owner want a realistic system, instead of one that guarantees the absolute comfort of occupants, everyone can work together more responsibly. “Let the engineer know that oversizing is not acceptable,” Clanton says.

Architects can help by providing accurate occupancy and plug load estimates. Postoccupancy measurements of previous buildings provide some real-life examples. Willingness to work with the engineer, to approach the liaison as a way to solve problems and save money, will mean a better, more comfortable building and a happier owner.

AIA/ARCHITECTURAL RECORD
CONTINUING EDUCATION

INSTRUCTIONS

♦ Read the article “Building Comfort with Less HVAC” using the learning objectives provided.
♦ Complete the questions below, then check your answers (page 158).
♦ Fill out and submit the AIA/CES education reporting form (page 158) or file the form on ARCHITECTURAL RECORD’s Web site at www.archrecord.com to receive two AIA Learning Units.

QUESTIONS

1. What are the two factors that are used to establish a building’s cooling load?

2. Why is the cooling load a larger problem than the heating load in designing energy-efficient mechanical systems?

3. What is energy modeling?

4. How could you reduce the thermal load on a building?
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THE REAL ADVANTAGES OF COMPUTER TECHNOLOGY TO AN ARCHITECTURAL FIRM OFTEN GO FAR BEYOND THE EXPECTATIONS AND PERCEPTIONS OF THE FIRM'S MANAGEMENT.

by Kristine K. Fallon, FAIA

We aren't taking advantage of half the technology we already own," is a common complaint among firm principals when they receive requests for more hardware or software expenditures. Those making the request—typically design teams seeking to meet the needs of a client—are frustrated by this response because, often, a firm is reaping greater benefits from its existing technology investments than its principals realize. Most design teams have moved beyond readily quantifiable, task-level productivity gains, such as spending fewer hours on each drawing, to higher-level professional gains, including better cost estimates and reductions in change orders and errors and omissions. These gains, though not always readily apparent to the principals, indicate that the firm is not just doing things faster and cheaper, but also better.

Earlier this year, Kristine Fallon Associates, a computer consulting firm, concluded a client-sponsored study to document the best information technology (IT) practices among architectural firms. The goal was to find real-world best practices demonstrating business results that could be emulated. Although the study was conducted for a single firm that is growing rapidly and whose principals wanted to ensure they were making good use of their technology, the results are applicable to all firms with computers.

The firms that participated in the study are similar in many respects. All design general building types; all use Intel PCs running a Microsoft Windows operating system; and all use computer-aided design (CAD) software, although some firms use more than one CAD system.

Principals were asked to evaluate the use of computer technology and its benefits within the firm. What was surprising was the number of principals who did not grasp the high-level benefits—including cost savings—that computers provide.

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Principals clearly recognize the value of CAD software. It saves time and it saves their clients money.

Firm size ranges from 22 persons to one with 700 employees and offices worldwide. To explore these issues in the kind of depth required, anonymity was required by the participants. What follows are not only the results of the study, but also our observations, extrapolated from the results.

Getting to know them
The study consisted of a two-part survey and interviews. One part of the study concerned the quantifiable aspects of the firms' computer operations: what software products they are using; the technical specifications for their hardware; what types of electronic data they exchange with consultants and owners; and to what extent they are using the Internet. This portion of the survey was directed to the person in the firm in charge of the day-to-day management of the computer systems.

The second was a management survey that was intended to elicit the principals' perceptions of the effects of computer use on their businesses. Principals were asked to judge the importance of a variety of computer applications to their businesses on a sliding scale from "never use" to "indispensable." This portion of the survey also proposed a number of potential technological benefits, which the principals were also asked to rate.

Kristine K. Fallon, FAIA, is president of Kristine Fallon Associates Inc., a computer consulting firm in Chicago.
The final and most revealing part of the study was the in-depth interviews conducted with one project team from each of the participating firms. In these interviews, a standard set of questions was used to determine each team’s view of project phases and work processes, how well the firm’s hardware and software served their projects, the extent to which electronic communications extended to outside consultants, the perceived benefits of computer use, and the quality of the technology training and support they received.

One of the most successful projects, measured by the way computers were used in the design and construction process, was a building designed in the early 90s using a CAD package that did not support reference files—the CAD equivalent of overlay drafting. Without the reference-file feature, the usual practice was to include the architectural base-plan information in the CAD plans of the engineers, landscape architects, and other disciplines participating in a project. This approach was not much different than manual drafting in that every time the architects changed the base plan, everyone had to be notified and every drawing that contained that architectural information had to be updated. In short, there were many opportunities for errors. But the successful project’s team included a CAD expert/programmer who saw the limitations of the system and developed a program that permitted the electronic versions of architectural base plans issued to the other members of the team to be automatically updated when they were revised. The programmer also customized the CAD program to ensure that the project's layering standards were enforced. Team members reported that this degree of automation made it easier to communicate changes among the design disciplines, reduced rework, and, most important, let the team focus on the architecture instead of the logistics. The project manager was adamant that this customization was a major factor in reducing errors and omissions to less than 1 percent of the construction cost.

Yet what is truly remarkable is that this firm’s principal, responding to the second portion of the survey, said that he did not know whether the technology used by his firm reduced errors and omissions. This startling admission was, in fact, consistent with the findings of the survey as a whole. Project teams almost uniformly reported improved results with greater technology. And not a single one of the principals interviewed strongly agreed that computer use provided a reduction in the number of field change orders, the cost of these change orders, or the percentage of errors and omissions. Many principals said they were forced into using CAD by their clients. The principals perceived the technology as an annoyance and delegated its management to relatively junior staff, who typically had little understanding of the business of architecture and were unable to identify the performance metrics that really count.

The lesson is clear. Principals must strive to understand how technology is benefitting their employees and their firms. Conversely, the firm’s technology users need to communicate directly with their principals about how technology contributes to their work and the results they achieve with it. In a broader sense, the design firm as a whole needs to align its use of computer technology with its business goals. This requires the thoughtful participation of the principals and their active support of new technology initiatives. Though it may seem ironic, the true measure of the effectiveness of a computer system is the degree to which it is perceived by managers or others to contribute directly to the realization of business goals.

Surprising results

Training and support at the project level

The study revealed three different approaches to technology training and support. The first involved no dedicated computer support and no in-depth technology expertise; informal peer training was the norm. This situation was typical in firms with fewer than 40 people, and it proved to be the least effective. Smaller firms need a technology partner who can provide expert technology evaluation, customization, training, and troubleshooting when needed.

The second approach involved a dedicated computer staff that offers generalized technology training, rather than training within the context of a project. Many firms rely on outside sources for technology training and many of these sources provide excellent instruction. But most people still need help fitting the tool to the work process, and a CAD class will not include instruction in the firm’s standards and procedures.

The third and rarest approach involved computer specialists participating as full-time members of the project team. Only one team had a full-time computer specialist, while another team involved IT staff in project-specific software customization. These were the two teams that identified the use of CAD as adding significant value to the design process.
The value of estimating and database creation are clearer to the principals of the firms who were surveyed than the more subtle advantages of computer technology, such as access to online product data.

and streamlining communication and coordination activities.

How technology support and training are delivered makes a difference in a firm's ability to utilize technology. The one project team with the dedicated programmer/trainer/support person was by far the most effective in its computer use. It was also the only team that rated computer use as "highly effective" throughout all project phases. This team received two types of training: basic CAD, and instruction in the use of the project-specific customization and standards. Since the project had dedicated technology support, this training was available as needed. This example seems to prove that preparing employees to do things right the first time enhances performance and morale.

**Plan automation for each project**

The uses and benefits of technology vary on different types of projects. Firms can benefit by exploring how information technology can be applied to their specific jobs. This process, referred to in the technology consulting business as "automation planning," simply means principals and their staff must think about the technology appropriate to the project and be ready to implement it early in the process. The launch of a major project is also the time for a firm to consider a stronger commitment to software or a major technology purchase.

Automation planning requires the participation of those who know the intimate details of the project's requirements, teaming arrangements, and contractual terms. It also requires input from computer specialists. The first must articulate the business issues, and the latter must judge the feasibility of various IT solutions.

An excellent example, though it is not taken from the study, is the technology planning undertaken for the Spallation Neutron Source project at Oak Ridge National Laboratory. This is a $1.33 billion project designed to meet the needs of the scientific and industrial research community into the next century. While the conceptual design for the project has been under way since 1996, this summer, the Department of Energy announced that the facility design/construction management contract was awarded to a joint venture of Lester B. Knight & Associates in Chicago and Sverdrup Facilities in St. Louis. The scope of work explicitly requires the design team to use 3D computer-aided modeling; to include sufficient information in the models to permit the extraction of equipment lists, a bill of materials, and drawings; to integrate the 3D models of the scientific equipment already under development at the various national laboratories; and to use the Internet for design collaboration. Schematic design of the facilities is scheduled to begin in the next few months.

While these technology requirements may be more extreme than most, they also show that clients are becoming more demanding about the way a project is managed on the computer. By the time Knight & Associates was notified of the award, the company had already conducted a preliminary computer technology assessment. They also scheduled their own "technology day" when vendors would come in and demonstrate various products to them. Also, key personnel from all of the design and construction team, as well as the client, convened for a full day this fall to evaluate state-of-the-art products for 3D modeling and electronic project communication—the first step in a thorough technology planning effort that will include a 3D modeling pilot program, comprehensive specifications of the hardware, software, and communications components required in each office, work process analysis, definition of training requirements, and the development of project data standards and procedures for electronic collaboration.

In contrast to the principals interviewed in the study, management, in this case, is not only championing the technology plan but leading the way. "Intelligent, early planning is required for successful technical and financial results on any project we start these days," says Robert H. Mellott, AIA, of Knight & Associates, design manager for the joint venture. "However, for projects like this one, with a three- to four-year design life, the information technology we select must be able to be integrated with new products as advances in technology occur. The selected software and communications systems must support our customer's objectives for interaction with our design process, and the design data must be usable by the owner for facility management after our work is complete."

In architecture, as elsewhere, it is the business requirements that must drive technology adoption. But the whole team must think creatively to imagine how various technology products can be focused to meet their specific project challenges.

**Recycled content**

One of the great advantages of information technology is the ability to reuse information. Every firm has grown accustomed to cutting and past-
ing text from proposals. Similarly, reusing CAD data can be a very successful strategy, the study found. The successful team cited above that held errors and omissions to less than 1 percent of construction cost focused on the ability to automatically reuse the architectural base plan information in the drawings of all the design disciplines. The key to this type of information reuse is CAD standards, particularly layering standards, that work for and are adhered to by all disciplines and outside consultants.

The majority of project teams interviewed were unable to share CAD information easily with outside consultants because each firm created its own CAD standards. These met the needs of the individual firm, but did not accommodate other team members.

Industry-wide standards that accommodate all disciplines are necessary in order for the design industry to reap the full benefits of electronic communication. Such standardization would not only streamline CAD operations within firms, but also allow a new team member to effortlessly plug into the data flow. An important start to this process is the AIA's Layer Guidelines, which provide recommendations for organizing CAD data into both files and layers, with naming conventions for both. Originally issued in 1990 and revised in 1997, the guidelines cover engineering, architecture, and interior design. It is also one of the foundation documents for the National CADD Standard, now being developed under the auspices of the National Institute of Building Sciences. Besides layering and file naming, this standard will cover drawing-set organization and sheet-file naming, sheet organization, schedules, plotting guidelines, and drafting conventions (including notations, symbols, diagrams, scale and linetypes, and attributes).

Another kind of information reuse is the ability to transfer portions of drawings or details from one project to another. Two of the projects in the study involved building prototypes. These projects experienced reduced design costs—savings of 50 percent in design development and 40 percent in construction documents were recorded by one team—by transferring information. They also achieved better conformance of actual bids to cost estimates.

Outside of these prototype projects, however, information reuse was not very effective. Although most teams borrowed some information from previous projects, the process was hampered by a lack of CAD standards. CAD files required extensive reworking to produce drawings that were consistent in terms of line weights, text heights, and dimension styles. This diminished the benefits of their reuse. Also, access to reusable information depended on an individual's knowledge of other projects, rather than on an official library of details or an electronic search capability. No guidance existed to distinguish good details suitable for reuse from less successful ones.

Facility management and maintenance is another important application for the reuse of information. However, none of the partici-

The future of technology
Object-based, intelligent 3D modeling systems will become even more important in the next generation of CAD products. Object class libraries, now under development by the International Alliance for Interoperability, an organization of software vendors, manufacturers, professional organizations, and consulting firms, will become more vital. These classes will provide a basis for sharing information throughout the construction project's life cycle and across disciplines.

As the more avant-garde CAD systems have demonstrated, design teams will soon be creating computer-based 3D facility models from an assembly of objects. An object will incorporate physical information such as material, color, electrical or thermal properties, and a definition of how it should appear within a space. An object may also encapsulate procedures that can be used to describe how it should relate to other objects—a light switch may record its required height and distance from a door.

It is said that electronic communications can eliminate advantages of size and allow small companies to compete effectively. The typical architectural firm is ready for this; most are small, nonbureaucratic, and full of creative, imaginative people. These firms are poised to compete successfully in the information age, where business strategy will increasingly demand flexibility, creativity, collaboration, and intuition.
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United States Aluminum
Commercial Products Group
VERSATILE ALUMINUM WINDOW AND DOOR FRAMES: THE MATERIAL OF CHOICE FOR INTERIOR APPLICATIONS

VERSATILE ALUMINUM

As you walk down any street in any major city, you have to appreciate the role of aluminum in shaping the modern urban environment. Take a moment to note that aluminum is often the material of choice for the framing of exterior entrance doors, windows and curtain walls. It's difficult to imagine the skyscrapers of today in all steel or wood.

As you will learn through this continuing education opportunity sponsored by United States Aluminum, RACO Interior OfficeFronts™, aluminum is a material with special characteristics that make it highly versatile for the construction industry. Most recently, this unique material has penetrated the interior environment and is now used widely for window and doorframes.

MATERIAL ADVANTAGES

Why aluminum? A unique combination of light weight, strength, corrosion resistance, electrical conductivity, heat reflectivity, formability, and suitability for a wide variety of durable finishes makes aluminum the most versatile metal used in building construction.

Start with its corrosion resistance. Aluminum's corrosion resistance comes from the metal's naturally occurring oxide coating. As soon as it is exposed to air, the newly smelted metal forms a hard, tightly bonded, glasslike surface film, which protects the interior. If scratched, the newly exposed aluminum surface immediately reforms a protective oxide coating.

The addition of alloys to the raw metal improves aluminum's performance across the entire spectrum of desirable properties—improved strength, corrosion resistance, flexibility, ductility, workability and weldability. Again, think of where you find aluminum—as door and window frames and curtain walls exposed to exterior weather conditions.

Use the learning objectives below to focus your study as you read VERSATILE ALUMINUM WINDOW AND DOOR FRAMES. To earn two health, safety, and welfare learning credits, answer the questions on page 150 and follow the report instructions on page 158 or use the Continuing Education self-report form on RECORD's website www.architectural-record.com.

Learning Objectives

- Describe how use of aluminum aids construction time.
- Discuss why aluminum is considered a versatile building material.
- Explain how the use of aluminum is good for our environment.
- Identify the versatility of aluminum window and door frames in specific applications.

This continuing education opportunity is brought to you by United States Aluminum Commercial Products Group, RACO Interior OfficeFronts. United States Aluminum offers a full range of aluminum entrance doors, storefronts, window walls, curtain walls, and slope glazing systems for both interior and exterior design. In 1998, the company acquired RACO, a company that for 26 years has manufactured interior door frames and glazing systems for commercial construction. The addition of RACO Interior OfficeFronts offers architects and designers a single resource to fully utilize the unique structural properties of aluminum for both interior and exterior design. All glazing systems are tested to the highest industry standards by certified independent testing laboratories. Comprehensive details, installation instructions, and test reports are available for each system.

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Aluminum is shaped by a brake press or an extrusion press. Simple low-volume aluminum profiles are usually done on a brake press. Shapes of greater intricacy are put through the extrusion process.

Basically, the process of extruding aluminum consists of pushing aluminum alloy metal through a die to give it its unique shape or profile. In more technical terms, aluminum billets are heated in an 800° F furnace to a plastic state and pushed by a hydraulic ram through a die that forms the desired cross section. Through this process the following are made: Fins, grooves and other projections or indentations for glazing, thermal breaks, air-pressure-equalizing channels and other features.

DESIGN PROPERTIES

The extremely intricate profiles of extruded aluminum make the material ideal for interior office fronts. This is most readily seen in the face profiles available as standard on many systems. (The face profile is the side of the extrusion viewed by a person looking perpendicular to the doorframe or window.)

In fact, one window may have many face profiles on it. For example, the verticals may have 1 1/2 inch face profile with the head having a 4-inch face profile, the intermediate horizontal having a 3-inch face profile and the sill having a 5-inch face profile. Yet, the frame’s appearance is quite crisp having been through the extrusion process. The same principles hold true for large horizontal mullions.

Instead of being raised above the framing with applied stops, the glazing pocket on interior window and door frames is recessed. This eliminates the need to have exposed screws showing on the applied stop. Various thicknesses of glass can fit in the pockets, including 1/4 inch, 3/8 inch, 1/2 inch, and 9/16 inch.
An intricate pattern and contrasting black aluminum frame with frosted glass. The system fronts a conference room at Nestle USA in Glendale, Calif. Designed by CHA Architects.

is extruded into one of the two shapes. Then the two shapes are simply screwed together, a much simpler method requiring less expertise by the assembler and the installer.

In comparison, the clip method requires the assemblers and installers to be trained in that particular system.

A new innovation in aluminum door frame and window systems are units that can be assembled and then fit into the dry wall opening 100 percent of the time. This is possible because of a detachable flange that is attached to the door or window frame after it is in place. The result is a full-throated framing system identical to the systems that do not have the detachable feature.

THE ENVIRONMENT
Recycling is an integral part of processing aluminum. Most aluminum alloys contain scrap aluminum, as much as 50 percent scrap. In fact, the larger aluminum door frame and window manufacturers have their own aluminum foundries to make the billet used in the extrusion process. These companies typically use a high percentage of recycled aluminum in the foundry to make new billets. A very small amount of the aluminum becomes waste material.

Aluminum door frames and windows are factory painted or anodized under the strict guidelines of local, state and federal codes. Little or no pollutants enter the atmosphere, whereas post painting in the field allows fumes to enter the atmosphere as a result of the drying process. Plus in the factory there is no danger of paint fumes affecting the air quality of other tenants.

Paint applied in the factory is cured during the painting process and its physical properties are set at that point. In addition, interior paint should meet the AAMA 603.8 performance specifications for pigmented organic coatings, something that is not the case in the field.

It's important to note that the curing process of air dry paint requires a significant amount of time and that even though the paint is dry to the touch, it may not necessarily be cured.

Anodizing, the other type of factory finishing, consists of applying a caustic etch followed by an anodic oxide treatment. A wide variety of colors are available, with the most commonly used being clear, dark bronze, and black. Clear anodized is consistent in its color. Bronze and black vary in shades by batch, a fact to be considered when a close color match is required.

INTERIOR APPLICATIONS
Curved and faceted walls are easily constructed with aluminum extrusions. An adjustable 24° vertical mullion is available to integrate the preassembled window units, which means that the curve or facets can be adjusted in the field.

Aluminum interior systems also include door framing for fire doors, pocket doors, bi-parting doors and bypassing doors, providing for a consistent interior appearance. Some aluminum doorframe manufacturers offer sliding doors that open to mirror sidelights. Doors can also be custom designed.

Aluminum as an interior officefront building material is also validated by its cost when compared to other building materials. Not only is aluminum comparable in material costs to other materials but, when labor costs for assembly, installation, and field painting are included, aluminum is often at a price advantage.
At First U.S.A. in Dallas, architect The Lauck Group used different paint finishes to bring variety to the aluminum frames (left and below).

At Nokia House (right) in Irving, Tex., aluminum frames and clear windows are integrated into a hall's partition system to create a traditional image. Designed by Good, Fulton and Farrell Architects. Gensler and Associates/Studio Architects achieve a more contemporary aesthetic at Apple Computers, Inc., Research and Development Campus (below) in Cupertino, Calif.
VERSATILE ALUMINUM WINDOW AND DOOR FRAMES

Learning Objectives:
After reading Versatile Aluminum Window and Door Frames: Material of Choice for Interior Applications, you should be able to:
• Describe how the use of aluminum aids construction time.
• Discuss why aluminum is considered a versatile building material.
• Explain how the use of aluminum is good for our environment.
• Identify the versatility of aluminum window and door frames in specific applications.

Instructions:
The preceding article Versatile Aluminum Window and Door Frames: Material of Choice for Interior Applications, provided by United States Aluminum is part of the AIA/Architectural Record Continuing Education Series. You can receive two continuing education learning units that qualify for health, safety and welfare credits by reading the article, studying the learning objectives and answering the question below. Turn the page upside down to check your answers. Then fill out the self-report form (page 158) and submit it or use the Continuing Education self-report form on Record’s website, www.architecturalrecord.com.

QUESTIONS
1. Why is aluminum considered a versatile building material?
   Answer

2. How is the use of aluminum good for our environment?
   Answer

3. How does aluminum become corrosion resistant?
   Answer

4. What are the benefits of using aluminum in construction scheduling?
   Answer

ANSWERS
For More Information Contact:
United States Aluminum
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attorney at the Youth Law Center in San Francisco. "The only boot camps that have real success," says Chinn, "are ones with a very strong therapeutic focus and that tie people into services when they come out."

The juvenile justice system today is becoming the last resort for children who once were handled in other ways. "You are seeing more suspensions and expulsions from schools," explains Colorado's Adamek. "The schools become safer, but too many of these kids are on the streets with no structure and no supervision. Many of them end up in the juvenile justice system in short order," as do poor youths with mental-health problems, who often have no other options.

Gail Gargiulo, regional manager for Correctional Health Services, which serves 13 adult and juvenile facilities in New Jersey, estimates that 65 percent of the juvenile inmates she sees are either "mentally disabled or emotionally challenged." Most facilities are simply not equipped or funded to handle the variety or seriousness of the disabilities of these inmates, who, Adamek notes, range from the developmentally disabled (with low IQs) to abused, neglected, or abandoned kids, situations often complicated by drug use. One national study documented "suicidal behavior" in 11,000 detained youths annually.

**Housing shoplifters and murderers—together**

Even new facilities must deal with a wide range of detainee behaviors and needs, especially those that handle people who have been arrested but not yet convicted. The three-year-old Hudson County Detention Center in Secaucus, New Jersey, by architect Ricci Associates with Dean Marchetto Associates, is clean and well maintained. Its architectural niceties include high ceilings, clerestory windows in dayrooms, and windows in every bunkroom. Residents, dressed in orange uniforms, are permitted to walk in columns down the center of halls only and must be quiet while moving from place to place and pause silently when visitors pass.

You can't judge from the look of the average detainee, but he (or she) may be a sex offender, a violent offender, or disabled. Robert Murray, director of the facility, has six housing units into which he can sort, or "classify," the youths. The facility has held youths picked up for infractions as minor as shoplifting toys to those accused of murder. The housing units are smaller than those in adult facilities, which gives Murray greater control, but he has had to double-bunk most rooms, which exposes smaller or weaker detainees to a higher risk of assault and rape.

More youths are now being waived to adult systems, which don't want them because they become prey to older, stronger inmates. A number of states have begun to build specialized facilities that combine the higher security and more restrictive environment of adult prisons with the education, mentoring, and treatment programs associated with juvenile systems.

Though unprecedented levels of construction and operation dollars have flowed into juvenile corrections in recent years, most jurisdictions find there is a limit to what taxpayers will tolerate. This is giving a higher profile to advocates' calls for better-implemented alternatives to prison, which may divert more kids from crime at lower cost. Architects may have a role in developing emerging models such as what Frank Greene, AIA, of Ricci Associates calls "one family, one court," which tries to forge closer links among family, civil, and criminal courts in order to involve the justice system in trying to solve family issues that foster crime. As Adamek says, "There is no evidence that any jurisdiction has built themselves out of this problem."
Fiber optic lighting systems are extremely versatile, and theoretically can be used in place of any traditional lighting system. However, the industry is still in its infancy. Given today's level of technology, it makes sense to use fiber optic lighting systems only in certain applications. But don't blink for too long, because the technology is advancing rapidly and in a couple of years it will make sense to use fiber optics even for general lighting.

Fiber optic systems make sense today for application where you must remove heat or UV from the systems (such as in retail displays and in museums). Fiber optics make sense when the electricity in the system should be remote from the light (pools and spas, e.g.). Or when it makes sense to reduce maintenance costs of lighting systems when lamp replacement is a major hassle (some chandeliers). And fiber optic lighting systems make sense when you're trying to achieve special lighting effects based on a number of small points of light, rather than a single large source (signs, accent lighting, etc.).

Fiber optic lighting systems are simply still too inefficient for general lighting to reach uniformly high ambient levels (say, 50 footcandles). And since it's not currently possible to put enough lumens into an individual fiber to carry over long throw distances, fiber optic lighting systems don't make sense when the throw distance (from the output fixture to the object being illuminated) is greater than four or five feet. So, much general room lighting is a poor choice for fiber optic lighting—for now.

What are the basic tenets of fiber optic lighting? How does the technology work? What advantages can architects gain through using these systems? The following, brought to you by Unison Fiber Optic Lighting Systems, will answer those questions and much more. And by studying the learning objectives, reading the article and answering the questions you can participate in an AIA/ARCHITECTURAL RECORD Continuing Education opportunity.

Unison™ is a joint venture of Advanced Lighting Technologies, makers of Venture Lighting metal halide lamps, and Rohm and Haas, makers of OptiFlex™ flexible light pipe. By combining these technologies, Unison offers a total solution for fiber optic lighting needs, including side and end light fiber, illuminators and fixtures, couplers, and even specially designed cutting and stripping tools.

Unison custom designs and manufactures complete fiber optic lighting systems. Unison's CableLite™ and FiberImages™ Divisions offer product design and application expertise for signs, panels, logos, curtains, and other products that require fiber optic systems.

FIBER OPTIC LIGHTING
In fiber optic lighting systems, a lamp transfers its light through to the end of the fiber or linearly through the fiber's transparent sheathing. The most noteworthy advantage of using fiber optic lighting systems is that the light is separated from the electricity that generates light. And, too, one source can drive many fibers and produce multiple points or lines of light.

By separating light and electricity, fiber optic lighting can be used to light electrically or chemically hazardous areas, such as pools, spas, fountains, or in environmentally sensitive industrial situations. The reason: the light produces no electrical shocks and will not become a fire hazard. A sidelight fiber can be used in places where the potential of breakage or of contact with a high voltage transformer makes a neon light hazardous.

In addition, nearly all fiber optic lighting systems use both heat (infrared or IR) and ultraviolet (UV) filters at the...
light source. As a result, the output light contains no UV and no heat. This makes the systems especially desirable for lighting retail displays containing products that are sensitive to heat, as well as museum displays of temperature sensitive artifacts and art. Basically, dyes and oil paints won't fade, chocolate won't melt, and fresh flowers won't wilt.

The use of fiber optic lighting systems (FOLS) can also lead to improved energy efficiency in some cases, particularly through the use of metal halide (MH) light sources. Because a single lamp can illuminate many fibers, maintenance costs can be reduced and maintenance tasks simplified, particularly for the hard-to-reach bulb. In addition there is economy of scale, as one bulb can light an entire chandelier or a ceiling or wall of sprinkle lights.

Overall, fiber optic lighting systems can be used in almost any lighting situation. The Lighting Research Center at Rensselaer Polytechnic Institute and others have tracked the following applications of fiber optic lighting:

• Displays and exhibits—fiber optics replace the traditional linear fluorescent and MR16 lighting in museum and retail displays.

• Water—fiber optics is used in at least 10 percent of the water lighting market and that market is growing.

• Architectural highlights—spots of light from end-emitting fibers can dramatically highlight the architectural features of a room or building. Side-emitting plastic fiber and prism light guides can outline the exterior contours of buildings.

• Signage and visual guidance—fiber optics systems are used to light a variety of signs and are also used in edge-lit exit signs, billboards, and traffic signals. Fiber optics light steps and aisles in theaters and in turn provide a safer, more accessible environment. Signage projects are perhaps the most dramatic application, in that PMMA fibers can be assembled to create unique and vibrant images ranging from random patterns to intricate designs including logs and animated figures. White light or a variety of colors can be used to achieve versatile candlelight for historic ambiance.

• Downlight and ambient—although the Rensselaer Lighting Research Center found that fiber optic lighting systems are not widely used for downlighting and ambient light in the United States, in Europe such systems are popular for offices and restaurants.

ANATOMY OF AN FOLS

A fiber optic lighting system (FOLS) consists of three principle components—

1. Illuminator. The illuminator consists of a lamp, ballast or transformer, and collection optics to channel the light into the fiber.

2. Lamp. Is most often either halogen or metal halide (MH). The most commonly used is a 150 W MH, although a variety of outputs are available.

3. Ballast or the transformer convert the input electricity to the current and voltage required to start and operate the lamp.

The collection optics channel the light into the fiber and are usually based on a glass or metal reflector, an UV filter, and if desired, color filters. The reflector captures the light emitted by the lamp and directs it into the fibers. Most illuminators employ a fan to dissipate the heat generated by the lamp, although Unison has recently introduced a fanless model.

Fibers. Optical fibers for illumination are either glass or plastic and at least two layers—an inner core surrounded by a thin cladding. There may be an additional third layer or sheathing for protection of the inner fiber. Bundling individual fibers together is a common practice, with this assembly referred to as bundled fiber. Nonbundled fibers are commonly called solid core fibers, or large diameter fibers.

The core and cladding must be of different materials for the system to function properly. Nearly all cladding layers are made of one kind of fluoropolymer (an example being Teflon FEP™). The core is either glass or plastic, with the plastic being either an acrylic or methacrylic copolymer. The most common plastic core for bundled fiber is PMMA (poly methyl methacrylate), known by the trade name Plexiglas™. If present, the sheathing is PVC (vinyl) or polyethylene.

Glass fibers. Made thin enough to bend (0.5 mm or .002 inch), glass fibers are inherently brittle. And, because the glass fibers are so delicate, they are always bundled and always completely assembled at the factory. Generally, several glass bundles are gathered together into a “common end,” which is attached to the illuminator (the complete assembly is called a harness). When you order a glass fiber harness, you must specify the number of tails, the length of each tail, and the diameters of the common end and of the tails.

Glass fibers are not damaged by heat or UV light like plastic fibers can be—an advantage for using glass. However, as mentioned above, unlike plastic, exact lengths must be specified and factory prefabricated rather than cut at site.

Bundled Plastic Fibers. Made of extruded PMMA, individual plastic fibers...
are commonly .030 inches to .060 inches, or about 20 times the size of glass fibers. The diameter of the individual fiber is determined by brittleness of the PMMA; if the fiber is larger than 1 mm, the fibers may not be bent to a reasonable radius without breaking. PMMA fibers are separated and used individually for such applications as signs, star ceilings, and fiber optic curtains.

PMMA fibers are considered very durable compared to other plastic fibers. The main disadvantage of PMMA fibers is packing fraction loss, in which light from the illuminator inevitably filters into the gap between the fibers, thus decreasing efficiency. For endlights, the individual fibers are bundled very loosely in an opaque sheathing. For sidelight, the individual fibers are tightly bundled and twisted around each other and then covered with a tightfitting clear sheathing. The tighter the twist, the more light escapes.

**Solid Core Plastic Fibers.** Typically ranging in diameter from 3mm (1/8 inch) to 12 mm (1/2 inch), most solid core plastic fibers are cast of copolymers of MMA (methyl methacrylate) and a cross-link/plasticizer to add strength and flexibility. Unison’s OptiFlex is constructed of a different, inherently flexible acrylate and a cross-linker to provide more flexibility at room temperature. With either process, the cladding acts to contain the core until the core “cures.” Therefore, for solid core fibers, the cladding layer is much thicker than the sprayed or dipped cladding layers on small diameter acrylic fibers.

**Output fixtures.** The first fixtures used for fiber optic lighting systems were simply standard lighting fixtures with the electrical guts ripped out. The industry has progressed and now offers fixtures designed specifically for fiber optics; yet, most output fixtures are still based on standard electrical lighting fixture designs.

**Coupler.** A coupler allows several large core fibers to be attached to a single illuminator. One coupling method is to split the light at the illuminator’s main port into several small ports using segmented lenses. Each fiber is then inserted into one of the small ports. Another method is to gather the fibers together in a bundle over the last several inches of their length, which is actually a labor-intensive operation. A third alternative utilizes a short glass fiber harness as a coupler, with the common end joined to the illuminator and each tail joined to a separate fiber.

The coupler is commonly used to randomize both the color and intensity across the faces of the various light pipes attached to it. Intensity variations occur because of the projection of the MH arc—the source of the light—onto a circular port. The color variations result from the chemistry inside the lamps. Basically, different colors are emitted at different angles, especially as you move away from the center of the arc.

Randomization is easy to accomplish with a glass fiber harness—just mix up the individual strands of glass so that the strands that are going to any given tail go to several different areas of the common end. Another method is to use a glass mixing rod that averages out the angular effects.

**HOW IT ALL WORKS**

All optical fibers work on the principal of total internal reflection, or TIR. Whenever light traveling in one material approaches another material (such as the movement from the core to the cladding), the light is bent somewhat as it enters the second material. If the light approaches the second material at a shallow enough angle (known as the critical angle), then it is bent so much that it never enters the second material at all. It is totally reflected back into the first material—an amazingly efficient process.

For instance, a typical glass mirror may reflect only about 90 percent of the light that hits it. However, total internal reflection reflects essentially all of the light. This allows the light to travel far distances, undergoing many hundreds of bounces along the light pipe without being absorbed.

How shallow the light rays must be in order to be totally reflected is determined by how different the core and cladding are. This is measured by the refractive index, which is essentially a measure of the speed of light in the material. The greater the difference between the indices of refraction, the more light (over steeper and steeper angles) will undergo TIR.

All optical fibers are characterized by an acceptance angle—the maximum angle (away from “straight on”) at which light can enter the fiber and be totally internally reflected down its length. The acceptance angle is determined only by what the core and cladding are made of. For plastic optical fibers, the acceptance angle is usually about 35° to 40°. This means that all lighting hitting the face of the fiber in a cone of 70° to 80° (from +35° or +40° to -35° to -40°) will be internally reflected. The rest of the light is reflected back out the face or absorbed by the core, cladding, or sheathing.

Another measure of the ability of a fiber to gather light is the numerical aperture (NA). This is defined as the square root of the difference between...
the squares of the refractive indices: \( NA = \sqrt{n_{core}^2 - n_{clad}^2} \) where \( n \) is the index of refraction.
The acceptance angle is simply the arcsine of the NA. The bigger the acceptance angle (or NA) the better, because the fiber collects more light.

Also note that if the fiber is bent, the angle at which light approaches the cladding from the core changes. For this reason, bending an optical fiber results in some light loss. Tests to measure loss under various bending conditions are not well-defined. In general, though, the more sweeping the bend, the less light is lost. The tighter the bend, the more light is lost.

**OPERATING PROPERTIES**

When specifying fiber optic lighting systems, the efficiencies, luminance, and color properties should be considered. Unfortunately, only a small amount of comparative data exists, although there is an effort among manufacturers to increase their analyses. In addition, output from any system depends on a number of factors not controlled by the manufacturer, such as the number and tightness of bends the fiber takes in the installation as well as the quality of the fiber end cuts. The quality of installation also affects the system's operation.

To aid in comparison and specification, the fiber optic industry is developing testing standards under the auspices of the National Electrical Manufacturers Association. Meanwhile, check with manufacturers for existing quantitative analyses. As with most lighting applications, a prototype or mock-up to determine system performance is suggested.

**Efficiency.** A typical fiber optic lighting system is about 15 percent efficient overall. In other words, of all the light generated by the lamp, only about 10 percent to 15 percent is emitted at the end source. Nearly all of the loss happens before the light is directed into the fiber. Fortunately, most FOLS use metal halide lamps, which are highly efficient, so overall efficiency can be higher than with incandescent lighting sources.

The most efficient system in the market is manufactured by Unison. The illuminator is based on a 68 W metal halide lamp that uses no fan. By getting rid of the fan and making the collection optics more efficient, the total system lumens of light per watt (lpw) of electricity used increases considerably and is similar to the efficiency of incandescent systems.

Within a year, Unison expects to introduce a system that will nearly double that efficiency—the system will be in the 25 to 30 lpw range—through a better coupling of the lamps' arc gap to the reflector (more efficient lamp-reflector combinations) and of the port to the fiber (a more efficient coupling mechanism).

**Illuminance.** To supply a particular quantity of light for a task, one measures illuminance. Illuminance is defined as flux density on a surface, expressed as lumens per square foot, or more typically known as a foot-candle.

Unless the system manufacturer specifies the total lumens emitted from the various output fixtures, the design should assume a MH lamp will produce 80 lpw. Thus, for a 250 W MH system, the designer should have no more than 15 percent of (80x250) or 3,000 total lumens at the fiber ends. (Remember, that's 3,000 total divided by the number of fibers, not just 3,000 for each fiber.) This also assumes a 10-foot-fiber runs with gentle bends only, excellent quality cuts, good connections, clean optics, fresh lamp, etc. Some manufacturers specify lumens available at the port. In that case, the designer should assume about 60 percent of those lumens can be delivered through 10 feet of fiber and the output fixture into the area to be lit.

It's important to note that output characteristics of the system change depending on the installation details—fiber length, number of bends, and the length of the run relative to the number and radius of the bends.

**Color.** All optical fibers change the color a bit as the light travels through them. Look at the color of light transmitted through 40 feet or more of fiber. Assuming that you start with white light, absorbing red will make the light appear greenish. Absorbing blue will make the light appear yellowish.

All types of plastic optical fibers absorb some red light. The absorption of blue differs, however, and is not fundamental to plastic fibers. This results from broad absorption bands in the UV that "tail" into the visible region. These UV absorptions are generally caused by "stuff" in the fiber left over from the polymerization. So, the cleaner the manufacturing process, the less blue is absorbed. Therefore, a greenish cast to the transmitted light implies a cleaner fiber and lower overall attenuation.

**THE FUTURE OF FOLS**

By all accounts the future for fiber optics lighting seems bright. Look for:

- Higher efficiency.
- Move toward fiber optics for more general room lighting, as seen in Europe.
- Systems cost decrease.
- Greater illuminance.

It's also important to note that manufacturers of fiber optic lighting systems are working to bring a standardization to the industry, which translates into more consumer confidence in a product and more information available to the consumer.

Advertising Supplement Provided by Unison Fiber Optic Lighting Systems
Learning Objectives.
After reading FIBER OPTICS REVOLUTIONIZES LIGHTING DESIGN, you should be able to:
1. Describe the advantages of using fiber optic lighting systems, compared to other lighting types.
2. Identify the architectural applications of fiber optic lighting systems.
3. Describe the three principle components of fiber optic lighting systems.
4. Explain in simple terms how a fiber optics lighting system works.
5. Discuss the importance of efficiencies, luminance and color properties.

Instructions
Refer to the learning objectives at left. Complete the questions below. Then turn the page upside down and check your answers.

QUESTIONS
1. When it is advantageous to use fiber optic lighting systems?
Answer

2. When it is not yet advantageous to use fiber optic lighting systems?
Answer

3. What are some specific architectural applications of fiber optic lighting systems?
Answer

4. Describe the three principle components of fiber optic lighting systems—and how they work.
Answer

5. In simple terms, how does a fiber optics lighting system work?
Answer

6. When specifying a fiber optic lighting system what is the significant of efficiencies and luminance?
Answer

ANSWERS

For more information, contact:

Unison™ Fiber Optic Lighting Systems
32000 Aurora Road, Solon, Ohio 44139, U.S.: 1-888-UNISON9, (440)-519-1033 / Fax: (440) 519-1038
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ANSWERS

1. The two factors in establishing a commercial building's cooling load are the design load and the actual operating load. The design load is based on the design of the building, how many people are expected to be in it, weather data, and solar radiation figures. This information is calculated to come up with a cooling system sized to reject heat gain on the hottest day of the year. Then a safety factor of 20 to 100 percent is added. The actual operating load is usually much less than the design load, since all of the projected figures are maximums that rarely occur at the same time.

2. The heating load is the amount of heat input needed to keep a building warm inside. Heating equipment takes up less space and costs less to buy and install than cooling equipment. The cooling load is the rate of heat rejection required to keep a building cool inside. Cooling loads include solar radiation, heat gain through the building skin, hot outside air brought in through the ventilation system, lights, people, and plug loads. Commercial buildings normally need more cooling than heating because they are often blocky, which means internal areas with no outside exposure have no cool windows in the wintertime to which they lose heat.

3. Energy modeling is a computer-generated projection of where energy will be used or lost from a building. Software programs re-create airflow and other dynamics within the building and give an accurate picture of where the heating and cooling energy will go. Modeling is especially useful when real figures can be used, as in the case of a building that is being retrofitted.

4. Thermal loads can be reduced with careful design and by working with the mechanical engineer. Most of a building's solar load is introduced through its glazing. Placing glass on the east and north walls, rather than the south and west, reduces solar heat gain. Glass that's tinted or has a low-e or spectrally selective coating has the best solar heat gain coefficient. Shading devices and deeply recessed windows also keep heat outside. Another factor in solar heat gain is roofing color. A light-colored roof saves 15 to 20 percent of total cooling energy. Electrical heat loads normally come from lighting and power outlets. New lighting systems that use compact fluorescent lamps and smart controls generate less heat than incandescents that are left on all day. Plug-in devices, such as copiers, computers, and printers, are a large part of the workplace thermal load. New devices use less energy and put out less heat than older models. Thermal mass, such as thick concrete or masonry slabs, can be used to buffer peak cooling loads and take advantage of cool nighttime temperatures. Insulation improves winter heating loads in cold climates where the temperature differential between inside and outside air is often more than 60 degrees.
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The Presidential Design Awards program is administered by the U.S. General Services Administration and the National Endowment for the Arts.
(continued from page 52)

James Beard Foundation/Interior Design Magazine Awards
Submission deadline: January 29
Established in 1995 to honor excellence in interior and graphic design for restaurants, these awards are given for projects in the United States and Canada. For more information, write the James Beard Foundation, 6 West 18th Street, 10th floor, New York, N.Y. 10011 or visit www.jamesbeard.org.

Assoplastrelle Design Award
Submission deadline: January 30
Sponsored by the Association of Italian Ceramic Tile Manufacturers, this award honors American designers or architects who have created interesting and innovative settings using Italian ceramic tiles. Tile dealers may submit projects on behalf of their clients. For further information, contact Christine Abbate at 718/783-3160 or fax 718/398-2591.

Library for the Information Age
Submission deadline: January 31
The first international Web-based architectural design competition, sponsored by the Association for Computer-Aided Design in Architecture (ACADIA), calls for the design of a library that takes full advantage of information technology while still serving the library’s roles in culture and society. Proposals may incorporate spatial simulations and/or physical solutions. Open to both student and professional designers worldwide. Visit www.acadia.org/competition/ for more information.

Union Internationale des Architectes Student Competition
Submission deadline: January 31
Student entrants are invited to design a housing project for a city in their home country. In addition to cash, the winner will receive the UNESCO Prize for Architecture. For registration information call Liu Kecheng at Xi’an University, Xi’an, China, 011/86/29/220-29-43, fax 011/86/29/552-78-21, or E-mail LiuKCH@pub.online.xa.sn.cn.

Resort Concept Competition
Submission deadline: February 15
The San Francisco–based Valor Group is sponsoring a competition for the design of an environmentally sensitive, portable tent village. For more information, call 415/276-5958.

Encouraging Neighborhoods of Choice and Diversity
Registration deadline: February 15
Submission deadline: April 15
This competition seeks innovative and sustainable redevelopment strategies for a Baltimore neighborhood that has witnessed a dramatic decline in population. First prize for the winner is $10,000. For more information, call Rob Inerfeld at the Neighborhood Design Center, 410/233-9686, E-mail him at inerfeld@hotmail.com, or visit www.ndc-md.org.

DuPont Benediktus Awards
Submission deadline: March 8 (professional architects); March 19 (students)
These awards, open to both professional architects and students, recognize the use of laminated glass in commercial and residential projects. Winning architects receive a sculpture by glass artist Hans Gode Fräbel; winning students receive $15,000 for their programs. Entry forms are available from the sponsoring organizations: contact Stephanie U. Vierra at the AIA, 202/626-7446 or vierras@aiamail.aia.org; Francine Troupillon at the UIA, 011/33/1/4524-3688 or uia@uiarchitectes.org; Joanna Hanes-Lahr at DuPont, 202/393-5247 or haneslahr@mcrimail.com. More information is also available at www.dupont.com/safetyglass/benediktus/index.html.

Please submit information for events and competitions at least six weeks prior to the magazine’s publication date (January 15 for the March issue).
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The JOMY Safety Ladder Co. proudly introduces the Mini-JOMY, a scaled down version of the JOMY Safety Ladder, especially designed for residential & light commercial applications. The Mini-JOMY looks like a drainpipe but folds out to a 17” wide ladder with slip resistant rungs constructed of extrud ed anodized aluminum & stainless steel. The Mini-JOMY is maintenance free & will last the lifetime of any building. Call 800-255-2591 for additional information.
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Catalog of Roofing Publications & Audiovisuals
The National Roofing Contractors Association has more than 90 roofing-related products, including the 1,858-page NRCA Roofing and Water-proofing Manual-Fourth Edition and the NRCA Construction Details on CD-ROM in .DWG and .DFX formats. For a free catalog, contact NRCA Marketing Services. 10255 W. Higgins Road, Suite 600, Rosemont, IL 60018, (800) 323-9545.

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**A New 1998 Catalog From Sternberg Vintage Lighting**

This 80-page full color catalog is packed with about 500 individual product photos and shots of installations of all types. There are new fixtures, ornamental poles, new bollards, a new fitter and more information to help specifiers choose the right product and options for a specific project. Sternberg celebrates their 75th anniversary in 1998. It is an employee owned company with all products manufactured in their Niles IL plant.

*Sternberg Vintage Lighting*

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1998 Catalog

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Investigative structural/architectural firm specializing in the evaluation and restoration of structures seeks a licensed Architect with 5+ years experience. Candidate must be proficient with AutoCAD R14 and have organization, technical and managerial skills to produce construction drawings. Please mail or fax resume to Steven E. Adams at Raths, Raths & Johnson, Inc., 450 Sibley Str., Ste. 501, La Crosse, WI 54601, 608-784-4711 phone, 608-784-4904 fax, csssearch.com.

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UNIVERSITY OF VIRGINIA

Applications and nominations are invited for the position of Dean of School of Architecture at the University of Virginia. The appointment will be effective on or before July 1, 1999. The four depart­ments of the School of Architecture offer graduate and undergraduate degrees in architecture, architectural history, urban and environmental planning and graduate degrees in landscape architecture. In addition to these major fields, students may enroll in dual degree programs and interdisciplinary certificate programs in historic preservation and American urbanism. Approximately 560 students are currently enrolled in all departments. The fifty full-time and twenty-four part time members of the faculty reflect the commitment of the university to the highest levels of teaching and scholarship. Candidates should possess a record of excellence in scholarship or professional practice and credentials sufficient to qualify for appointment as a tenured professor in one of the departments of the School of Architecture; experience in leadership in an academic setting or comparable environment; a commitment to promoting gender, racial and ethnic equity; a capacity and willingness to support and represent the diverse disciplines within the School; and an understanding of and capability for resource development. Compensation is competitive and commensurate with qualifications and experience. Applications and nominations must be received by January 1, 1999 to ensure consideration and the review process will continue until the position is filled. The University of Virginia is an Affirmative Action/Equal Opportunity Employer. Submit applications and/or nominations, with a letter of interest, resume and references, to: William H. Sherman, Chair, Dean Search Committee, c/o Office of the Vice President and Provost, University of Virginia, P.O. Box 9014, Charlottesville, Virginia 22906-9014.

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FACULTY POSITIONS VACANT

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UNIVERSITY OF VIRGINIA

Applications and nominations are invited for the position of Dean of School of Architecture at the University of Virginia. The appointment will be effective on or before July 1, 1999. The four depart­ments of the School of Architecture offer graduate and undergraduate degrees in architecture, architectural history, urban and environmental planning and graduate degrees in landscape architecture. In addition to these major fields, students may enroll in dual degree programs and interdisciplinary certificate programs in historic preservation and American urbanism. Approximately 560 students are currently enrolled in all departments. The fifty full-time and twenty-four part time members of the faculty reflect the commitment of the university to the highest levels of teaching and scholarship. Candidates should possess a record of excellence in scholarship or professional practice and credentials sufficient to qualify for appointment as a tenured professor in one of the departments of the School of Architecture; experience in leadership in an academic setting or comparable environment; a commitment to promoting gender, racial and ethnic equity; a capacity and willingness to support and represent the diverse disciplines within the School; and an understanding of and capability for resource development. Compensation is competitive and commensurate with qualifications and experience. Applications and nominations must be received by January 1, 1999 to ensure consideration and the review process will continue until the position is filled. The University of Virginia is an Affirmative Action/Equal Opportunity Employer. Submit applications and/or nominations, with a letter of interest, resume and references, to: William H. Sherman, Chair, Dean Search Committee, c/o Office of the Vice President and Provost, University of Virginia, P.O. Box 9014, Charlottesville, Virginia 22906-9014.
Faculty Positions Vacant

University of Illinois at Urbana-Champaign
School of Architecture

The School of Architecture is seeking applications and nominations for four full-time, nine-month teaching positions to begin August 21, 1999. The School of Architecture is comprised of four teaching divisions (Design, Architectural Structures, Practice and Technology and History and Preservation) and a research division (Building Research Council). Individuals who can integrate knowledge from their specialty into design studios will be given highest priority.

The salary for these positions will be determined by qualifications and experience. Candidates must be highly motivated and dedicated individuals who can take advantage of the University of Illinois' resources which include one of the country's largest and finest university library systems and access to associated research programs and computer facilities. A Ph.D. program is in the final stage of development. All teaching positions will have other responsibilities to include research/creativity, committee assignments, and public service.

Although each position indicates specific qualifications, this does not preclude candidates with exceptional research, teaching, or scholarship qualifications from applying.

REQUISITE SUBMISSIONS: Please send a Letter of Application which should state clearly which of the positions you are seeking, a complete Curriculum Vitae, a brief Statement of Educational and Research Objectives and the Names of three referees. Short-listed candidates will be asked for examples of work.

POSITION 1: ARCHITECTURAL STRUCTURES DIVISION
One tenure track position at the Assistant Professor level.

RESPONSIBILITIES: Teaching responsibilities of 6 full time faculty in the division included 4 required courses in structural analysis and design to Junior and Senior B.S.A.S. candidates; 1 required course in structural planning to all two-year MArch candidates; and 7 required courses plus electives in advanced structural analysis and design to MArch candidates pursuing the Structures Option in the graduate program.

QUALIFICATIONS: Candidates must have 1) a MArch, MSAS, or MSCE degree and license to practice architecture or structural engineering; or a Ph.D with research experience related to building structures, and 2) the ability to teach undergraduate and graduate courses in the Structures Division and to participate in architectural design studio reviews.

POSITION 2 AND 3: PRACTICE & TECHNOLOGY DIVISION
Two tenure track positions at the Assistant Professor level.

RESPONSIBILITIES: Teaching responsibilities of the division include graduate and undergraduate courses and conducting research in their respective fields. Candidates for each position must show evidence of academic and professional and or research achievement in at least two of the following areas: 1) Building Materials and Constructions Technology; 2) Building Thermal Physics and Mechanical Systems; 3) Comprehensive Building Design with Design Integration; and 4) Architectural Practice and Management.

QUALIFICATIONS: Candidates must have 1) a MArch and professional registration or 2) a Ph.D in architecture, engineering, or related field with direct relevance for the position. Professional and teaching experiences are desirable and candidates should have the ability to participate in architectural design studio reviews.

POSITION 4: DESIGN DIVISION, COMPUTER APPLICATIONS
One tenure track or tenured position at the Assistant or Associate Professor level.

RESPONSIBILITIES: Teaching responsibilities include one design studio course each semester, a lecture/seminar course, and participation in design reviews. Ability to teach courses in technology or architectural theory is also desirable. Candidates must be able to demonstrate significant experience using computer applications in architectural design. Candidates are expected to be able to demonstrate their potential to be leaders in the field of computer-based design applications. Candidates must have knowledge of a wide range of computer graphics and three dimensional modeling software and operating platforms including Macintosh, PC and Unix environments. Individuals who are able to 1) integrate computer control into design studio learning, and 2) integrate design issues with building technology will be given highest priority.

QUALIFICATIONS: Candidates must have 1) a MArch and professional registration or 2) a Ph.D in architecture. Professional experience and teaching experience is required.

To receive full consideration applications must be received by January 15, 1999. Direct submissions and inquiries to:

R. Alan Forrester, Director
School of Architecture
(identify which position number and Search by name here)
University of Illinois at Urbana-Champaign
611 Taft Drive
Champaign, IL 61820-6921 USA
Tel: 217-333-1330
Fax: 217-244-2900
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Responsibilities include teaching, scholarship, and administration. Candidates should have a Ph.D. or equivalent degree in a relevant field and a demonstrated ability to engage in scholarly research and writing. Experience in teaching is also required.

Applications are accepted from all qualified candidates, including women and minorities. Applications should be submitted by December 1, 1998, to:

Professor Mary Woods, Chair
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CIRCLE 60 ON INQUIRY CARD
In 1999, we won’t be living on the moon. But that hasn’t stopped some architects from trying.

BY TED KATAUSKAS

Remembering Space: 1999, the sci-fi series from my youth, which supposed that by next year, people would be watching soufflés rise in lunar gravity, I recently telephoned Wendell Mendell. I wanted to ask the unofficial “Father of Lunar-based Concepts” at the Johnson Space Center in Houston where things stood, design-wise, with NASA’s version of Moonbase Alpha.

“I could run around my office and find some lunar base designs,” said Mendell, who, despite lacking a mandate or much funding from Congress or NASA, has been doggedly husbanding the design of a manned lunar outpost for the past 16 years. “But these were all done by university architecture students who needed a project to work on.” As long as NASA’s resources are tied up in the design of the International Space Station and the space shuttle operations, it appears that Mendell’s moonbase will remain an academic project.

Two weeks later, I received a bulging manila envelope. Inside were nearly 200 pages of schematics, drawings, and text relating to a moonbase project called Genesis (see drawings). Included in the package was everything from stress equations for spheres, toruses, cylinders, and cones to sketches of low-gravity furniture and a laundry room, along with plans for a kitchen equipped with a range and convection oven (perfect for soufflés). There was even a colorful treatise on lunar hygiene, which noted that in an enclosed environment “objectionable body odors can quickly build without adequate personal hygiene facilities” and that “good grooming can enhance self-image, improve morale, and increase productivity.”

Genesis was designed by 20 undergraduate and graduate students at the Center for Architecture and Planning Research at the University of Wisconsin, Milwaukee, one of four architecture schools that participated in the NASA-funded Advanced Design Program in Space Architecture from 1989 to 1995. One of the students was Janis Huebner-Moths, whose father had designed rocket equipment for NASA in the Mercury days and instilled in his daughter a love for all things space-related. When she heard that architecture students at the University of Wisconsin were designing a moonbase for NASA, she filled out an application.

John Connolly, one of Mendell’s supporters at the Johnson Space Center’s Exploration Programs Office, the agency’s long-range-planning operation, was the NASA official flown out from Houston to critique Genesis. “Architects were the first to breach NASA’s engineering barrier,” Connolly says. “When we look beyond Earth’s orbit and start talking about space stations and moonbases, we’re talking about something entirely out of the engineering ballpark and more into the experience-base of architects.” Ten years ago, architects at NASA were a curiosity; now we don’t think there’s anything odd about them.

Ted Katauskas is a freelance writer in Portland, Oregon.